PAPER A

General Instructions

Paper A has two parts:

- **Part A** requires you to prepare a full patent specification and drawings based on a hypothetical invention and prior art.
- **Part B** consists of one question related to the subject matter of Part A that requires a written answer.

You will be provided with the following materials during the examination:

- Instructions and mark breakdown, also reproduced below.
- A narrative describing the invention in the inventor's own words, including prior art and invention illustrations for reference.
- A set of three invention drawings for labelling in accordance with your specification.
- The *Patent Act* and *Patent Rules*.

Instructions for Part A

You have been approached by an inventor with an invention that she would like to patent. She has provided you with an invention disclosure form that explains her invention in her own words.

The inventor wishes you to prepare a Canadian patent application for her invention. The inventor has also provided a set of drawings already prepared by a technical artist for use in the application.

On the basis of the information and documents provided by the inventor, prepare the specification and drawings of a Canadian patent application in accordance with the following instructions.

1. You are required to prepare the specification and drawings only. The petition and other such formal parts of an application are not required.
2. Assume that there is no more relevant prior art aside from what is mentioned by the inventor.
3. Do not import your own knowledge of the subject matter into your analysis and preparation of the specification.
4. Your description and claims must be compliant with subsections 27(3)-(5.2) and sections 28.2 and 28.3 of the *Patent Act*, and with sections 46, 51, 52, 56, 57 and 60-63 of the *Patent Rules*.
5. You have been given a set of drawings to be used in preparing the application. You may use some or all of the drawings as you consider appropriate to illustrate the invention. If you choose not to use a particular drawing, do not insert any labels in that drawing. If you do wish to refer to a particular drawing, you must ensure that you have numbered that drawing and labelled it with a figure number. Each drawing is also marked up with lead lines that can be labelled with reference numerals in accordance with the *Patent Act* and *Patent Rules*. If you determine that certain lead lines are unnecessary for the purpose of illustrating the invention, you may ignore those lead lines and leave them unlabelled.
6. Marks for the description are awarded in part for appropriate terminology and organization as well as completeness, accuracy, and inclusion of alternative embodiments where appropriate. Since the inventor lacks patent training, the terminology, structure, and organization of the inventor's description of her own invention may not be appropriate for a patent application.
7. Your specification must include the following claims:
    a. A first **independent claim of the apparatus type**.
    b. **Four dependent claims** for the above independent claim.

c. A second, **commercially relevant, independent claim of any type** you choose (e.g., art, process, method, use, machine, apparatus, device, system, assembly, manufacture, kit, product, composition of matter, compound).

8. All claims must recite novel and inventive subject matter. The independent claims must be drafted as broadly as possible while still meeting the requirements for patentability under Canadian law, when construed in accordance with the rules for purposive construction applied by Canadian courts. However, you **may** ignore the requirement for unity of invention in subsection 36(1) of the *Patent Act*.

9. Marks will be given for only the first four dependent claims. Additional dependent claims will **not** be marked.

10. Marks for the dependent claims are based in part on the strategic, legal and/or commercial significance of their subject matter. For example, dependent claims that further distinguish the claimed invention from the prior art may be allocated more marks than dependent claims that describe known subject matter.

11. Marks for the second independent claim are based in part on the strategic, legal and/or commercial significance of their claimed subject matter.

Instructions for Part B

Answer the question provided in complete sentences. Citations to legal authorities (case law, statutes, regulations) are not necessary and will not be marked.

MARK BREAKDOWN

Part A – Patent Specification			
Claims			
Claim 1 - independent			40
Claim 2 - dependent			2
Claim 3 - dependent			2
Claim 4 - dependent			2
Claim 5 - dependent			2
Claim 6 - independent			12
		Subtotal	**60**
Description			
Title	1	Description ("summary") of invention	3
Technical field	1	Brief description of the drawings	2
Background art	3	Description of preferred embodiments (including reference to drawings)	24
		Subtotal	**34**
Part B – Short Answer Question			
First concern			3
Second concern			3
		Subtotal	**6**
		TOTAL	**100**

PART A

Patent Drafting Question (94 marks maximum)

INVENTION DISCLOSURE FORM

1. WHAT IS THE NAME OF YOUR INVENTION?

Novel Fruit Picking Canvas Bag

2. WHAT PROBLEM DOES YOUR INVENTION SOLVE?

My invention solves the problem of having a useful, expandable fruit picking bag.

3. HOW DID YOU DEVELOP YOUR INVENTION?

As a kid growing up, I worked on my family's orchard. As I got older, I worked with the seasonal staff picking tree fruit such as apples, pears, peaches which are harvested by hand. Working in the orchard we wore picking bags that were typically made of canvas or another heavy-duty material which we slung over our shoulders with a harness or straps.

We also operated a "U-pick" operation on Wednesdays at the orchard, during which members of the public could pay to pick fruit from our trees. We let our U-pick customers use our picking bags. Figures A-C illustrate the picking bags we used at the orchard.

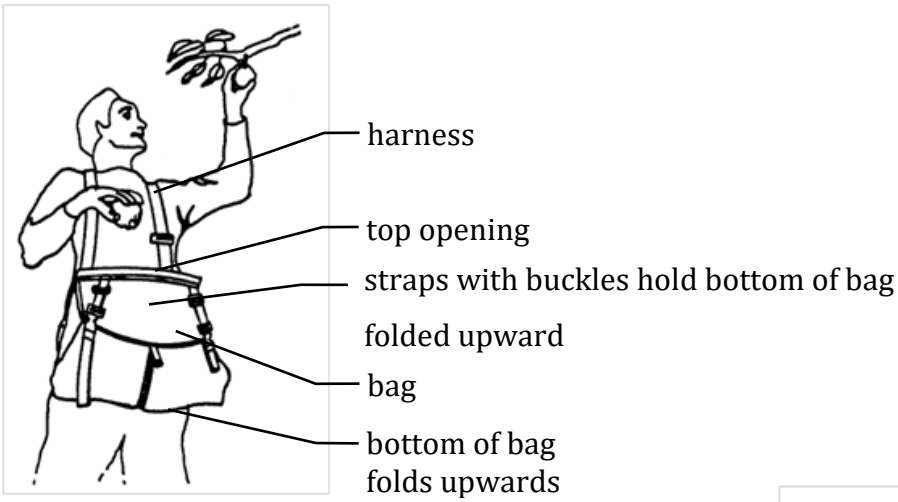


Figure A. Picking fruit with the picking bag.

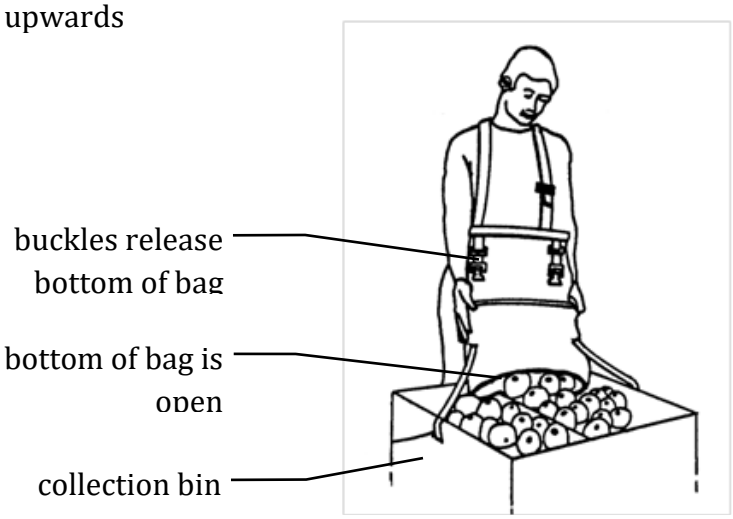


Figure B. Dumping fruit through the bottom of the bag.

These bags were tubular, having an opening at the top and the bottom. You would hang the bag from your shoulders with the harness or straps, and close up the bottom. The bag was held in a closed configuration, shown in Figure A, by folding the bottom of the bag upward and then securing the fold with buckles. The fold provided a temporary bottom to the bag to contain the fruit. You would pick fruit and add it to the bag through the opening at the top. When the bag was full, the buckles holding the bag closed were released, causing the bag to unfold. The fruit could then roll out the open bottom of the bag onto a table or into a collection bin as shown in Figure B. Figure C shows the bag in more detail.

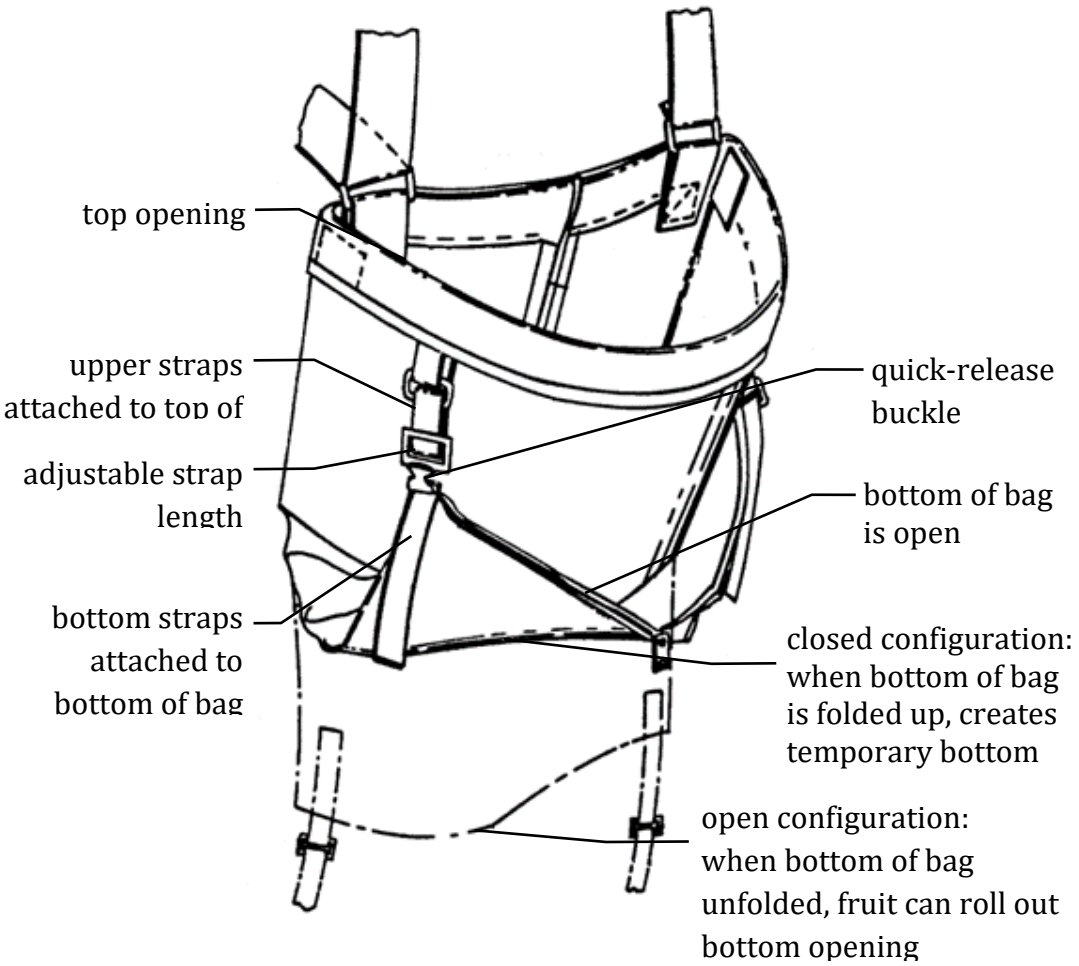


Figure C. Detailed view of fruit picking bag.

My family always talked about how the buyers in the fruit industry insisted that each piece of fruit be completely bruise-free. Fruit that was even slightly bruised or blemished was worth only a fraction of fruit that was perfect in appearance. Our pickers had to be really careful as most bruising of fruit occurs as it is being picked.

A common problem with fruit picking bags was that when you dropped the fruit into the bag, the fruit falls a certain distance before reaching the bottom of the bag. As picking continues each subsequent piece of fruit can hit the prior pieces of fruit placed into the bag. The impact as fruit fell into the bag created a risk of bruising the fruit.

The buckle bags illustrated above were relatively shallow. Since they were shallow, the fruit did not have to fall far to reach the bottom of the bag. That did help avoid bruising, but we

found that the pickers had to come back to the collection bins to empty their bags very frequently. This reduced productivity since they wasted time walking back and forth instead of picking fruit.

We tried increasing the capacity of the bag in the closed configuration by lengthening the straps on the bag to make the bags deeper when closed. As you can see in Figure C, the buckles allow you to adjust the length of the straps holding the bag closed. However, we could not increase the capacity very much in this way, since the bag itself was not very deep.

We also tried using a second kind of bag that could carry a larger volume of fruit. This other bag is shown in Figures D-F.

This bag was also a tube that folded up to create a temporary bottom. However, this new bag used a cord and knot system along with hooks located at either side at the top edge at the bag and a hole reinforced by a grommet at either side of the bottom edge of the bag. Two cords were threaded through the grommets and knotted at either end.

To close the bag, while you were wearing it, you would pull upward on the cords at the upper end to cause the bag to fold up. The knots at the bottom end prevented the cords from sliding out of the grommets. You would then hitch the cords on the hooks attached near the top edge of the bag. The knots at the upper ends of the cords kept the cords from sliding out of the hooks. You could then fill the bag and it would stay folded closed at the bottom.

To empty the bag, you would lift the upper end of the cord out of the hook, then lower the cords. This would allow the bottom part of the bag to unfold, so the contents could drop out the bottom into a collection bin.

Figure D. Wearing the second bag design.

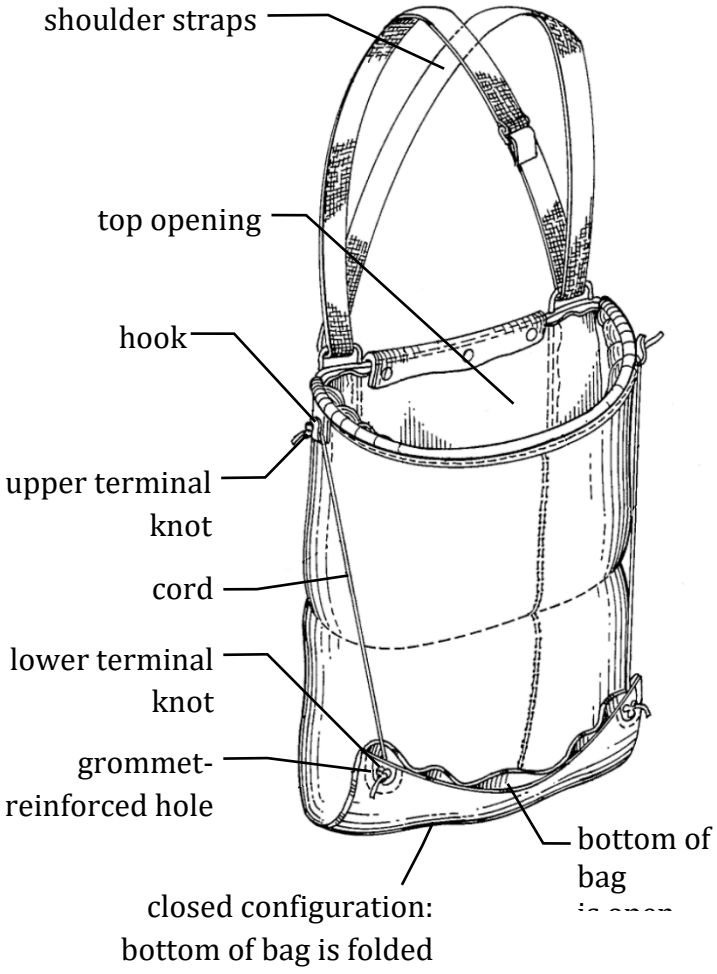


Figure E. Detailed view of the second bag design when closed.

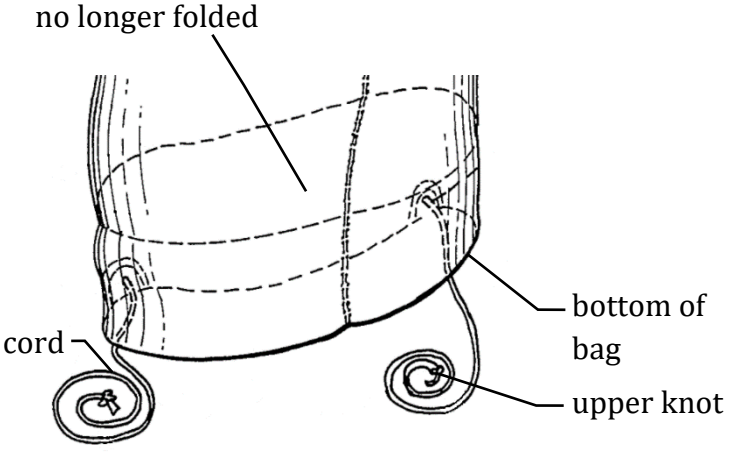


Figure F. Detailed view of the bottom portion of the bag when open.

The cord was long and the bag was deep, so the pickers were more efficient as they could empty their bags less frequently. But more bruising occurred because the fruit had to fall a longer distance to the bottom of the bag.

One summer, maybe five years ago, I tried making a simple alteration to this bag. I tried adding an intermediate knot (shown in Figure G) around the midway point on the cords. The idea was that when the pickers were first heading out to collect the fruit that they would hang the cords from the hooks using the intermediate knot to hold the cords in place, instead of using the terminal knot at the upper end of the cord. This made the bag fold at a higher point, effectively changing the depth and initial volume of the bag so that fruit didn't have to fall as far. As the bag filled up, the picker was to raise the cords out of the hooks, allow the cords to slide through their hands until they reached the upper terminal knots, then replace the cord in the hooks with the upper terminal knots behind the hooks to hold the cords in place. I thought that this action would increase the volume of the bag, enabling the pickers to continue to pick more fruit while maintaining the bag in the closed state. The fruit that was already picked would remain at the bottom the bag.

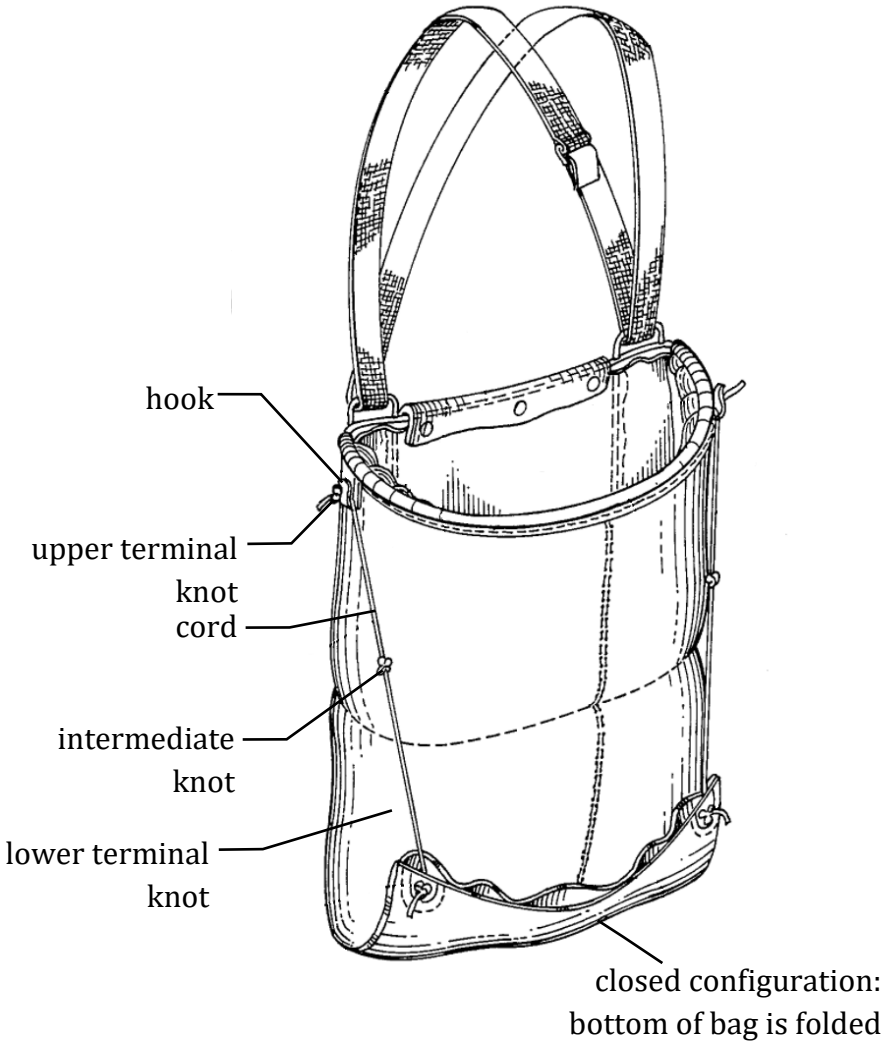


Figure G. Second bag design with intermediate knot

Unfortunately, due to the weight of the fruit already in the bag, this was difficult to do even for experienced pickers. Shifting the knots often resulted in losing a grip on the cord, causing the bottom of the bag to open and spilling fruit onto the ground. It was even worse for our U-pick customers who tried using this altered bag.

I tried to make other little changes, like adding handles to the ends of the cords, but it made no difference: it was too difficult for the pickers and our U-pick customers to adjust the depth or capacity of the bag while in use and holding fruit. The same was true with the original bag we used (Figures A-C): you could not adjust the length of the straps while

actually carrying fruit in the bag, because you could not adjust the length while there was weight pulling on the straps.

This was a constant frustration for my family over the years, but no one could come up with a better idea of how to adjust the volume of the bag to reduce the distance the fruit had to fall into the bag to reach the bottom to avoid bruising while actually carrying fruit in the bag at the same time.

I am now at university pursing a degree in engineering, but I often think about the problems with the picking bags. This past summer, during my last co-op term at school, I had the chance to work at the Nabisco® commercial plant where breakfast cereals and snack foods were made.

One day I was working on the plant floor and noticed some of the large bulk bags suspended on a forklift. It caught my attention because it reminded me of my days picking fruit in the orchard. I watched the entire assembly line process of the bag being filled and transferred through the plant. An example of the bulk bag is shown in Figures H and I. The bags had openings at the top and bottom and were made of flexible material. When the bag was empty, it was scrunched up, with layers of the bag material folded and bunched together. However, when cereal was loaded into the bag through the top opening, the bag expanded. It seemed that the weight of the cereal caused the walls of the bag to stretch and increase in height, gradually increasing the volume of bag as more cereal was added.

The filled bags could be transferred by a forklift lifting the bag by straps attached to the top of the bag. Once the bag reached its destination in the plant, the bag was emptied.

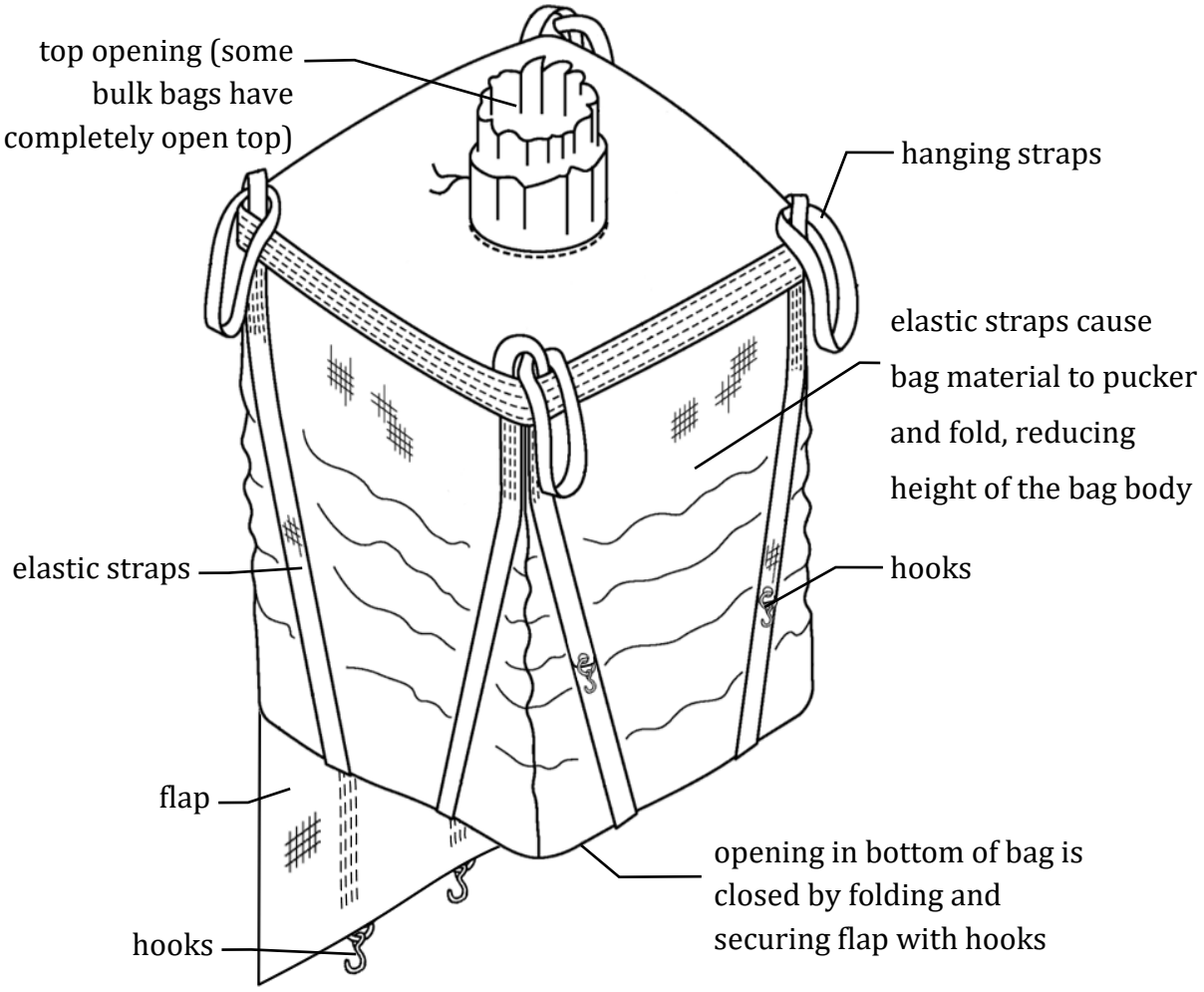


Figure H. Bulk bag when open.

The bottom opening of the bag was blocked by a flap that extended downwards from one of the side walls of the bag. This flap was simply folded over the bottom opening and up the opposite side and held in place by some hooks at the end of the flap, which connected to some corresponding hooks higher up on the opposite side of the bag, as you can see in Figures H and I. To empty the bag, you released the hooks and allowed the flap to fall open, revealing the bottom opening.

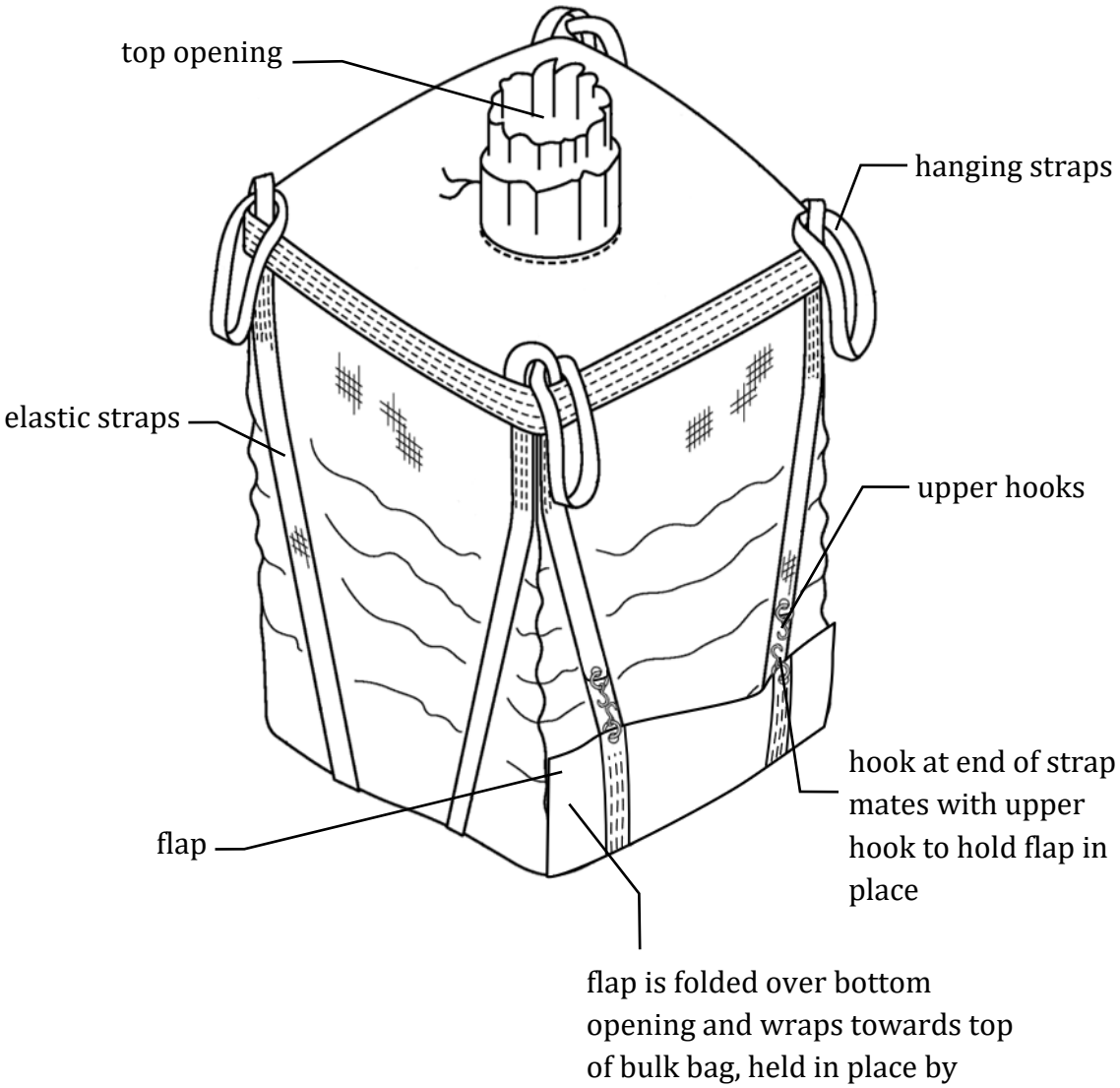


Figure I. Bulk bag when closed.

I asked my supervisor about the bag, and he said the bag itself was made from heavy duty flexible nylon fabric. He told me that there were elastic straps attached to the side walls of the bag. My supervisor explained that the elastic portions on the side of the bag behaved like an elastic waistband in clothing. When the elastic of a waistband is relaxed, it is shorter than the fabric to which it is attached. This causes the fabric to bunch up in gathers when the elastic is relaxed. When the elastic is stretched the gathers disappear and the fabric becomes flatter. The elastic can be stretched as far as the fabric allows, so the maximum stretch is determined by the attached fabric. Similarly, the elastic attached to the side walls of the bulk bag gathered the side walls into a series of folds when the elastic was relaxed.

When the bag was at rest with nothing inside it effectively had a small volume. But as the weight of the contents within the bag increased, the force of gravity caused the elastic to stretch. The side walls extended and the folds opened up, increasing the volume of the bag. My supervisor mentioned that this type of bulk bag was used for a variety of foods that required careful or delicate handling. As food is added through the top of the bag, it does not have as far to fall before it comes to rest.

At that exact moment, I knew how to improve the fruit picking bags. The next time I went home I went to the local hardware store and purchased some bungee cords. A bungee cord, also referred to as a shock cord, consists of one or more strands of an elastic material, usually rubber, covered by a fabric covering, like cotton or nylon. The elastic core and the fabric covering are attached together at the ends. The bungee cord stretches when tension is applied. These cords had a hook attached at either end and are typically used to tie down loads on trucks and secure tarps and tents.

I grabbed that old picking bag with the cords (Figures D-F) and replaced the cords with two bungee cords. I used the hooks at either end of the bungee cord and slid one into the hook at the top of the bag and one into the grommet at the bottom of the bag.

I threw my old picking bag on over my shoulder and started throwing things in from around my house to simulate the adding of fruit. The bungee cord did exactly what I hoped. It allowed the bag to slowly lengthen as I added more volume to the bag, while still keeping the bottom of the bag folded. The fold just sort of moved downward toward the bottom end of the bag, gradually increasing the volume of the bag.

The experiment wasn't a complete success. When the bag got too heavy the bungee hook slipped out of the grommet and flew out with great force and gave me a huge bruise on the arm. I needed to figure out a better and safer attachment mechanism, but the basic concept worked.

4. DESCRIBE YOUR INVENTION IN DETAIL

My invention is essentially an improved fruit picking bag. Like the first and second fruit picking bags I described above with reference to Figures A-C and D-F, it is basically a tube of

flexible material, like canvas like the old fruit picking bags. The top and the bottom are open. You suspend it from your shoulders using a harness or a set of straps that are just made out of common, heavy-duty webbing.

The attached Figures 1-3 show my fruit picking bag in action. Figure 1 is when the bag is empty prior to adding any fruit. Figure 2 is when the bag is partially loaded with some fruit. And Figure 3 is when the bag is fully loaded.

The picking bag can be made from cotton canvas, which is the traditional material for such bags, but really it can be made from any woven or non-woven fabric as long as it is durable. For best results and longer lifespan it should be treated for water resistance, for example a waxed cotton canvas. Or, it can be given a coating of a water resistant or waterproof substance like polyurethane or latex (natural or synthetic), or it can have a waterproof liner, like vinyl. I have seen all these materials used in old fruit picking bags. Ideally, I would want to use the Cordura® brand of nylon because it is really durable: it resists abrasion, has high tear strength, and is waterproof. However, it is more expensive.

The version of the bag shown in Figures 1-3 is basically a retrofit of the old fruit picking bag of Figures D-F.

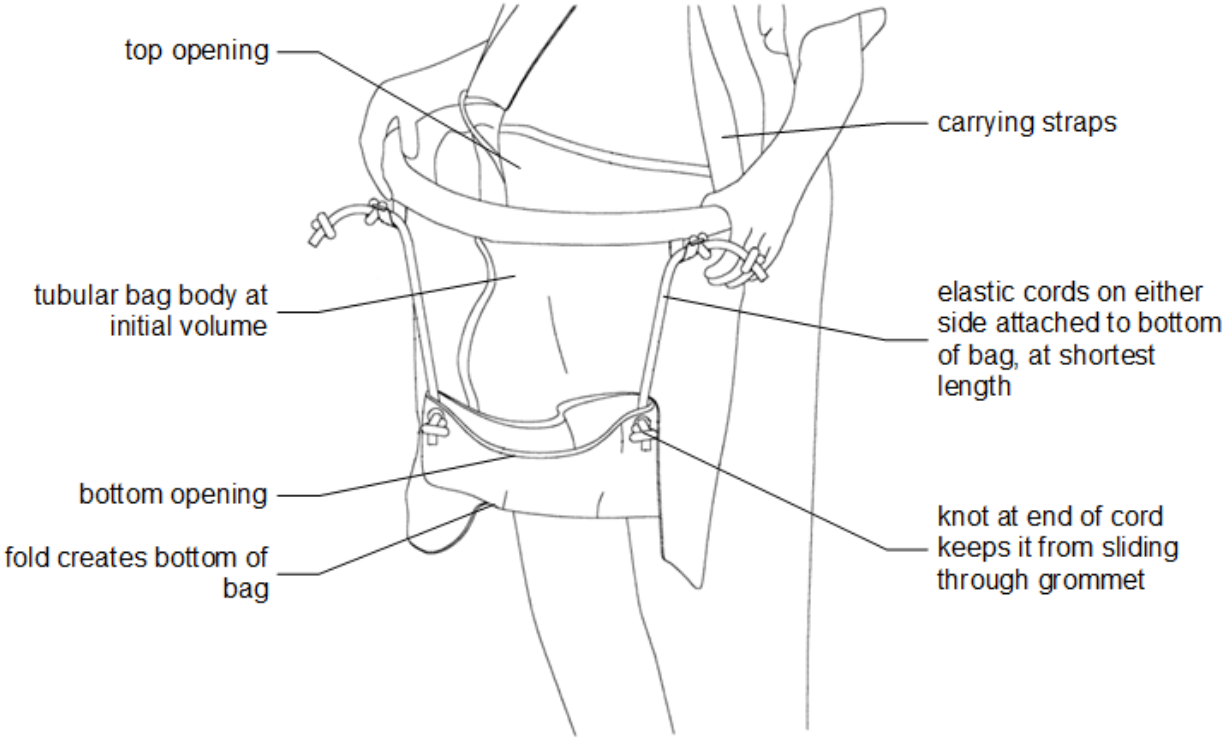


Figure 1. My new fruit-picking bag, when the bag is empty.

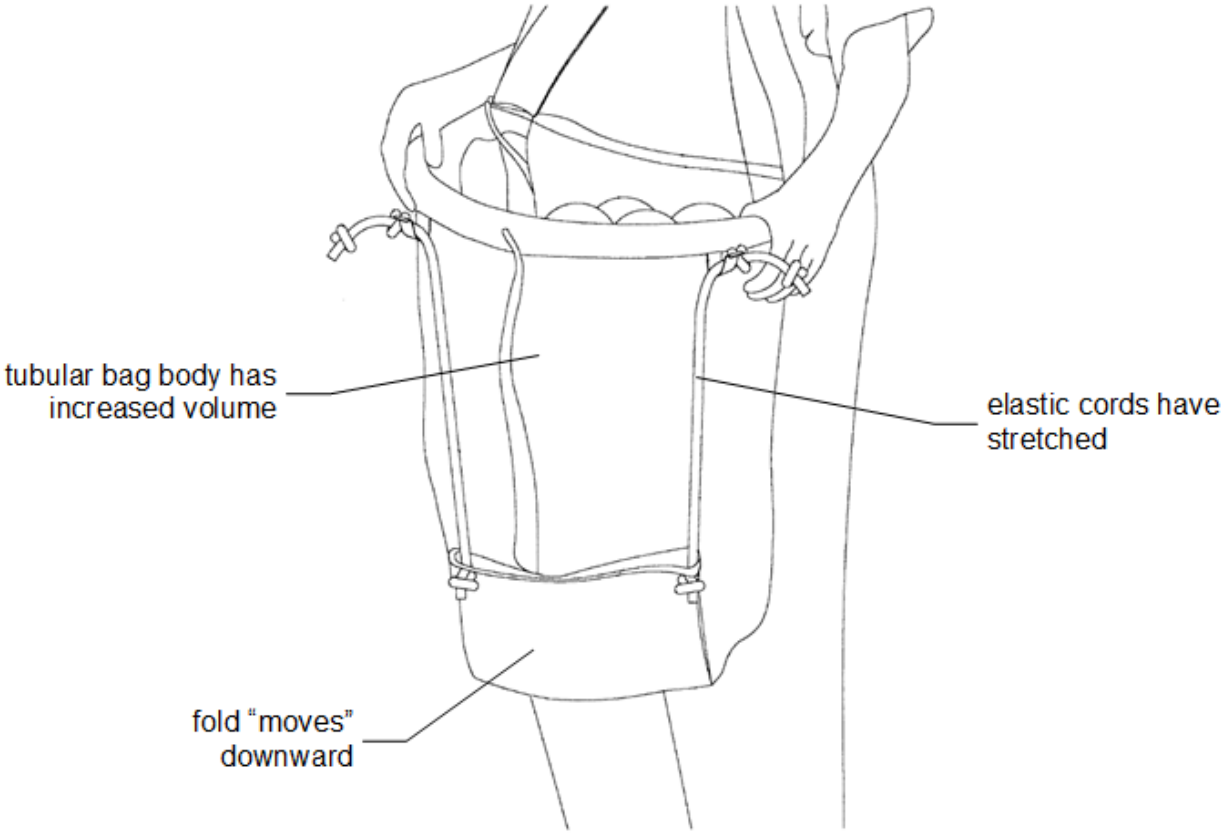


Figure 2. My new fruit-picking bag, partially loaded.

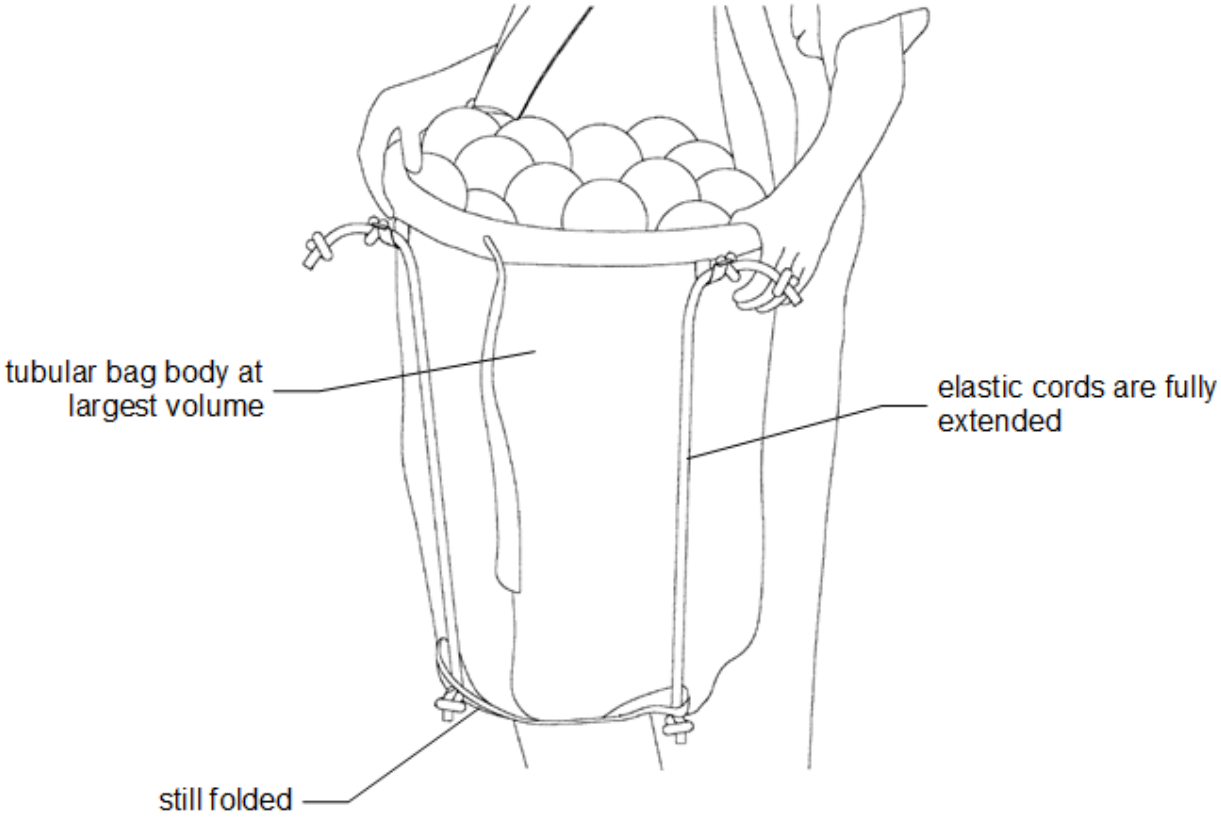


Figure 3. My new fruit-picking bag, fully loaded.

The bungee cords (with the hooks removed) are knotted at one end and are threaded through the bottom grommets or eyelets on the bottom of the bag. The terminal knot is big enough to prevent the cord from sliding out. I suppose something else could be attached instead of just a knot, something bigger than the grommet or eyelet. In my prototype, the knots also helped hold the elastic core and fabric sheath of the cord together. The cords could also be secured at the bottom of the bag with heavy duty stitching, instead. An epoxy or thermal fusing would work as well, if the cord and bag were made of the right kind of material. However, permanently attaching the cords at the bottom prevents you from exchanging them for different cords.

The other end of the cords, the upper ends, are also knotted. When the bag is worn, the cords are pulled upwards in front of the wearer, causing the bottom of the bag to fold up in the closed configuration. The upper ends of the cords are then laid in holders attached to the top of the bag to hold the cords in place. I have been using hooks just like on the old fruit picking bags, so the upper ends of the cords run from front to back. The upper terminal knot is positioned on the back side of the hook. That way, the cord is prevented from slipping out of the hook. This holds the bag in the closed configuration. This is what you can see in Figure 1.

When the picker starts their day of fruit picking, the length of the bag is short, as shown in Figure 1. The volume of the bag or container at this stage is its smallest volume. As the picker picks the fruit, each piece of fruit is placed into the bag. After a first period of time, the bag is not filled to capacity yet. The cords have stretched, effectively lengthening the bag because the fold at the bottom of the bag will “move” downwards. This increases the volume so it is now greater than the initial volume. This is shown in Figure 2. The user continues to pick and place the fruit into the bag, and the length of the cords and the bag continues to increase. Eventually, the bag reaches a final state where the bungee is fully extended, the bag is fully loaded and is still folded with a smaller fold, so it remains closed. This is shown in Figure 3.

To empty the bag, the picker returns to the fruit emptying station and positions the bag over an emptying table or bin such that the bottom of the bag is resting on a surface. This can be a table surface or other fruit in the bin. The picker then grips the upper terminal

knots of the cords, and lifts the cords up and out of the hooks. They move the cords forward to gently unfold the bottom of the bag, allowing the fruit to be dumped out the bottom opening. Once the fruit is emptied from the bag, the bag can be closed again as shown in Figure 1. It is now ready to be filled with fruit once again.

Because the natural rubber in commercially available bungee cords has the ability to be extended while also being resilient (the ability to regain its original shape after being extended), these bungee cords generally work well, as long as they are chosen correctly.

Different bungee cords have different tensile strengths (the ability to be extended under load without breaking), and need to be selected depending on the type of fruit to be picked. A less dense fruit requires a bungee cord with less tensile strength which usually means a smaller diameter bungee cord so that the cord will stretch the right amount. A denser fruit requires a cord with more tensile strength. The bungee cord must not stretch too far under the weight of the fruit, either. It is actually very easy to choose the right tensile strength. It is a simple matter to test different diameter cords with a weight in the bag.

I tested a variety of different commercially available bungee cords and have found that the best ones had a core of a specially formulated thermoplastic elastomer (TPE), such as a thermoplastic rubber polymer tubing manufactured by Kent Elastomer Products, Inc. of Kent, Ohio, U.S.A., and specifically of the “K2000” series work best. I believe this is because TPE exhibits high flexibility, even in colder temperatures, has excellent grip characteristics, is resistant to sunlight, ozone, and maintains its original length, even with repeated use. Alternatives such as natural latex rubber or other elastomeric blends will also work. It is important that the material be elastic. An elastic material does not merely stretch when force is applied; it also returns to its original dimensions when the force is removed. I suspect that any kind of elastomer, natural or synthetic, would probably work just fine as long as you chose a resilient elastomer that is strong enough to carry the weight of the fruit you are picking, but stretchy enough to stretch to the desired depth when the bag fills up.

The sheath of the bungee cord is preferably made from a non-elastic fiber or material that is braided around the core in a manner that allows the sheath to stretch and retract along with the elastic core, even though the fibers of the sheath itself do not stretch. It seems that

any kind of natural or synthetic fiber works as long as the sheath and fibers remain supple and have a long life without becoming brittle, especially under outdoor temperature extremes. Most existing commercial bungee cords are made this way.

5. LIST THE ADVANTAGES OF YOUR INVENTION

My invention does what I said above. It provides a hands-free way to adjust the depth of your fruit picking bag.

My invention also maximizes profitability because it reduces the “downtime” involved in going back to the collection bins to empty shallower bags.

When testing out my field protype in the orchard, I found an additional benefit of using the bungee cord. Since the bungee is elastic, it stretches slightly and then bounces back as you walk with the picking bag. This stretching action seemed to provide some cushioning and helped to avoid bruising of the fruit when walking between trees or to the collection the bin.

You can also unload the bag from the top, not just the bottom. I realized this when I went to the local fair this past summer and saw one of the games where you try to knock over a target with a baseball. A user could load the bag with baseballs or toys, or some other item to hand out. The cords will start stretched out, like Figure 3 above. As the user reaches in and removes the items, the weight of the contents decreases, and the cords will start to retract and the bag will become shallower as the fold “moves” upwards, pushing the remaining items upwards, as in Figure 2 and then Figure 1. Therefore, you do not need to reach very far to pick up the next item, because they are being pushed upwards. Without my invention, you’d have to reach down to the bottom of a deep bag to get the last items out of the bag.

I plan to manufacture my improved bags in Canada and sell directly to orchards and farms, but I do not think that will happen for a couple of years because I need to raise funds first. In the meantime, I can get started by selling retrofitted bags of the type shown in Figures D-F, and also sets of elastic cords for retrofitting such bags. The sets of elastic cords can have different tensile strength, so the users can customize their bags for different weights. I also

think my invention will be useful for other businesses, like amusement parks and fairs, so I am going to find a distributor who can help me sell to those markets.

Currently, there is one dominant supplier of fruit-picking bags on the market, Orchard Supply Co. Their bags work similarly to those in Figures D-F, although they are not quite the same as Figures D-F. For example, some of their styles have a closed bottom. They are the most popular brand because their bags are made of premium materials and available in trendy colours, but they are competitively priced because they purchase all their goods from an offshore manufacturer. I want to make sure that I am protected against them, because I'm sure this is the kind of innovation they would want to copy.

6. DESCRIBE ANY VARIATIONS OF YOUR INVENTION

It is possible to remove the knotted bungee cords from the bags by untying the knots, but it is difficult to do. Instead, the bottom ends of the cords can be attached to carabiner clips, or similar clips that are metal loops that can be opened and closed with a spring latch. The clips can be easily attached and removed from the grommets at the bottom of the bag, and it is much safer than the hooks in my original prototype. This makes it easy to change out the cords for a different pair. Also, some users may find it easier to open the bag over a collection bin by releasing the clips from the grommets at the bottom of the bag, rather than lifting the top ends of the cords out of the hooks.

I tried using a single elastic cord instead of two, but it did not work because it did not maintain a fold in the bottom of the bag.

PART B

Short Answer Question (6 marks maximum)

The inventor questions the value of including the second independent claim in her patent application. Provide two brief and distinct explanations why the subject matter of your second independent claim is legally, commercially, or strategically desirable or valuable, discussing two of the following:

- patentability or patent validity
- patent infringement
- claim construction

Your answer must clearly identify each distinct legal, commercial or strategic concern and the legal rule or principle giving rise to that concern, and explain how your second independent claim addresses that concern.

Part A – Patent Specification

INDEPENDENT APPARATUS CLAIM 1

Example claim:

1. A bag (1), comprising (1):
   - a body (1) of flexible material (2) having a top opening (2) and a bottom opening (2);
   - a plurality (2) of elastic (2) support members (2) attached to the body at positions proximate to the bottom opening (2) and proximate to the top opening (2) to cause a portion of the body including the bottom opening to fold towards the top opening (3) to define a bottom of the bag for retaining contents received through the top opening (3), the elastic support members being detachable from the body at least at the position proximate to the top opening (2),
   - a length of each elastic support member being extensible between an initial length and a second length (4) while maintaining a fold in the body (3), a location of the fold in the body varying in distance from the bottom opening in response to the length of the elastic support member (6).

Claim Element	Requirements	Mark
A bag,	1 pt max for suitable preamble, e.g. a bag, a container, a chamber, a receptacle, a vessel. If a broader preamble is selected (e.g. "apparatus"), then 1 pt max if the claim does convey that the apparatus is for holding content. Must not be commonly understood to have rigid construction. For example, will not accept bin, crate, box, basket or other terms implying rigidity.	0 or 1
comprising	1 pt max for transitional phrase. Will accept: "including". Note: If "consisting of" is used, apply deduction for superfluous claim limitation.	0 or 1
a body of flexible material	2 pts max: 1 pt for the body, will accept other terms such as a tube or anything forming the main body of the bag. 1 pts for flexible or pliable nature of body; will also accept foldable, bendable. No marks for terms such as collapsible and expandible that do not imply flexibility, or terms that can be construed as including rigid side walls. The flexible/foldable nature of the body can be provided elsewhere in this claim.	0, 1,or 2
having a top opening and a bottom opening	2 pts max: 1 pt for top opening, 1 pt for bottom opening. Claim must recite two openings that are	0, 1 or 2

	distinguishable with one being at or near the top, the other at or near the bottom, but "top" and "bottom" modifiers not required (e.g., a claim could be written with reference to first and second openings located at respective first and second ends of the body). If term such as "tube" is used, assume that this has open ends unless must be construed to the contrary.	
a plurality of [elastic support members]	2 pts max for reciting a plurality of these elements. 1 pt if limited to two or a pair. Note deduction if claim encompasses one support member alone. Also note deduction in description if "plurality" is used, but there is insufficient support for an embodiment having more than two.	0, 1 or 2
elastic support members	2 pts for "elastic" or its meaning, or "resilient", given the definition provided by the inventor. No marks for other terms unless specification explicitly defines selected term as having the same meaning, or unless the elasticity is defined functionally (e.g., claim recites that the support member retracts to initial length when weight removed from bag).	0 or 2
attached to the body at positions proximate to the bottom opening and proximate to the top opening	4 pts max: 2 pts for indicating attachment of the elastic support members near the top opening or top end of the bag 2 pts for indicating attachment of the elastic support members near the bottom opening or bottom end of the bag Note deduction below if claim must be construed as having top or bottom attachment point exactly <u>at</u> the end or opening.	0, 2 or 4
to cause a portion of the body including the bottom opening to fold towards the top opening to define a bottom of the bag for retaining contents received through the top opening	7 pts max: 3 points for expressing that the bag folds upwards 4 points for expressing that a (temporary) bottom of the bag (i.e., to stop contents from passing through) is formed as a result Note: if bottom is construed to have a closed bottom that cannot be opened, apply deduction for superfluous limitation.	0, 3, 4 or 7
the elastic support members being detachable from the body at least at one position	2 pts max for expressing that the support members are detachable from or removably attached at least one position.	0 or 2

	Note deduction if the claim cannot be construed as permitting the support members to be detachable at the bottom position.	
a length of each elastic support member being extensible between an initial length and a second length while maintaining a fold in the body	7 pts max: 3 pts for expressing that the support members (which are elastic; marks already allocated above) extend or stretch between initial and second lengths. May be expressed in the context of weight, fullness of bag, holding volume or capacity (e.g., empty bag vs full bag, smallest vs largest capacity) rather than initial/second lengths. 4 pts for expressing that the fold or temporary bottom continues to exist. May be expressed in the context of the bag continuing to contain content.	0, 3, 4 or 7
a location of the fold in the body varying in distance from the bottom opening in response to the length of the elastic support member	10 pts max for expressing that the fold itself has moved with respect to the bottom edge. May be expressed by describing the amount of the bag that is folded in the final vs initial state, or final vs intermediate vs initial state; that the temporary bottom location changes with reference to the <u>end</u> of the bag. Note that merely reciting that the (temporary) bottom is in a different position may aptly describe the bulk bag, because its fold and its bottom are in a different position when the elastic straps stretch.	0 or 10
Claim elements with no impact on the marking		
No marks are awarded or deducted for including or omitting the following features: • a limitation of use that is not unduly limiting (e.g., for holding or retaining content, or a "holder" or similar general language for retaining the cords, as long as it must not be limited to a particular structure); note deduction for an unnecessary limitation such as for use in picking produce or fruit • straps, handles, or a harness for wearing/carrying the bag, unless additional characteristics are recited • a tubular or tube shape • reciting the effect of weight in the bag when the bag is suspended or worn, as long as the condition of being suspended/worn or a human body part is not an essential element (in which case deduct for unacceptable feature)		

• reciting that elastic support member can retract when weight is removed, as long as actual retraction not an essential element (in which case deduct for unacceptable feature) • reciting that contents can be released through bottom opening by releasing the elastic support members at an end, as long as actually opening is not an essential element (in which case deduct for unacceptable feature)	
Deductions for unacceptable features and other errors	**Deduction**
Reciting an unnecessary limitation of use (e.g., for picking produce or fruit): -5	
Essential element comprising a human body part or a requirement that the bag be suspended or worn to infringe the claim: -5	
Stretching of elastic support members when content added not limited to bag being in suspended condition: -3	
Recital of particular structure of support member (e.g., specific cord such as bungee cord): -5	
Support members are attached exactly the bottom or top of the bag or bottom/top opening: -5	
Claim encompasses a single support member (e.g., "one or more"): -5	
Support members are not detachable at bottom: -5	
Recital of method step: -5	
For any other superfluous claim limitation or element, each incident: -5	
For each incident of unclear language or inconsistency (e.g., antecedent errors): -0.5	
TOTAL INDEPENDENT APPARATUS CLAIM MARK (minimum 0)	**/40**

DEPENDENT CLAIMS 2-5

Only the first four dependent claims are marked. Claims are worth a maximum of 0.5, 1, or 2 marks depending on limitation value (extent to which the limitation usefully differentiates over the prior art). If more than one limitation is included in a claim, only the higher mark applies to that claim. Deductions are taken for any error to a minimum score of 0 for the claim.

Limitations worth 2 marks:

- more specific structure for the support member (e.g., elastic core and inelastic sheath);
- in this structure, there is a knot in the core and sheath which is the same knot that is retained to provide the attachment of the elastic support member to an upper portion of the bag.
- the elastic support member is a bungee cord.
- the bottom of the bag is permanently closed (since the baseball example will work with a closed bottom), unless bottom is defined as open in claim 1.
- use of carabiner clips or similar clips
- folded portion of bag is unfoldable/bottom of bag is openable by releasing the support members at the <u>bottom</u>

Limitations worth 1 mark:

- stitching, fusing, glue to attach the cords to the bag

- support members retract when weight/contents removed from bag
- selection of support member according to desired tensile strength, etc.
- support members providing shock absorbency (cushioning)
- if plurality of support members in claim 1, limiting plurality to two
- specifying that the bottom of the bag is open (e.g., the bag is a tube open at both ends)

Limitations worth 0.5 marks:

- folded portion of bag is unfoldable/bottom of bag is openable by releasing the support members at the top
- handle at end of support members
- any material selection (e.g., nylon, Cordura nylon, TPE)
- harness or straps
- tubular shape
- knots to attach support cords to bag
- any feature that is redundant in view of either independent claim or a dependent claim, e.g. reiterating another effect of a feature of an independent claim such as using an elastic cord, relative sizes of the bag above and below the fold (other than those listed above)
- limitation used for claim differentiation for independent claim
- a feature that should have been an element of the independent claim
- any other feature clearly in prior art fruit picking bags

Claim 2 (minimum mark 0; maximum 2)	**Mark**
Limitation value (0.5, 1, or 2 marks)	
Improper dependency deduction: -0.5 max	
Unclear language or inconsistencies: -0.5 max	
Claim 3 (minimum mark 0; maximum 2)	**Mark**
Limitation value (0.5, 1, or 2 marks)	
Improper dependency deduction: -0.5 max	
Unclear language or inconsistencies: -0.5 max	
Claim 4 (minimum mark 0; maximum 2)	**Mark**
Limitation value (0.5, 1, or 2 marks)	
Improper dependency deduction: -0.5 max	
Unclear language or inconsistencies: -0.5 max	
Claim 5 (minimum mark 0; maximum 2)	**Mark**
Limitation value (0.5, 1, or 2 marks)	
Improper dependency deduction: -0.5 max	
Unclear language or inconsistencies: -0.5 max	
TOTAL DEPENDENT APPARATUS CLAIMS MARK (minimum 0)	**/8**

SECOND INDEPENDENT CLAIM

This claim is worth a maximum of 12 marks. 4 marks are allocated to objective strategic value, and 8 marks are allocated for drafting a sound claim. Claims that are anticipated receive a score of 0. Other deductions are taken for any error to a minimum score of 0 for the claim.

Claim 6 (minimum 0 marks)	**Mark**
Objective strategic value Subject matter worth 6 marks: Method for retrofitting an old style fruit-picking bag with elastic members, Use of elastic members to expand and/or decrease a fruit-picking bag volume, Apparatus claim directed to an elastic member. Subject matter worth 4.5 marks: , Kit of elastic members of varying tensile strengths for use with bag, Kit of at least a pair of elastic members of the same strength for use with bag. Subject matter worth 3 marks: Kit of a bag + multiple sets of elastic members of varying tensile strengths, Closed bottom bag of similar structure to claim 1. Subject matter worth 1.5 marks: Method of unloading the bag from the top (e.g., closed bottom bag), Apparatus claim directed to same or similar bag with an additional feature not found in the prior art Subject matter worth 0 marks: Method of unloading a bag from the bottom, method of loading a bag; merely making, constructing or using anything falling within the scope of any of the other claims (e.g., a use claim that is actually use of the bag of the other claims, or a kit with components that form the bag of any of the other claims, but simply disassembled since the final assembly step is a trivial prior art step).	0, 1.5, 3, 4.5, or 6
Body Preamble must be clear and relevant (1 pt); Body of claim must be generally consistent with preamble (e.g., if preamble directed to something that appears to be system or apparatus, body should have moving or cooperating parts and an implicit rule of action or operation (e.g., not proper to recite elements of mere kit); if preamble appears to be written for article of manufacture, body should not include interacting parts or implicit action or operation; if written for single article, body should not have multiple articles) (1 pts, but cannot be awarded if preamble not clear)	0, 1 or 2
Essential elements Sufficient essential elements to patentably distinguish over prior art (i.e., to make the claim inventive) and to give effect to what the preamble/Part B purports the claim is about. For example, if claim is directed to a kit of at least two elastic members of the same strength without sufficient structural detail so as to distinguish over a prior art bungee cord as described by the inventor, the claim is obvious and possibly anticipated (describing that they are sized or configured in a manner compatible with a target bag is not helpful since the bag is not defined in the claim); or, if claim is directed to a	0 or 4

method of retrofitting but there is no clear step that pertains to a retrofit (e.g., without a step of removing original cords or buckles, adding holes, etc.) then the claim reads as though one were assembling a bag like that of the invention.	
Deductions	
If claim is anticipated (i.e., lacking novelty over a piece of prior art), then Body/Essential elements marks set to 0; candidate may only receive the Objective strategic value marks	
If claim encompasses non-working embodiment then Essential elements marks set to 0	
If claim can be written as dependent on any of the other claims, or vice versa: -3	
For each superfluous claim limitation, in view of preamble and explanation given in Part B: -3	
For each use of the same terminology as the other claims in a conflicting manner (an indefiniteness): -2	
For each incident of unclear language or other inconsistency: -0.5 (e.g., antecedent errors)	
TOTAL SECOND INDEPENDENT CLAIM MARK	**/12**

DESCRIPTION – PARAGRAPHS 56(1)(a) TO (d)

Minor typographical and spelling errors do not result in deductions unless the errors adversely impact clarity or impede reading the description. Deductions for this will be taken as lack of clarity (unclear or informal language) as set out below.

Element	**Requirements**	**Mark**
Title	1 pt for title that is consistent with description and claims as drafted, precise, but not overly limiting. **Deductions:** Any error (e.g., inaccuracy, overly narrow, inclusion of trademark, coined word or personal name): -1	0 or 1
Technical field	1 pt for technical field that is consistent with description / claims as drafted and useful for narrowing field of search to a subclass (neither too broad nor too narrow). Must pertain to both independent claims. For example, if claims are not limited to fruit picking bag, technical field that is limited to fruit picking is too narrow; no mark awarded. **Deductions**: Lack of relevance to one independent claim: -0.5	0 or 1

	Any other error (e.g. inaccuracy, too much information, e.g. claim language or inventive concept as discerned from description): -1 (minimum mark 0)	
Background art	3 pts max: 1 pt for generally identifying the prior art technology 1 pt for brief explanation of function or structure of prior art giving rise to problem to be solved (e.g., difficult to adjust capacity of a prior art bag such as fruit picking bag when in use) 1 pt for identifying or alluding to the problem to be solved (e.g., dropping contents into bag can cause damage or bruising if the capacity cannot be adjusted to reduce drop distance) **Deductions**: Referring to the invention as prior art: background section scores 0. Admitting any individual non-prior art features as prior art: -1, to a minimum mark of 0.	0, 1, 2, or 3
Description ("summary") of invention	3 pts max: 1 pt for statement that permits the reader to understand the technical problem to be solved 1 pt for statement that summarizes solution, consistent with first independent claim 1 pt for statement that summarizes solution, consistent with second independent claim Consistory clauses not acceptable unless it meets the requirements above	0, 1, 2 or 3
Brief description of drawings	2 pts max for correct description of views of selected figures, correctly and sequentially numbered, using terms consistent with description/claims. **Deductions:** For each of the criteria above not met: -1, to a minimum mark of 0.	0, 1, or 2
Sub-total before description of embodiments and drawings		**/10**

DESCRIPTION – PARAGRAPHS 56(1)(e) AND (f)

Requirement		Mark
CONSISTENCY		

First independent claim fully supported	The first independent apparatus claim must be fully and clearly supported by the description and drawings e.g. claim language used in the specification, all elements clearly described, consistent language throughout Consistory clauses not acceptable	0 or 4
Dependent apparatus claims fully supported	All dependent apparatus claims as drafted are fully and clearly supported by the description (note: if one or more dependent claims are not supported the mark is 0) Consistory clauses not acceptable	0 or 2
Second independent claim fully supported	The second independent claims must be clearly and fully supported by the description Consistory clauses not acceptable	0 or 2
Proper Reference Numbers	Reference numbers added to the drawings for all elements found the in the claims, and same is used in the text and drawings, consistent use of reference numbers	0 or 2
COMPLETENESS		
Bag body features	Must include all of the following for 1 pt • flexible • material options • open top and bottom	0 or 1
Elastic support members	Must include all of the following for 3 pts If description does not include at least one material option or does not indicate that tensile strength can be selected but includes the rest, deduct 1 pt If description fails to describe sheath/core structure but includes the rest, deduct 1 pt • plurality • elasticity • bungee/shock cord • sheath/core structure • material options • appropriate tensile strength depending on contents	0, 1, 2, or 3
Attachment of support members to bag body	Must include all of the following for 3 pts If description omits hooks (at top of bag) or eyelets/grommets/knots (at bottom of bag) but includes the rest, 2 pts • hooks at top	0, 2 or 3

	• eyelets or grommets with knots at bottom • carabiner clip option at bottom • releasable at top • releasable at bottom	
Expanding volume	Must include all the following for 5 pts • fold proximate to bottom of bag and defines a bottom of the holding portion of the bag • fold moves/travels as weight added to and removed from the bag • volume of bag increases while fold is maintained	0 or 5
Other uses	Retrofitting prior art fruit-picking bags (1 pt) Unloading from top, causing bottom to move up (1 pt)	0, 1 or 2
DEDUCTIONS		
For each non-essential element characterized as essential or essential element characterized as optional: -3		
Application parts in wrong order (claims may be at the beginning or end): -3		
Unclear or informal language: -1 x type of ambiguity or informality to -3 max		
Inconsistencies in language: -1 x inconsistency to -3 max		
Sub-total for description of embodiments and drawings		**/24**

Part B – Short Answer Questions (6 MARKS MAXIMUM)

Only the first two answers (concerns) will be marked. For each concern identified, 1 mark will be allocated for each of the following, to a maximum of 3 marks for each concern and 6 marks total for the question.

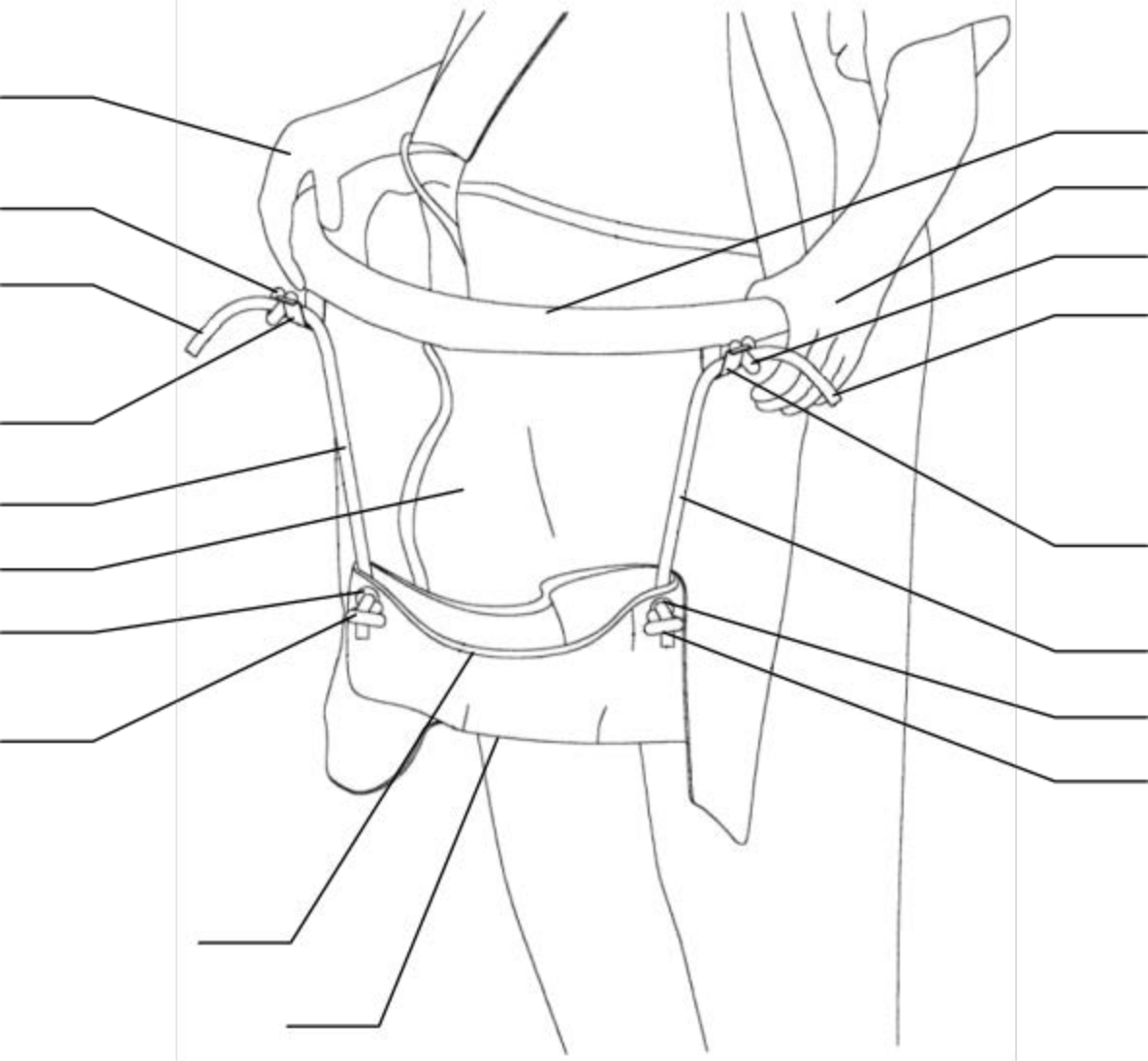
Requirement	**Example)**	**Mark**
Legal, commercial or strategic concern must be applicable to the fact scenario described by the inventor and a reasonable, practical business concern.	**Example 1: kit comprising a pair of elastic members of same tensile strength, for use with bag where knotted ends hold sheath and core together and serve as stoppers to hold member on bag** [infringement] Claim 1 is directed to a bag with elastic members, but it is possible that competitors may circumvent the claims by selling only replacement elastic straps if they are not patented. [validity] While it is desirable to claim just the elastic member, merely claiming any single	*Concern 1* 0 or 1 *Concern 2* 0 or 1

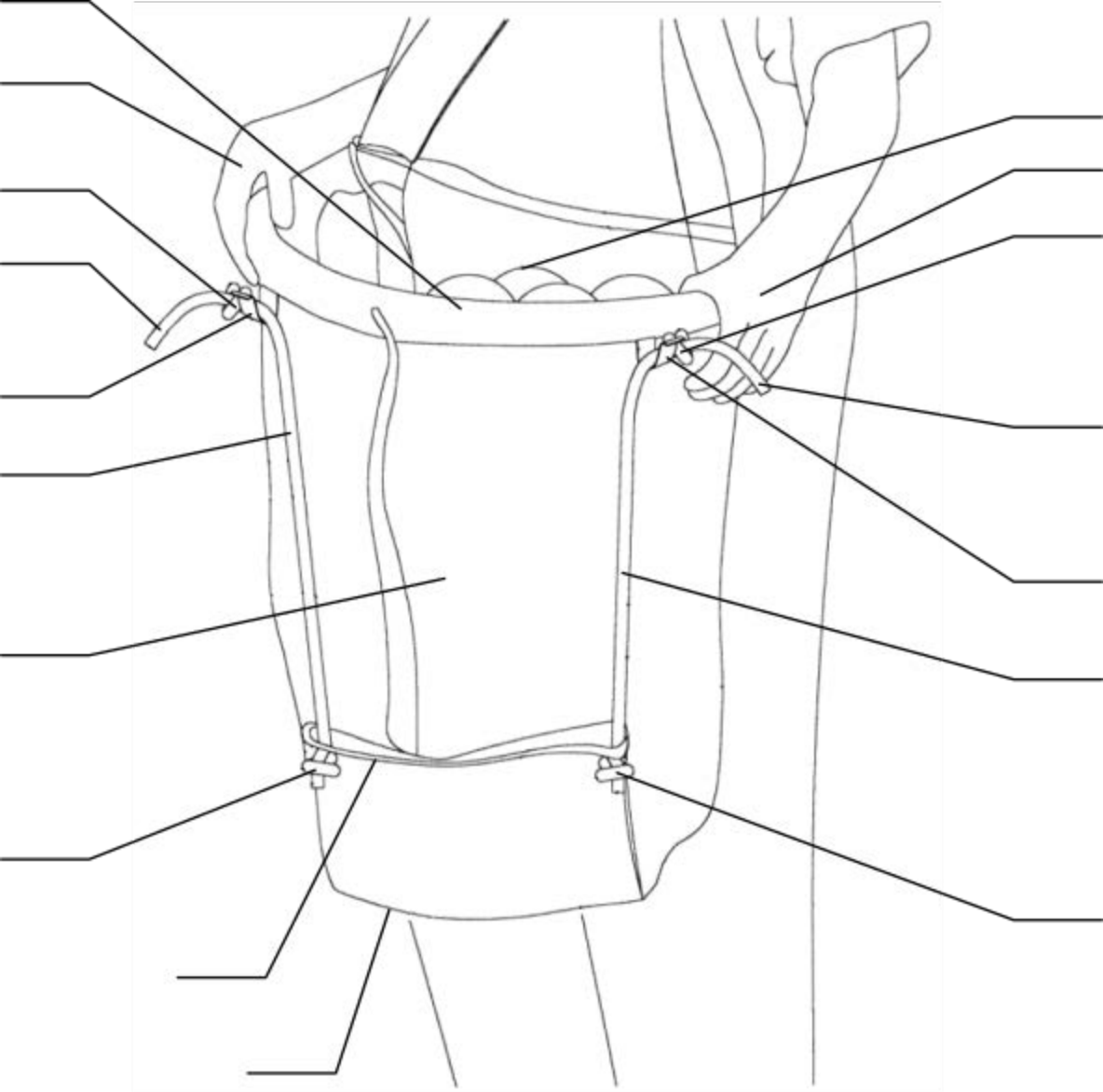
	replacement elastic member runs the risk of being anticipated or obvious (even if limited for use in a bag) since they predate the invention (already sold in hardware stores/disclosed in expired patent) **Example 2: use of elastic members to expand/contract volume of fruit-picking bag, where bag structure is somewhat broader than claim 1** [claim construction] The other claims are directed to a bag without any stated purpose. There may be some concern that when construed by the court, the bag will be construed, perhaps incorrectly, as being limited to one for use for fruit picking when it was not the intent. [infringement] The inventor commented that Orchard Supply makes bags that are similar, but not identical, to FIGS. D-F and we have no information as to their precise structure, so we do not know for certain whether claim 1 would capture the Orchard Supply bag with elastic members.	
Legal rule or principle must be clearly explained and correlate to the identified concern. Simply identifying a general topic such as "infringement" or "validity" is insufficient.	**Example 1:** [infringement] Selling an unpatented component intended to be incorporated in a patented item (i.e., the bag) without doing anything further (e.g., absence of influence so as to induce infringement) does not constitute infringement. (e.g., MacLennan v. Les Produits Gilbert Inc, 2008 FCA 35) [validity] Claimed invention must not be previously publicly disclosed (Patent Act, s. 28.2) or obvious to the posita in view of information available to the public (Patent Act, s. 28.3) **Example 2:** [claim construction] Expressed broadly, the principle of claim differentiation is that a limitation of one claim cannot be read into another. (e.g., Halford v. Seed Hawk Inc., 2004 FC 88) [infringement] Infringement occurs only when the accused product takes all the essential elements of the claims. (e.g., Free World Trust v. Électro Santé Inc., 2000 SCC 66)	*Concern 1* 0 or 1 *Concern 2* 0 or 1

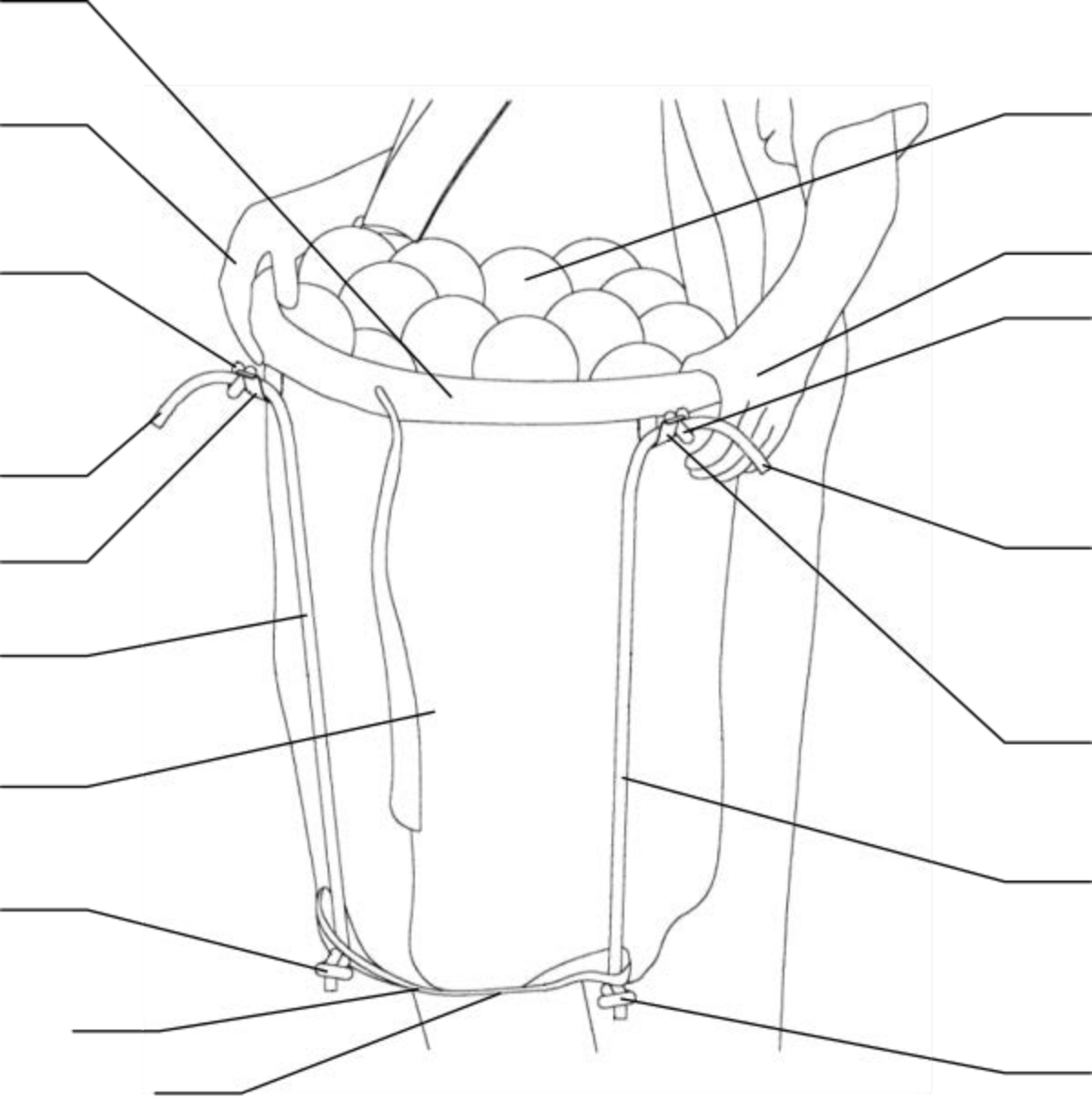
	[citations not required; provided here for reference]	
Explanation must clearly link the claimed subject matter to the resolution of the concern and be applicable to the fact scenario No marks if the characterization of the claimed subject matter is inaccurate (e.g., answer states that claim will prevent competitors from selling new design, but claim does not actually encompass new design).	**Example 1:** [infringement] This second independent claim recites a likely mode of selling replacement members, since customers use a pair with a single bag. [validity] This claim is directed to an elastic member embodiment with knotted ends that is new and arguably non-obvious over the inventor's acknowledged prior art, since the prior art does not describe knotting the ends of a sheath with the core to hold them together. **Example 2:** [claim construction] By including another claim that specifically recites a bag for fruit-picking, the inventor will have a claim differentiation-based argument that the other claims encompass bags for other purposes. [infringement] This second independent claim omits some of the structure of claim 1 and focuses instead on the inventive use of the elastic members specifically with a fruit-picking bag. This reduces the number of essential elements in the claim, so may enlarge the scope of protection even though we do not know exactly what Orchard Supply sells.	*Concern 1* 0 or 1 *Concern 2* 0 or 1

OVERALL RESULTS

Part A		
Independent Apparatus Claim	Maximum 40	
Dependent Apparatus Claims	Maximum 8	
Second Independent Claim	Maximum 12	
Disclosure excluding detailed description (sub-total)	Maximum 10	
Detailed description	Maximum 24	
Part B		
Short Answer Question	Maximum 6	
TOTAL	**Maximum 100**	







PATENT AGENT EXAMINATION

PAPER B

2021

PART A (80 marks)

The following four (4) documents are provided:

1. Canadian Patent No. 2,xxx,222
2. D1: European Patent Application No. 2,xxx,496
3. D2: Canadian Patent Application No. 2,xxx,100
4. D3: US Patent No. 8,xxx,999

INSTRUCTIONS TO CANDIDATES

Review the following background and documents provided and include an appropriate response to each question. Do not provide extraneous commentary if not directly relevant to the question. For example, if the question requires a determination as to novelty, do not comment on other criteria such as utility, obviousness, etc. Note that statements of authorities or pertinent law (which may include case law and statutory and regulatory provisions), analysis and argument are required ONLY when requested. Point form answer is acceptable.

BACKGROUND

Your client is Weston, a single father devoted to his six-year-old daughter, Amy. Before heading to his job as a mechanic at Automobiles, Inc., he helps Amy get ready for school. Both often arrived late at work and school because Weston had great difficulty in grooming Amy's long wet hair which easily tangled during brushing. As a result of extensive research, Weston invented an improved hair brush using tools in the repair shop.

He showed the hair brush to his friend, Wendy, a stylist at Better Hair Care, Inc. Among the customers present in the salon, a heavy metal musician, Nash, agreed to be the test subject. After successfully testing the hair brush on Nash's wild locks, Wendy suggested adding blow drying as a feature. Weston re-designed the hair brush and filed a U.S. provisional patent application on February 20, 2012, a U.S. patent application on July 11, 2012, and a subsequent Canadian patent application on February 12, 2013. Canadian Patent No. 2,xxx,222 issued on August 18, 2016.

Weston has now learned that a customer, who had been present in the salon during testing of the hair styling tool, is now manufacturing a similar hair styling tool which might fall within the scope of the claims of his Canadian Patent No. 2,xxx,222.

He asks you to assess the validity of Canadian Patent No. 2,xxx,222. He provides you with Canadian Patent No. 2,xxx,222 and the results of his prior art search which revealed documents D1-D3, which do not appear to have been considered by the Canadian Examiner.

CA ‘222

Canadian Patent No. 2,xxx,222
Issue Date: August 18, 2016

HAIR STYLING TOOL

Filing Date:	**February 12, 2013**
Publication Date:	**August 20, 2013**
Priority Data:	**US 13/xxx,468 filed July 11, 2012 and US 61/xxx,432 filed February 20, 2012**

Inventors:	**Weston Inacio, Nash Pauly, and Wendy Reece**
Owner:	**Better Hair Care, Inc.**

FIELD OF THE INVENTION

[1] The present invention relates to a hair stying tool.

BACKGROUND OF THE INVENTION

[2] Brushing hair smoothes hair cuticles and pulls oil from the scalp and spreads it throughout the hair, which adds body and sheen to the hair and keeps hair healthier. Many people blow dry their hair while simultaneously brushing their hair, known as a blowout. When simultaneously blow drying and brushing hair, preferable results are achieved by pulling the bristles of a hair brush through the hair while heat, such as hot air from a blow dryer, is applied to the hair. Hair is blown out in sections while turning the brush partially and moving the brush through the hair. A user can usually rotate a brush about one half turn manually, and after each half turn, the user pulls the brush from the hair. The brush is then placed on a new section of hair, usually adjacent to the preceding location, and the process is repeated throughout the entire head of hair.

[3] When proper tension is placed on the hair with a brush, the hair is elongated, and when heat is applied during a blowout, even frizzy and otherwise unmanageable hair can achieve a sleek, glossy appearance which can last for several days. Blow drying an entire head of hair, with professional looking results, can be difficult on one's own head of hair as it is difficult to reach the back of the hair while coordinating the brush movements and applying heat from a blow dryer.

CA ‘222

[4] Various brushes, including rotating brushes, are known which address the difficulties associated with blow drying hair and seek to maximize the benefits of brushing hair while drying with heat. These brushes can, however, lead to hair tangling for an inexperienced user, especially for longer hair, hair that is improperly sectioned, or improper brush positioning by the user.

SUMMARY OF THE INVENTION

[5] In one aspect, a hair styling tool is provided and comprises a handle, a core, a heating member, a motor, a plurality of projections and at least one pair of movable members. The core has a longitudinal axis and is attached to the handle. The heating member heats the core. The motor rotates the core about its longitudinal axis relative to the handle. The projections extend radially outwardly from the core at a first fixed distance from the longitudinal axis. The pair of movable members comprise a first movable member and a second movable member and are positioned at opposing sides of the core and connected with at least one connector. The first movable member and the second movable member each extend radially outward from the connector to a distal end having a distal surface. The pair of movable members move together between opposing positions, which comprise a retracted position and an extended position. In the retracted position, the movable member distal end is distant radially from the longitudinal axis at a second distance that is less than the first distance. In the extended position, the movable member distal end is distant radially from the longitudinal axis at a third distance that is more than the second distance. The first movable member moves from its extended position to its retracted position and the second movable member moves together with the first movable member from its retracted position to its extended position, and when the second movable member moves from its extended position to its retracted position, the first movable member moves together with the second movable member from its retracted position to its extended position.

BRIEF DESCRIPTION OF THE DRAWINGS

CA ‘222

[6] The invention will now be described in more detail with reference to the accompanying drawings which by way of example illustrate different embodiments of the invention.

[7] FIG. 1 is a perspective view of an embodiment of a hair styling tool ;

[8] FIG. 2A is a sectional view of a hair styling tool of FIG. 1, taken through line 2-2 of FIG. 1, showing the movable members in one position;

[9] FIG. 2B is a sectional view of the hair styling tool of FIG. 2A, taken through line 2-2 of FIG. 1A, showing the movable members in the opposing position;

[10] FIG. 3A and FIG. 3B are perspective sectional views of different embodiments of movable members of the brush end shown in FIG. 1;

[11] FIG. 4 is a side sectional view of a rotating hair brush, showing a pair of movable members according to another embodiment;

[12] FIG. 5A, FIG. 5B, and FIG. 5C are sectional views of the rotating hair brush shown in FIG. 4, taken through line 3-3 of FIG. 4, showing bristles and a pair of movable members that engage and disengage a section of hair; and

[13] FIG. 6 is a perspective view of the hair styling tool shown in FIG. 4, having a heated blower and a vented core which provides hot air venting out the core.

DETAILED DESCRIPTION

[14] Referring to FIG. 1, a perspective view of an embodiment of a hair styling tool 10 is shown. The hair styling tool 10 comprises a handle 12 and a brush end 14, which also may be referred to as a brush, brush end, or brush portion. The brush end 14 is attached to the handle 12 and comprises a core 16 having a longitudinal axis 18 and a plurality of projections 20 that extend radially outward from the core 16 at a first distance 22 from the longitudinal axis 18. The first distance 22 is fixed for the projections. The hair styling tool 10 has at least one movable member 24 having a distal end 26. Typically, the distal end of at least one movable member 24 provides a continuous surface that extends substantially the entire length of the core 16 to disengage the hair along the length of the core 16, in order to effectively prevent tangling.

CA ‘222

[15] The movable member 24 extends radially outwardly from the core 16 and is movable between opposing positions. The movable member 24 moves between a retracted position 28, where the distal end 26 of the movable member 24 is distant radially from the longitudinal axis 18 at a second distance 30 (e.g. retracted position) that is less than the first distance 22 (e.g. intermediate position), and an extended position 32, where the distal end 26 of the movable member 24 is distant radially from the longitudinal axis 18 at a third distance 34 (e.g. extended position) that is more than the first distance 22. The hair styling tool 10 has at least one and preferably up to eight or more movable members 24. The handle 12 may also have an anti-tangle collar 40.

[16] Referring now to FIGS. 2A and 2B, a sectional view of the hair styling tool of FIG. 1 taken through line 2-2 of FIG. 1 is shown. FIGS. 2A and 2B show the movable members in one position. The hair styling tool 10 typically has movable members 24 in pairs, comprising a first movable member 24a and a second movable member 24b. The first and second movable members 24a and 24b are typically connected and positioned at opposing sides of the core 16 and are movable together with respect to the core 16. In other embodiments, the first and second movable members 24a and 24b are joined with a connecting rod 36 through the core and slideable between opposing positions.

[17] As shown in FIGS. 2A and 2B, in a typical embodiment, the hair styling tool 10 has a first movable member 24a positioned in the retracted position 28 when the second movable member 24b is positioned in the extended position 32 (FIG. 2A). Conversely, the second movable member 24b is positioned in the retracted position 28 when the first movable member 24a is positioned in the extended position 32 (FIG. 2B). As a pair, the movable members 24a and 24b are connected and movable together between the opposing positions. In another embodiment, the hair styling tool 10 has two or more pairs of movable members 24a and 24b. As a pair, the movable members 24a and 24b are connected and positioned at opposing sides of the core 16, and at least a portion of the plurality of projections 20 are positioned in a row extending parallel to a longitudinal length 18 of the core 16 and between the pair of movable members 24a and 24b.

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[18] The core 16 of the brush end 14 is generally of a cylindrical shape, but may comprise other shapes, and may be comprised of a variety of materials including metal, for heat conduction, or plastic or wood, when heat conduction is not desired.

[19] The plurality of projections 20 are generally a type of hair brush bristle including boar bristles, nylon or other plastic bristles, or a combination of bristle types, such as boar and plastic bristles. The nylon or plastic bristles may have rounded or balled ends to prevent scratching of the scalp, and boar and plastic or nylon bristles may be combined in one brush for other hair brushing applications.

[20] Referring now to FIGS. 3A and 3B, the distal end 26 of the movable member 24 may be of varying shapes, such as rounded, as shown in FIG. 3A, or an inverted rounded triangular shape, as shown in FIG. 3B, or other suitable shapes having a preferably rounded distal end 26. Further, the hair styling tool 10 may have a combination of shapes used for the distal end 26 of multiple movable members 24. The function of the movable member 24 is to prevent hair from tangling in the brush projections 20. Especially when hair is wet, rotation of the hair tool 10 can carry ends of the hair around the bristles of the hair styling tool 10. The hair ends then can get under other parts of the hair and tangle. The movable member(s) 24 smooth the bottom of the hair when the movable member is in the retracted position 28 and push the hair outward when the movable member is in the extended position 32 which makes the hair less likely to tangle.

[21] Referring now to FIG. 4, a side sectional view of another embodiment of a rotating hair brush 50 is shown. The rotating hair brush 50 has a handle 52, a distal brush end 54, a core 56 having a longitudinal axis 58, and a rotation member 84 for rotating the core 56 about its longitudinal axis 58 relative to the handle 52. The rotating hair brush 50 has a plurality of projections 62 extending radially outwardly from the core 56 at a first distance 64 from the longitudinal axis 58 and movable members 66 (e.g., 66a and 66b) having a distal end 68 (e.g. 68a and 68b). Typically, the rotating hair brush has a pair of movable members comprising a first movable member 66a and a second movable member 66b, with each movable member 66a and 66b having a distal end 68a and 68b which extends radially

outward from the core 56. The movable members 66a and 66b move between opposing positions including a retracted position 70 and an extended position 74.

[22] In the retracted position 70, the movable member distal end 68a is distant radially from the longitudinal axis at a second distance 72 that is less than the first distance 64. In the extended position 74, the movable member distal end 68b is distant radially from the longitudinal axis at a third distance 76 that is more than the first distance 64. The first and second movable members 66a and 66b are positioned at opposing sides of the core 56 and connected therethrough with a connecting rod 78. The movable members 66a and 66b and projections 62 on the rotating hair brush 50 are capable of engaging hair when the movable members 66a and 66b are positioned in the retracted position 70. The movable members 66a and 66b are capable of pushing hair away from the core 54 and disengaging hair from projections 62 when the movable member 66b is positioned in the extended position 74.

[23] The rotating hair brush also includes a rotating member 84 for rotating the core 56 about its longitudinal axis 58 relative to the handle 52, and an optionally removable anti-tangle collar 82 capable of preventing hair from tangling at the rotation member 84 when core 56 is rotating relative to handle 52. The handle 52 may house an internal battery 86 or optionally, the rotating hair brush 50 may be directly powered by electricity from an electrical outlet, in which case the rotating hair brush 50 would also include a cord and plug for powering the device (not shown). One or more switches 88 and 90 are located on the handle 52 for controlling the power to the brush's rotating member 84. One of the switches 88 or 90 may control the direction that the brush rotates, while the other switch may be used as on an/off switch, and/or to control brush speed.

[24] The rotating member 84 may comprise a motor 92 for rotating the core 56 about its longitudinal axis 56 relative to the handle 52. The rotating member 84 may be located in the handle 52, as shown in FIG. 4, or alternately, the rotating member 84 may be located in the core 56 (not shown).

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[25] Referring now to FIGS. 5A, 5B and 5C, sectional views of the rotating hair brush 50 shown in FIG. 4 is shown, illustrating a method of brushing hair.

[26] According to the method, first, as shown in FIG. 5A, a section of hair 94 is contacted with a portion of the projections 62a and 62b on the rotating hair brush 50 when the first movable member 66a is positioned in the retracted position 70. As also shown in FIG. 5A, the second movable member 66b is in the extended position 74. The rotating hair brush 50 is then rotated, and optionally, the motor 92 is started (before or after the hair is contacted) causing the core 56 to rotate about the longitudinal axis 58. Next, as the core 56 is rotated about the longitudinal axis 58, the projections 62a and 62b are pulled through the hair.

[27] Next, as shown in FIG. 5B, the first movable member 66a moves to an intermediate position 70(i) (e.g. first distance) where the first movable member 66a begins to extend to a position even with or slightly below or beyond the projections 62a and 62b, contacting the hair 94 with the distal end 68a. The second movable member 66b also moves to a second intermediate position 74(i) which is retracted from the extended position shown in FIG. 5A as the core 56 rotates.

[28] Then, as shown in FIG. 5C, the first movable member 66a moves to the extended position 74 and the hair 94 is pushed away from the core 56 as the distal end 68a of the first movable member 66a extends beyond the projections 62a and 62b. As also shown in FIG. 5C, the second movable member 66b moves to the retracted position 70 as the core 56 rotates and the projections 62c and 62d begin to engage the hair 94.

[29] Thus, according to the method, the movable members 66a and 66b and projections 62a and 62b on the rotating hair brush 50 are capable of engaging hair 94 when the movable members 66a and 66b are positioned in the retracted position 70. The movable members 66a and 66b are capable of pushing hair away from the core 56 and disengaging hair 94 from projections 62a and 62b when the movable member 66 is positioned in the extended position 74.

[30] According to another embodiment, a rotating hair brush has a movable member as described herein, and further comprises a heating member for heating the hair while brushing. Examples of the heating member include a heating element within or integral with the core such that the core may be heated while the rotating hair brush is in use, and/or a heated blower which may be within or integral with the handle, or otherwise situated to provide hot air venting (i.e., moving) out from the core or otherwise blowing out hot air such that the hair is heated with hot air while the rotating hair brush is in use.

[31] Referring now to FIG. 6, a perspective view of another version of the rotating hair brush 50 of FIG. 4 is shown, having an example of the heating member. According to this example, the heating member is a heated blower. The components of the hair brush are configured to provide a substantially unobstructed flow of air through apertures 104 in the core 56 of the rotating hair brush 50. The heating member comprises a heated blower, which may include a heater assembly (not shown) and a fan assembly (not shown). The heater assembly extends from the fan assembly, to within the core 56 and current is supplied via a power cord 102 or other means, such as battery. The interior of the core 56 may be equipped with heating elements such that air forced through the heater assembly can be heated and forced through the apertures 104 in the core 56 for the purpose of both drying and styling hair. One or more of the switches 88 and 90 may also control power to the heater assembly and the fan assembly, and/or may be used as on an/off switch.

[32] The hair styling tool described herein has the ability to eliminate tangling while brushing while the hair is being dried, or "blown out" and "styled" with a handheld hair dryer with brushing regardless of hair section size, hair length or brush placement. The design of the rotating hair tool allows the bristles to freely engage a section of hair that is intended to be brushed when the movable member is in the retracted position. Then, as the brush end rotates, the hair encounters a movable member in the extended position and any hair currently engaged in the bristles adjacent to the extended movable member will be pushed out and away from the bristles, thus eliminating tangling in the area of the brush immediately adjacent to the extended movable member. The distal ends of the movable

members further serve to concentrate heat and smooth hair while under tension against hair as the brush end rotates. The rotating hair tool can be used to apply proper tension on the hair, and when heat is applied during the blow out, even frizzy and otherwise unmanageable hair can achieve a sleek, glossy appearance which can last for several days. Further, with the hair styling tool described, an entire head of hair can be blown out and styled with professional looking results on one's own head of hair, thus lessening trips to the salon for a professional blow dry, which can be a significant cost savings to the user.

[33] It is understood that the size and shape of the movable members may be varied, as well as the type and length of bristles, the rotation member, the shape of the brush head, the core, and/or the heating member.

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CLAIMS:

1. A hair styling tool comprising:

a) a handle;

b) a core having a longitudinal axis and attached to the handle;

c) a heating member for heating the core;

d) a motor for rotating the core about its longitudinal axis relative to the handle;

e) a plurality of projections extending radially outwardly from the core at a first fixed distance from the longitudinal axis; and

f) at least one pair of movable members comprising a first movable member and a second movable member and positioned at opposing sides of the core and connected through the core with at least one connector, the first movable member and the second movable member each extending radially outward from the at least one connector to a distal end having a distal surface, and wherein the pair of movable members move together between opposing positions, the opposing positions comprising:

(i) a retracted position wherein the movable member distal end is distant radially from the longitudinal axis at a second distance that is less than the first distance, and

(ii) an extended position wherein the movable member distal end is distant radially from the longitudinal axis at a third distance that is more than the second distance,

whereby when the first movable member moves from its extended position to its retracted position, the second movable member moves together with the first movable member from its retracted position to its extended position, and when the second movable member moves from its extended position to its retracted position, the first movable member moves together with the second movable member from its retracted position to its extended position.

2. The hair styling tool according to claim 1 wherein at least a portion of the plurality of projections are positioned in a row extending parallel to a longitudinal length of the core

and between the pair of movable members.

3. The hair styling tool according to claim 1 wherein the distal end of the movable member extends continuously along the entire length of the rotatable core.

4. The hair styling tool according to claim 1 wherein the heating member is a heated blower.

5. The hair styling tool according to claim 1 wherein the projections are bristles.

6. A hair styling tool comprising:

a) a handle;

b) a core having a longitudinal axis and attached to the handle;

c) a heating member for heating the core;

d) a motor for rotating the core about its longitudinal axis relative to the handle;

e) a plurality of projections extending radially outwardly from the core at a first fixed distance from the longitudinal axis; and

f) at least one pair of movable members comprising a first movable member and a second movable member and positioned at opposing sides of the core and connected through the core with at least one connector, the first movable member and the second movable member each extending radially outward from the at least one connector to a distal end having a distal surface, wherein the distal ends of the movable members extend continuously along the entire length of the core, and wherein the pair of movable members move together between opposing positions, the opposing positions comprising:

(i) a retracted position wherein the movable member distal end is distant radially from the longitudinal axis at a second distance that is less than the first distance, and

(ii) an extended position wherein the movable member distal end is distant radially from the longitudinal axis at a third distance that is more than the second distance,

whereby when the first movable member moves from its extended position to its retracted position, the second movable member moves together with the first movable member from its retracted position to its extended position, and when the second movable member moves from its extended position to its retracted position, the first movable member moves together with the second movable member from its retracted position to its extended position so that the movable members push hair away from the projections to keep hair from tangling in the projections as the movable members move to their extended position.

7. The hair styling tool according to claim 6 wherein the heating member is a heated blower.

8. The hair styling tool according to claim 6 or 7 wherein the projections are bristles.

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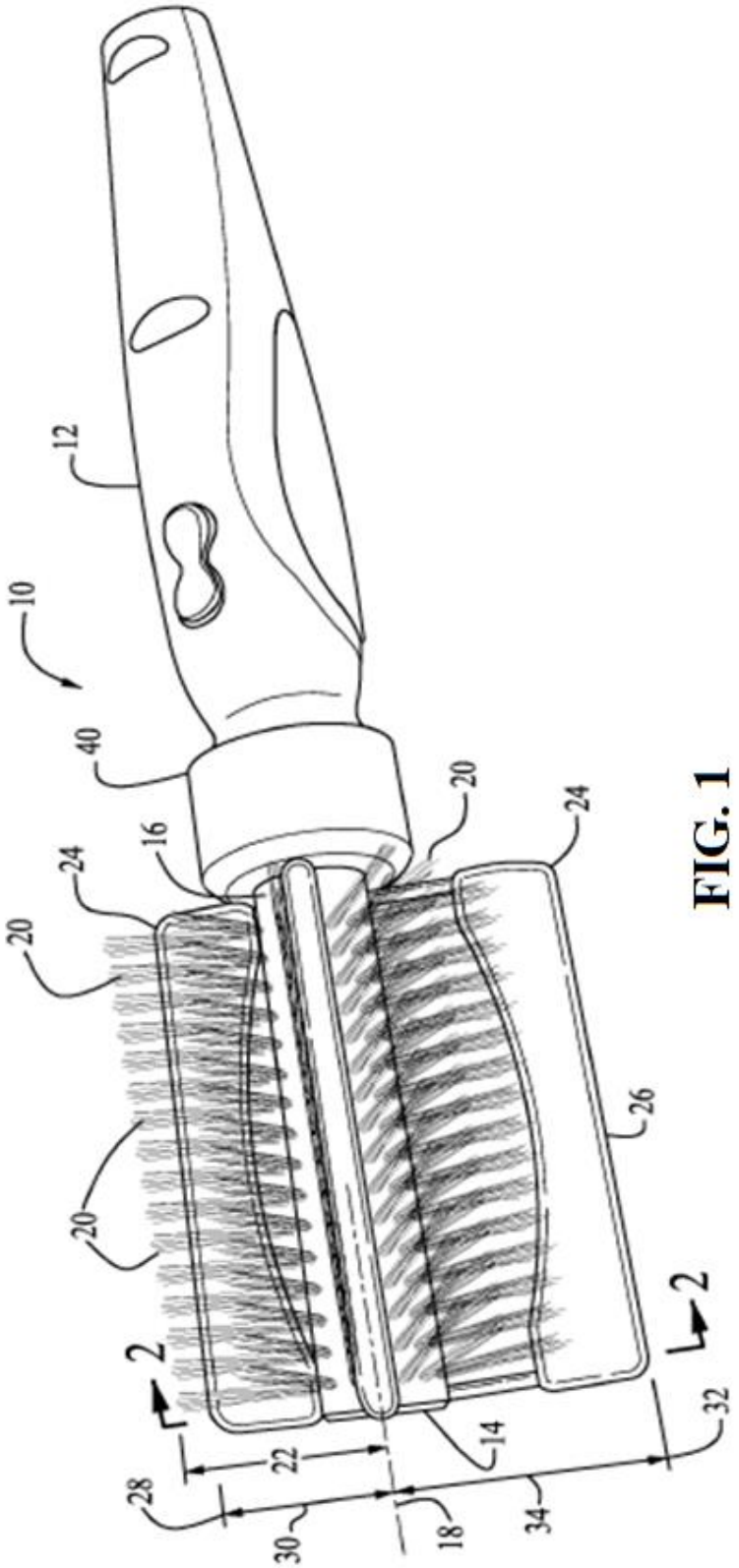

FIG. 1

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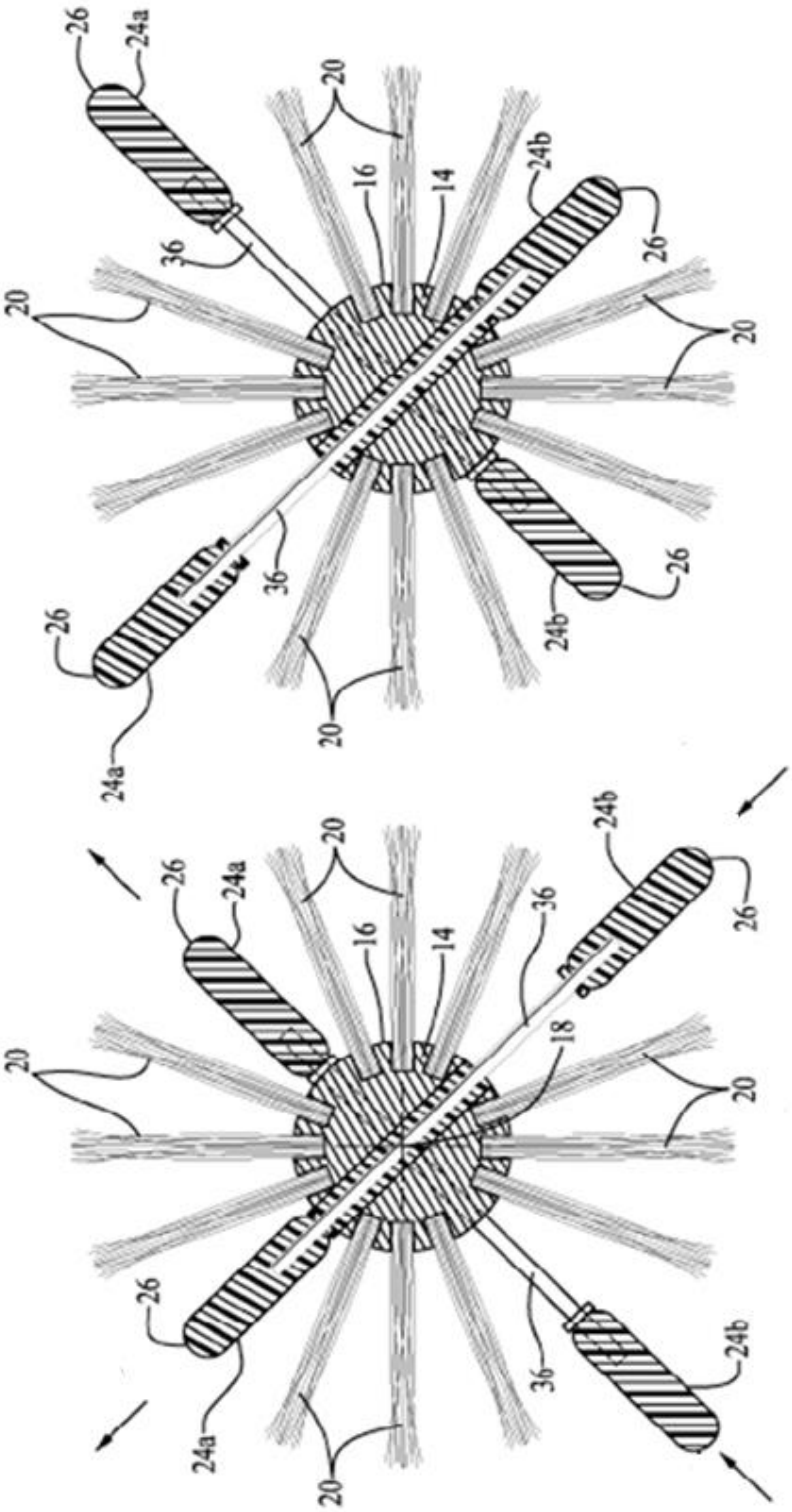

FIG. 2B

FIG. 2A

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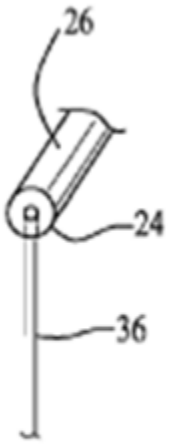

FIG. 3A

FIG. 3B

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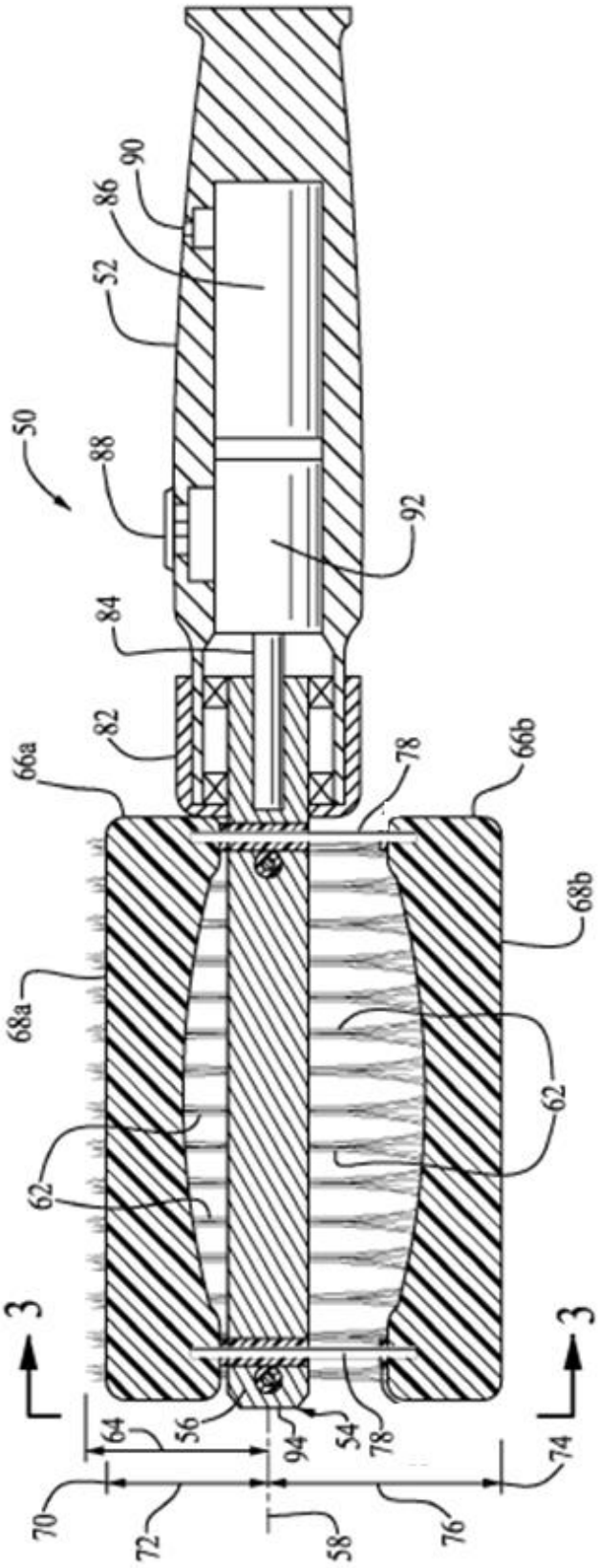
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FIG. 4

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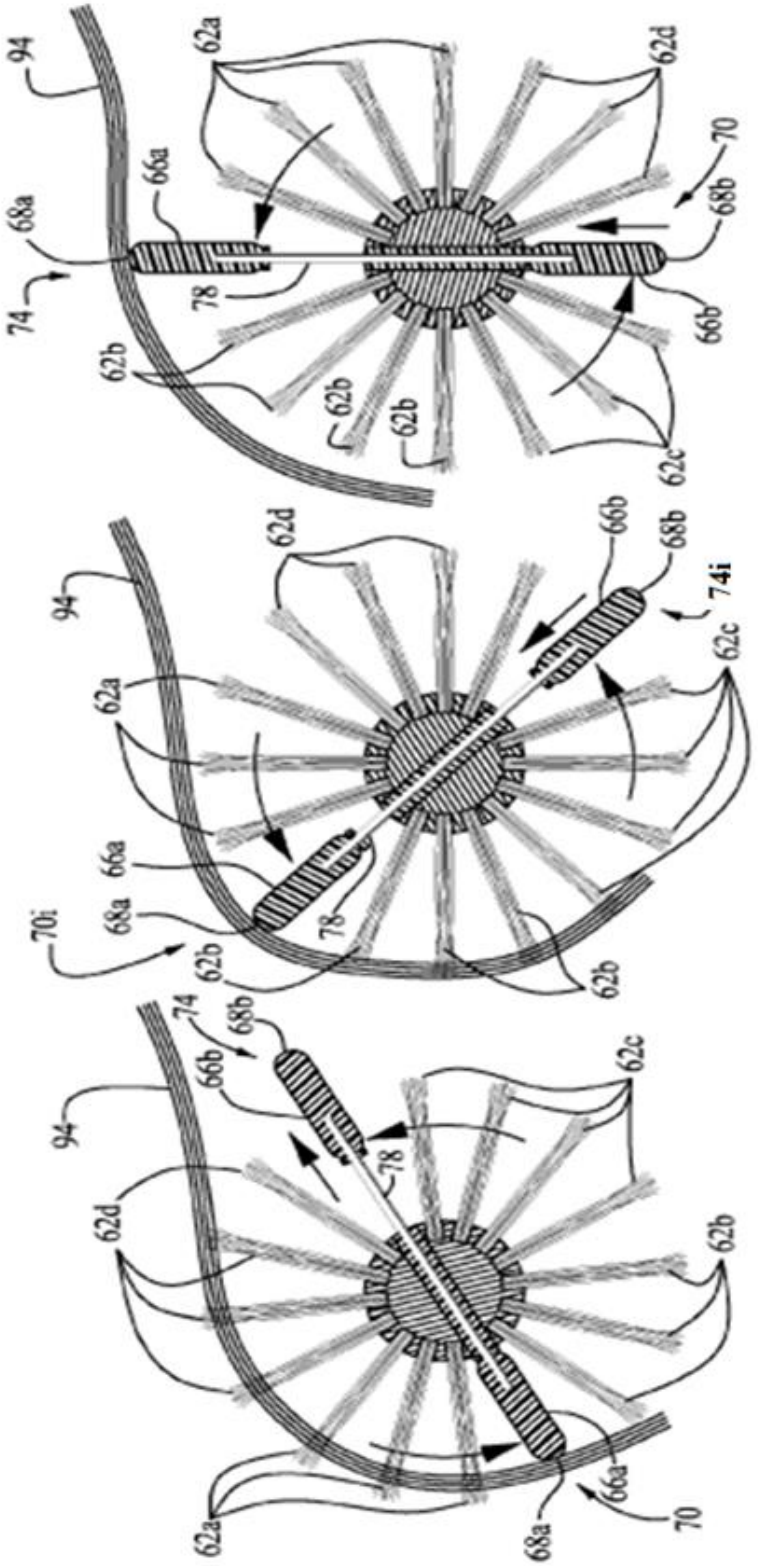

FIG. 5A

FIG. 5B

FIG. 5C

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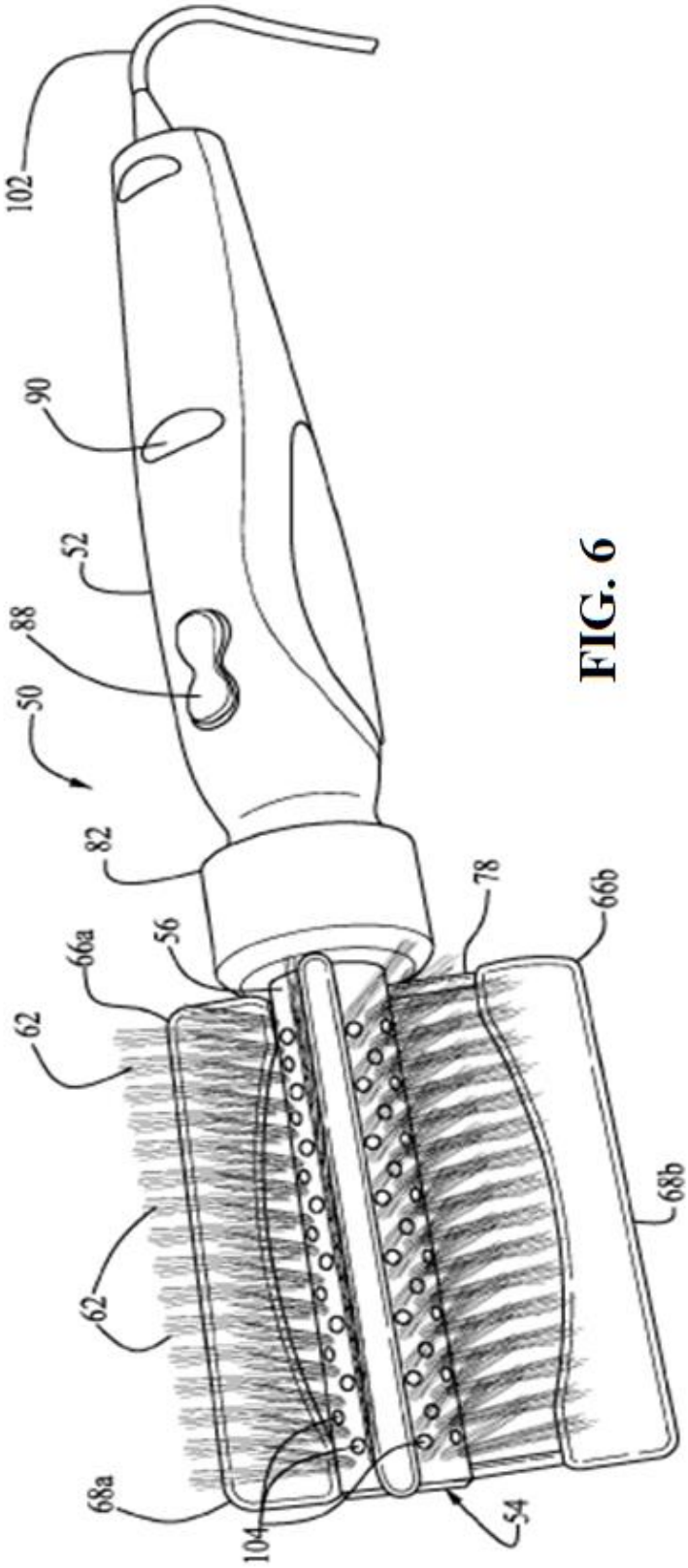

FIG. 6

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DOCUMENT D1

European Patent Application No. 2,xxx,496

BRISTLED BRUSH

Filing Date: **July 4, 2014**
Publication Date: **January 13, 2015**
Priority Data: **US 61/xxx,513 filed July 11, 2013**
Inventors: **Craig Abernathy**
Owner: **Happy Hair Ltd.**

BACKGROUND OF THE INVENTION

[1] During use, at least some known brushes, such as hairbrushes, tend to pick up foreign matter, such as hair or debris. For example, with respect to hairbrushes, hair products, such as gel or hair spray, may increase the likelihood that foreign matter may be transferred from a person's hair to the brush during subsequent uses. To prevent fouling of the brush, bristles extending from the brush must be periodically cleaned, such as by running warm water over the bristles and/or by dragging a second brush or comb through the bristles of the first brush to loosen any foreign matter contained in the brush. However, depending on the relative spacing and density of the bristles extending from the brush, it may be difficult to drag such a cleaning element through the bristles. Moreover, the bristles of the brush may become damaged over time as the cleaning element is dragged through the hairbrush. Another method of removing the foreign matter is by manually grasping the foreign matter in an attempt to pull the foreign matter from the hairbrush. Such a cleaning process may be time-consuming and may provide only limited effectiveness, depending on the size, orientation, and spacing of the bristles.

[2] To facilitate cleaning hairbrushes, at least some known hairbrushes include a cleaning element. For example, at least one known brush includes a cleaning element that is slidably coupled to the brush, such that when the cleaning element is slid down the length of the brush, foreign matter is removed from the brush. Although such a cleaning element is effective in removing foreign matter from brushes, the bristles of such brushes may be displaced by the cleaning element, and over time the effectiveness of the cleaning element

and/or brush may decrease. Other known brushes include a re-useable netting material that is removably coupled over the bristles. After the bristles have become fouled, the netting is lifted from the bristles to facilitate removing contaminates from the bristles. Repositioning the netting over the bristles may be a cumbersome and time consuming task.

BRIEF DESCRIPTION OF THE DRAWINGS

[3] FIG. 1 is a perspective view of an exemplary brush that may be cleaned with a cleaning element.

[4] FIG. 2 is an end view of brush shown in FIG. 1.

DETAILED DESCRIPTION

[5] FIG. 1 is a perspective view of an exemplary hairbrush 10 that may be easily cleaned using a cleaning element 12. FIG. 2 is an end view of hairbrush 10. In the exemplary embodiment, hairbrush 10 includes a body 14 that further includes a handle portion 16 and a tined portion 18. More specifically, in the exemplary embodiment, body 14 is unitarily constructed with handle portion 16 and tined portion 18 molded as a single unit. Alternatively, handle portion 16 may be fabricated independently from tined portion 18. In the embodiment, a plurality of bristles 20 extend generally radially outward from tined portion 18, as further described below.

[6] In the embodiment, handle portion 16 includes a first end 22 and an opposite second end 24. In the exemplary embodiment, handle first end 22 comprises a frusto-conical portion 25 and an end surface 26. In the exemplary embodiment, handle portion 16 has a generally circular cross-sectional profile. Alternatively, handle portion 16 may have any shape that enables hairbrush 10 to function as described herein.

[7] Tined portion 18 includes a plurality of circumferentially-spaced tines 28. Tined portion 18 extends generally co-axially outward from handle portion 18 and, in the exemplary embodiment, the plurality of tines 28 are oriented such that each tine 27 is spaced equi-distantly from each circumferentially-adjacent tine 27. Alternatively, the

plurality of tines 28 may be arranged in any orientation that enables brush 10 to function as described herein. In the embodiment, tines 28 are not coupled together, but rather, each extends independently outward from end surface 26. Accordingly, tined portion 18 is known as a "vented" brush and as such, a plurality of gaps 29 are defined between each pair of circumferentially-adjacent tines 28. Moreover, in the exemplary embodiment, gaps 29 are interconnected through a center portion of tined portion 18. In the exemplary embodiment, each gap 29 is uniform and of length L. Alternatively, each gap 29 may be a different length than each adjacent gap.

[8] In the embodiment, bristles 20 extends outward from each tine 27. More specifically, in the exemplary embodiment, bristles 20 each extend generally radially outward from each tine 27. Alternatively, bristles 20 may extend outward from tines 28 in any orientation that enables brush 10 to function as described herein. Moreover, in the exemplary embodiment, bristles 20 are oriented in clusters 30 spaced laterally across each tine 27 from end surface 26 towards an end 34 of each tine 27. More specifically, in the exemplary embodiment, each tine 27 includes a plurality of longitudinally-spaced clusters 30 of bristles 20. Alternatively, brush 10 does not include clusters 30 of bristles 20 but rather bristles are oriented in rows that extend generally longitudinally across each tine 27. Moreover, in the exemplary embodiment, bristles 20 are coupled radially to each tine 27 such that tines 28 are circumferentially identical within tined portion 18. Alternatively, bristles 20 may be secured to tines 28 in any pattern, orientation, or arrangement that enables hairbrush 10 to function as described herein.

[9] In an embodiment, the cleaning element 12 is a rod-shaped structure having a maximum width W of less than the length L, allowing the cleaning element 12 to be inserted between two adjacent tines 27 in the plurality of tines 28. The cleaning element 12 can then be translated from the position of insertion along the length of the tine portion 18 towards an end 34 of tine portion 18, enabling the user to clear any foreign matter that is present within the plurality of tines 28 or within the array of bristles 20. Alternatively, the cleaning element 12 is a structure that allows the user to grip the cleaning element 12 and of a size to allow the user to insert the cleaning element 12 in

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between two tines 27 in the plurality of tines 28 at any position along tine portion 18, for example, a rod, a comb or a hair pick.

[10] Exemplary embodiments of hairbrushes including tines and cleaning elements are described in detail above. The above-described hairbrushes, and methods of cleaning enable a hairbrush to be easily cleaned of foreign matter without the potential of damage to the bristles. More specifically, the hairbrush 10 and method facilitate cleaning the hairbrush 10 by slidably translating a cleaning element 12 between the tines of a plurality of tines 28, thereby removing foreign matter held against the cleaning element 12 after the cleaning element 12 has been translated at least partially along the length between each tine of the plurality of tines 28. As a result, the hairbrush 10 can be reliably and efficiently cleaned without damage or disarrangement of the individual bristles 20 or the cluster 30 of bristles 20.

[11] Exemplary embodiments of an apparatus and method for cleaning a hairbrush are described above in detail. The apparatus and method are not limited to the specific embodiments described herein, but rather, components of the apparatus and/or steps of the method may be utilized independently and separately from other components and/or steps described herein. Additionally, while hairbrush 10 is described herein as a brush for hair, it is understood that hair brush 10 may be any brush having spaced tines that would facilitate cleaning as described herein, such as a lint brush, a cleaning brush, a scrub brush or a currycomb. Further, the described apparatus components and/or method steps can also be defined in, or used in combination with, other apparatus and/or methods, and are not limited to practice with only the apparatus and method as described herein.

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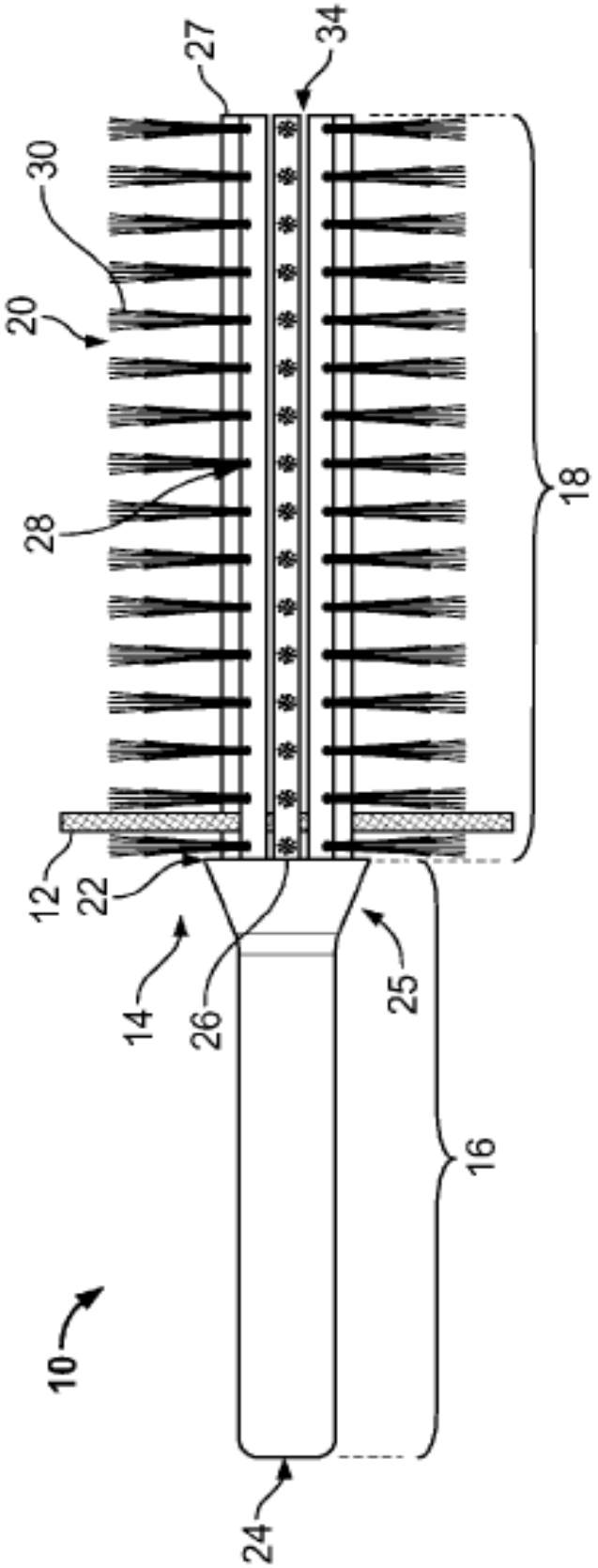

FIG. 1

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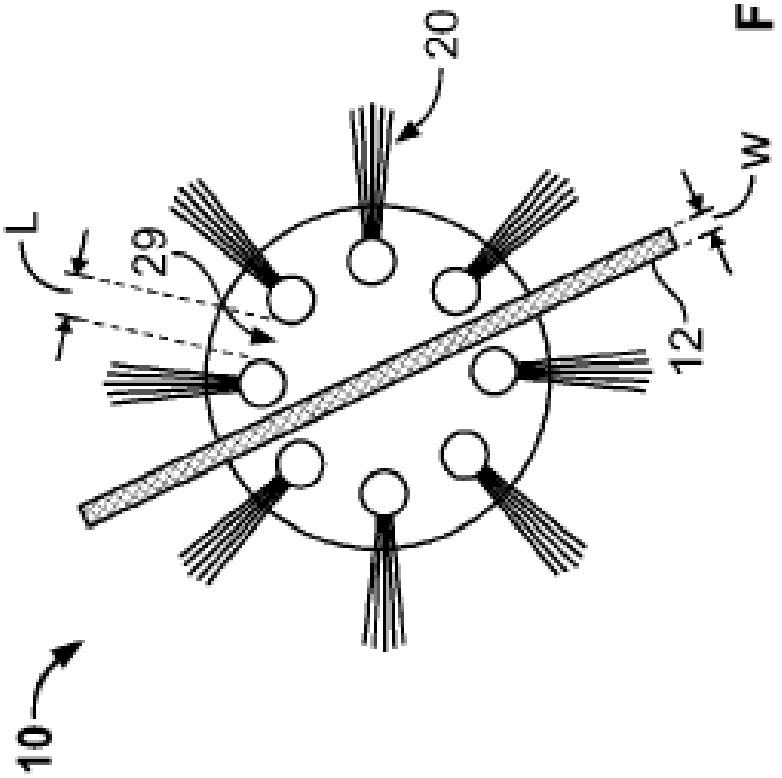

FIG. 2

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DOCUMENT D2

DOCUMENT D2

Canadian Patent Application No. 2,xxx,100

HAIR DRYER WITH ROTARY BRUSH

National Entry: **August 17, 2010**
PCT Filing Date: **August 17, 2009**
Publication Date: **March 2, 2010**
PCT: **PCT/CN2011/xxx,710**
Priority Data: **CN 2008xx,xxx,xxx.1 filed on August 25, 2008**

Inventor: **Fiona Hy**
Assignee: **Wild Hair Products Ltd.**

BACKGROUND OF THE INVENTION

[1] There are a number of known hair drying and hair brushing implements. Some include brushes, combs or the like through which hot air can be flowed. It would be highly desirable if a combination hair drying and rotary brushing implement were available so that a greater portion of the hot air would serve to dry the portion of the hair that is being contacted by the rotating brush. It is also desirable for the brush to have an overload cutoff which would stop rotation of the brush responsive to the high resistance to rotation which can occur when hair becomes entangled in the bristles of the brush. It would also be advantageous if such a brush were available with interchangeable brush portions so that different members of a family could hygienically utilize the same handle.

BRIEF DESCRIPTION OF THE DRAWINGS

[2] The invention will be better understood by reference to the drawing in the figures of which like numbers denote like parts throughout and wherein:

[3] FIG. 1 is a perspective view of an embodiment.

[4] FIG. 2 comprises a partial section view taken along line 2--2 of FIG. 1.

[5] FIG. 3 comprises a section view taken along line 3--3 of FIG. 2.

[6] FIG. 4 comprises a section view taken along line 4--4 of FIG. 2.

[7] FIG. 5 is a partial sectional view of the connection between a handle and a brush of FIG. 1.

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DETAILED DESCRIPTION

[8] In an embodiment, the rotary hair styler 11 includes a hollow handle 13 which includes an on-off switch 15, direction of rotation selector 17, speed control 19 and overload reset button 21. The hollow handle includes at one end 23, an opening 25 which serves to allow entry of air into the handle.

[9] The air which enters the hollow handle 13 via the opening 25 passes first into the fan and heater unit 27, the direction of flow of the air being shown by the arrows in FIGS. 2, 3 and 5. The fan and heater unit is held in place within the handle by the shoulder 29.

[10] Also mounted interiorly of the handle 13 is the electric motor 31. The motor 31 is mounted to the interior of the handle 13 at the ridge 33. A motor shaft 35 extends from the motor 31 toward the brush end 37 of the handle 13. The portion of the motor shaft 35 adjacent the end thereof 39 furthest removed from the motor 31 is rotatably held by a circular hole in the annular support 41. The motor shaft 35 is drivably attached to the gear 43, said gear 43 in turn being drivably attached to the hollow drive shaft 45 by the drive gear 46. The hollow drive shaft 45 is held in place and aligned by the same support 41 which rotably holds the motor shaft 35 and which is integral with the interior of the handle 13.

[11] A conduit 47 is mounted to the fan and heater unit 27 in position to receive the flow of hot air therefrom and to conduct this hot air as shown by the arrows in FIG. 2 through the hollow center portion of the drive shaft 45. The conduit 47 extends out the brush end 37 of the handle 13 (FIG. 2). The conduit 47 has a longitudinal slot 49 which commences adjacent the end 51 of the conduit 47 furthest from the handle 13. The slot 49 terminates short of the handle 13 (FIGS. 2 and 3). Hot air from the fan and heater unit 27 passes through the conduit 47 and out the slot 49 in a directional manner and through a limited Angle, A.

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[12] A brush 53 comprises bristles 55 attached to a tube 57 and extending outwardly therefrom. The bristles 55 can be any suitable length and, typically, all one length. The bristles 55 are relatively stiff and are fixed to the tube 57. The tube 57 has a plurality of openings 59 therethrough adjacent the bases of each of the bristles 55 (FIG. 1). The bristles 55 are arranged in rows along the length of the tube 57 and each row is arranged equidistant from an adjacent row. The tube 57 is coupled to the hollow handle 13, along a lengthwise direction. More specifically, the tube 57 communicates rotatably at one end 61 with the drive shaft 45 in the handle 13, which in turn is driven by the gears 43 and 46, the shaft 35 and the motor 31. It is clear that the tube 57 is substantially concentric with the conduit 47 and is adapted to fit externally around the conduit 47. The openings 59 in the tube are adapted to receive the flow of hot air which exits from the conduit 47 via the slot 49. Due to the directional flow of air from the slot 49, it is possible to more completely utilize the hot air by always contacting the portion of the brush 53 opposite the slot 49 with the hair being brushed. The brush 53 at the other end 65 thereof is adapted to rotatably and removably fit over the end 51 of the conduit 47 of the brush 53. Thus, a plurality of brushes 53 can be snapped in place over the conduit 47.

[13] FIGS. 4 and 5 illustrate in detail how the brush 53 is attached adjacent the handle 13. The conduit 47 has an annular ring 67 which has mounted concentrically and externally thereto the first ball bearing holding channel 69. A first plurality of ball bearings 71 are mounted within the first channel 69. Opposite the first channel 69 is the mating second ball bearing holding channel 73 which is attached internally of the drive shaft 45. Thus, the first plurality of ball bearings 71 are held between the first and second channels 69, 73. Externally of the drive shaft 45 there is a third ball bearing holding channel 75 which is adapted to hold a second plurality of ball bearings 77. Externally of the second plurality of ball bearings 77 and internally of the brush end 37 of the handle 13 there is a mating fourth ball bearing holding channel 79 whereby the second plurality of ball bearings 77 are held between the third and fourth channels 75, 79. The drive shaft 45 and the brush end 37 of the handle 13 each terminate adjacent the four channels 69, 73, 75, 79.

[14] Attached to the drive shaft 45 externally thereof is the annular ridge 81. The tube

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57 has attached interiorly thereof the shoulder 83. Attached to the shoulder 83 is the ring 85 which is adapted to fit between the drive shaft 45 and the brush end 37 of the handle 13. The ring 85 includes a snap on channel 86 adapted to fit over the ridge 81 in a mating fit whereby the drive shaft 45 causes the tube 57 to rotate in consort therewith. The tube 57 adjacent the end 61 thereof also includes a lip 87 which fits over the brush end 37 of the handle 13, thereby assuring that hair cannot become caught in the interior of the handle 13. The brush 53 can be removed from the handle 13 by simply grasping the handle 13 in one hand and the brush 53 in the other and pulling the two members apart whereby the ring 85 slides off the ridge 81. It is preferred that the handle 13 and the tube 57 are of a resilient material, e.g., plastic, so that the snap fit can be easily attained.

[15] The switch 17 is provided on the handle 13 as a means for selecting the direction of rotation of the brush 53. The switch 17 can be put in any of the positions, R, O or L (FIG. 1). The position R could correspond to a rotation in one direction; the position L to a rotation in another direction; and the position O to no rotation at all. The speed of the motor 31 is controlled by the speed control 19. Both the direction and speed of rotation of the brush 53 are thus easily controllable by the user of the hair styler 11. The on-off switch 15 in the off position renders the styler completely inoperable other than as a manual hair brush. When the on-off switch 15 is in the on position, power is available to the motor 31 and to the fan and heater unit 27. When the load on the motor 31 becomes too great as, for example, when high resistance to rotation of the brush 53 results (for example, from hair becoming entangled in the brush 53), then power to the motor 31 is cut off as by a circuit breaker and must be restarted through pushing the reset button 21. The electric wire 89 serves its usual purpose.

[16] The hair styler 11 of the present invention provides a number of highly desirable features. It provides a brush 53 which is rotatable at a desired speed and in a desired direction and further provides means for directionally flowing hot air against a portion of the interior of the brush 53 whereby the hot air will be efficiently used to dry that portion of the hair that is being brushed. The styler 11 also provides a capability for operation when the brush 53 is not being rotated, that is, when only the fan and heater unit 27 is operating.

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This can be useful in delicate styling operations wherein rotation of the brush 53 would be undesirable. The styler 11 further provides means for stopping the rotation of the brush 53 responsive to high resistance to rotation thereof as when hair becomes entangled in the bristles 55 of the brush 53. Thus, a person whose hair is being brushed is saved from possible serious pain. Since the direction of rotation of the brush 53 can be selected, the stylist does not need to work at some times from the front of the head and at other times from the back of the head as would be the case if reversal of rotation were not available. The variation in speed of the brush 53 is useful for brushing different parts of the hair and for brushing hair of different persons which would provide different resistance to brushing. Finally, the ability to use a plurality of brushes 53 with a single heating and rotating unit is highly desirable since the most expensive part of the styler 11 is the motor 31 and heater unit 27 and thus, a number of persons can hygienically use the styler 11 by each using their own brush portion. Further, since the air which is pulled into the fan and heater unit 27 is guided outwardly therefrom through the conduit 47, the motor 31 which turns the brush 53 is protected from this hot air and has a reduced tendency to overheat.

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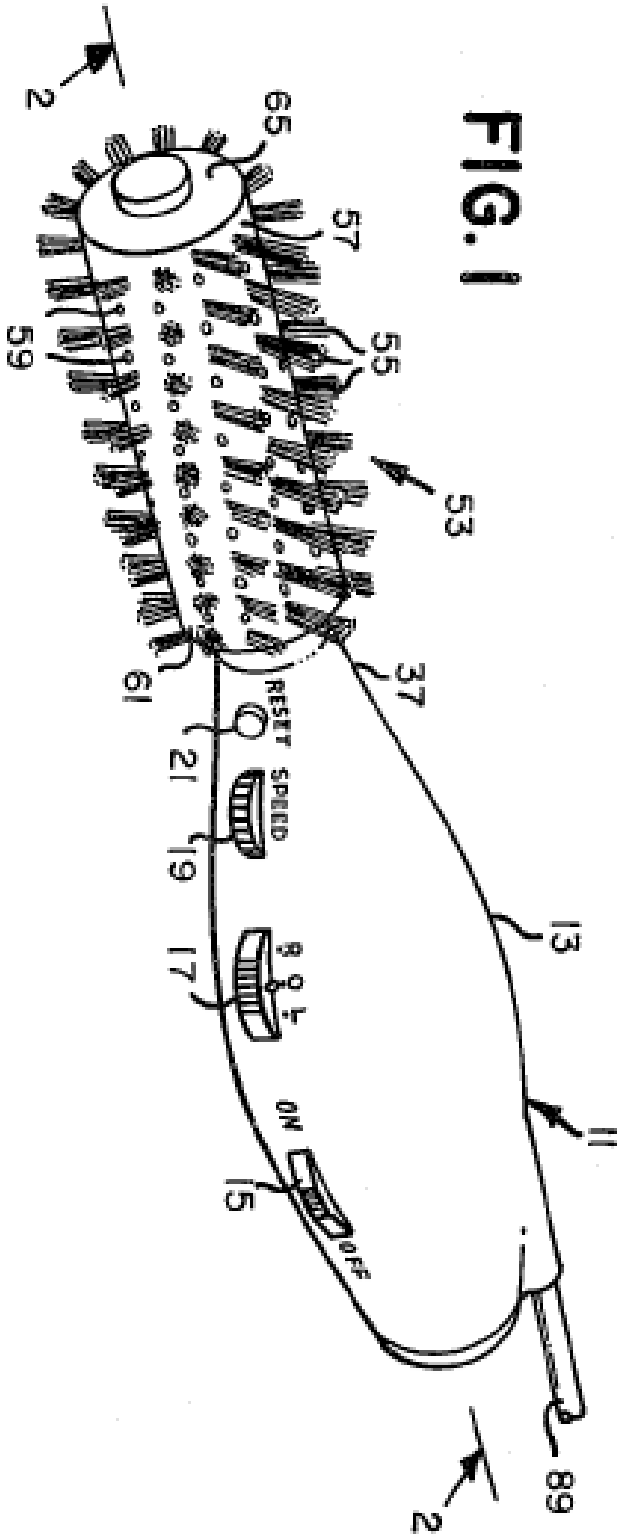

FIG. 1

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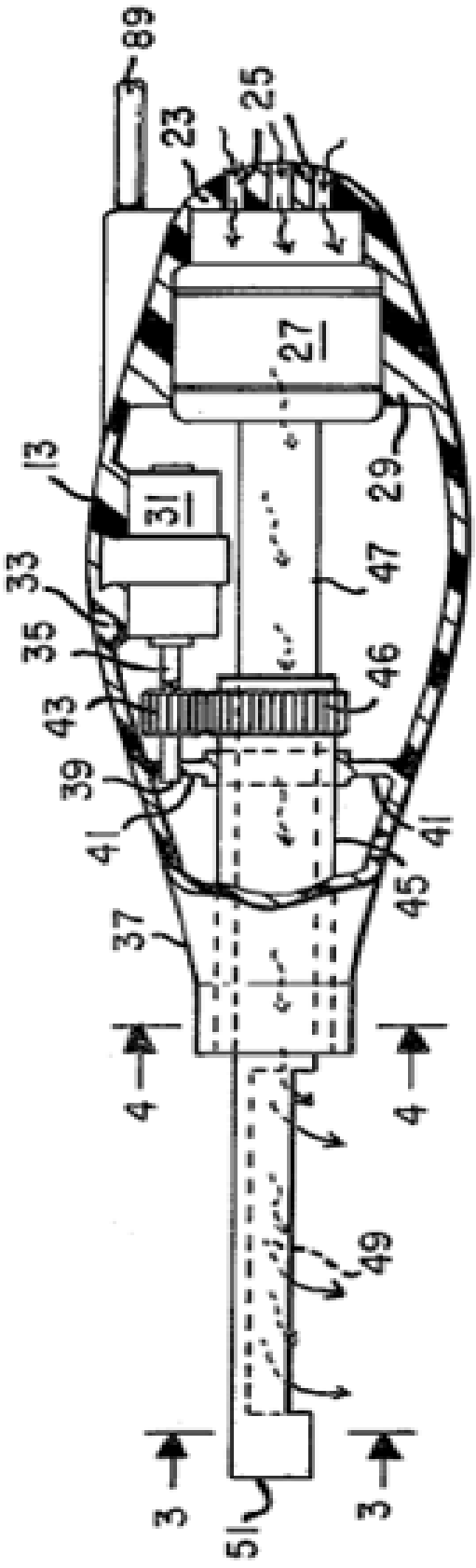

FIG. 2

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FIG. 3

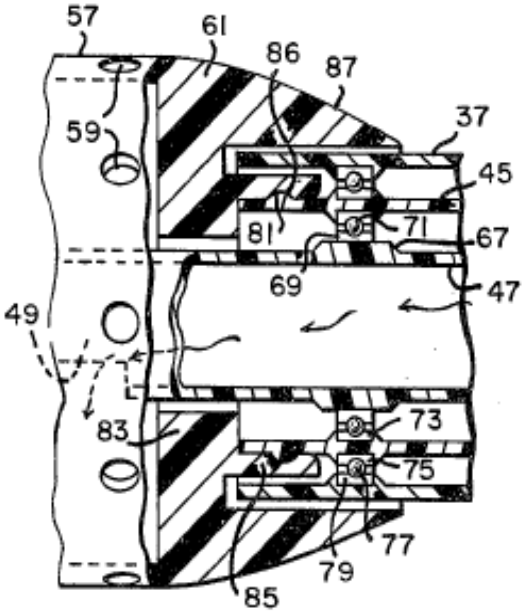

FIG. 5

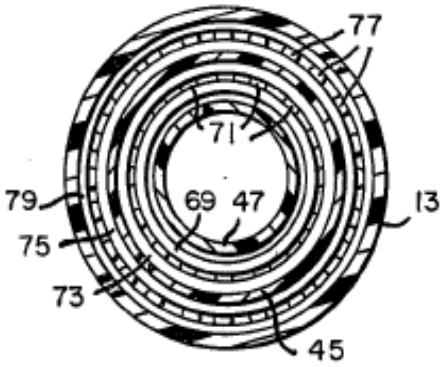

FIG. 4

* * *

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US Patent No. 8,xxx,999
Issue Date: January 8, 2011

ELECTRICALLY DRIVEN AND HEATED HAIR TREATING DEVICE

Filing Date: **August 11, 2008**
Publication Date: **February 17, 2009**
Priority Data: **Continuation of application no. 11/xxx,322 filed on August 14, 2007**

Inventor: **Sonia Subramaniam and Mei Chan**
Assignee: **Wild Hair Products Ltd.**

BACKGROUND OF THE INVENTION

[1] Hair can be more effectively groomed using the combination of hair drying and a rotating brush or comb. Devices presently known have not been able to provide the efficiency of elongated bristles normally associated with a brush, or the plurality of parallel teeth that are normally associated with a comb, in a rotating heated device, as the hair can become entangled in the device. One example of known device that attempted to overcome this problem provided a hollow drum that is motor driven and through which heated air may be passed. The drum is provided with a sleeve on the outer surface thereof so as to engage but only apply a frictional tension to the hair. As an alternative embodiment, the drum may be provided with a multiplicity of small projections or bristles. However, the bristles must be relatively short and serve only to increase the frictional resistance with respect to the hair.

BRIEF DESCRIPTION OF THE DRAWINGS

[2] In the various figures of the drawing like reference characters designate like parts.

[3] FIG. 1 is a schematic view illustrating the manner of use of the hair treating device comprising the present invention;

[4] FIG. 2 is a longitudinal, sectional view through the hair treating device comprising the present invention;

[5] FIG. 3 is an end view taken along lines 3--3 of FIG. 2;

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[6] FIG. 4A is a transverse sectional view taken along lines 4A--4A of FIG. 2; and

[7] FIGS. 4B and 4C are views similar to FIG. 4A that show alternative positions of the combs used with the present invention.

DETAILED DESCRIPTION

[8] FIG. 1 shows an embodiment of a hair treating device 10. The device 10 incorporates a comb and may be used with either hand, and on either side of the individual's head, with the combs being displaced in a direction so as to move along the strands of hair away from the scalp.

[9] The hair treating device 10, which is more completely shown in FIG. 2, is comprised of a first hollow housing 12 that may be made of a suitable insulating plastic and acts as the handle of the device. A motor 14 is suitably mounted in the first hollow housing 12 and is provided with an output shaft 16 having an output pinion 18 secured thereto in any suitable manner.

[10] The output shaft 16 of the motor 14 rotatably supports a fan 20 that is disposed within a cage 22. The fan 20 is constructed so as to force the air to the right as shown in FIG. 2. For this purpose, a plurality of inlet holes 24 are formed in the rear wall of the housing 12.

[11] A pair of brackets 26 support a shaft 28 that has a first crown gear 30 mounted in any suitable manner thereon. The output pinion 18 of the motor 14 is in meshing engagement with the first crown gear 30. A pinion 32 is rigidly secured to the shaft 28 opposite the first crown gear 30 for rotation together therewith.

[12] An elongated shaft 34 is journaled in the housing 12 and also in a flange that forms part of the cage 22 of the fan 20. A pair of spaced apart second and third crown gears 36 and 38 are mounted on the shaft 34 in proximaty to the pinion 32. The other end of the shaft 34 is provided with a drive pinion 40. Intermediate the second crown gear 36 and the drive pinion 40 there is provided, integrally with the shaft 34, a reversing lever 42. The reversing lever 42 is used to axially displace the shaft 34 so that either one of the second or third crown gears 36 or 38 may be placed in meshing engagement with the pinion 32. The lever 42 may be used to selectively displace the

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shaft 34 in both axial directions as shown by the arrows in FIG. 2.

[13] In the housing 12, there is an integral web 46 having a hub 48 in which a non-rotatable shaft 50 is releasably secured by means of a ball and detent arrangement (not shown). By means of a bearing a spur gear 52 is loosely mounted on a circular portion of the shaft 50 and is in meshing engagement with the pinion 40. A second hollow housing 54, typically made of plastic, is rigidly secured to the face of the spur gear 52 and in-line, longitudinally with the handle. The housing 54 is provided with a plurality of elongated axially extending slots 56 through the wall thereof. There may be 1, 2, 3 or more of the slots 56 formed in the housing 54. A crank arm 58 is rigidly secured to one end of the shaft 50 so as to support a second shaft 60 eccentrically with respect to the shaft 50. A second crank arm 62 is rigidly secured to the opposite end of the second shaft 60 and is provided with a third shaft 64 that is mounted in the end of the housing 54.

[14] In the embodiment illustrated in FIG. 2 there are two combs 66a and 66b loosely mounted 180^{o} apart on the second shaft 60. Each of the combs 66a and 66b have teeth 67. The teeth 67 are shown only at the ends of the combs 66a and 66b but are understood to extend the length of each comb 66a and 66b with gaps between each tooth 67. Each comb 66a and 66b is linked through a coupler 69. FIG. 3 shows an end view taken along lines 3--3 of FIG. 2 of the the combs 66 and the housing 54.

[15] The hair treating device 10 may also be provided with a conventional heater mechanism 68 and a thermostat 70. The motor 14 is electrically connected to a switch 72 mounted on the housing 12 of the device 10 with the switch 72 being adapted to be connected to a suitable source of current. Preferably diodes 74 are used in a conventional manner in the circuitry of the device 10. When the motor 14 is energized, the fan 20 will draw ambient air through the openings 24 and pass the air over the heater 68 and through a plurality of holes 76. The heated air is then passed over the combs 66 and outwardly of the housing 54 through the slots 56.

[16] The mode of operation of the present invention may be more fully understood by reference to FIGS. 4A, 4B and 4C. As shown in FIGS. 4A and 4B the second shaft 60 is relatively close to the inside surface of the housing 54.

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[17] In FIG. 4A the comb 66a extends substantially completely outward of the housing 54, whereby the teeth 67a are at a first length as measured from the centre of the housing 54 (i.e., axis along shaft 50 and through the center of the housing 54) and outward to the end of the teeth 67a. The comb 66b is generally flush or perhaps slightly below the outside surface of the housing 54, whereby the teeth 67b are at a second length as measured from the centre of the housing 54 (i.e., axis along shaft 50 and through the center of the housing 54) and outward to the end of the teeth 67b. The second length is shorter than the first length. When the motor 14 is energized, the gear train comprising the pinion 18, the first crown gear 30, the pinion 32, the second crown gear 36, the pinion 40 and the spur gear 52 will rotate. Since the housing 54 is rigidly secured to the spur gear 52 of the housing 12, the housing 54 will also rotate for example in a clockwise direction in relation to the handle.

[18] As the rotation continues, as shown in FIG. 4B, the dimension between the slot 56 for the comb 66a and the shaft 60 will increase so that the comb 66a will be drawn inwardly relative to the outside diameter of the housing 54 and the comb 66b will move in just the opposite relative direction since the dimension between the slot 56 for the comb 66b decreases. At this point, the lengths for combs 66a and 66b, as measured from the centre of the housing 54 (i.e., axis along shaft 50 and through the center of the housing), are essentially the same length. Each of these lengths are longer than the second length of comb 66b in FIG. 4A, as well as the second length for comb 66a below in FIG. 4C.

[19] Continued rotation will bring the combs to the position shown in FIG. 4C wherein the dimension between the slot 56 for the comb 66a and the shaft 60 is at its greatest and the comb 66a is also at its most inward position relative to the outside diameter of the housing 54. The comb 66b in FIG. 4C is at its most relative outward position. In a similar manner as in FIG. 4A, the teeth 67b are now at the first length as measured from the centre of the housing 54 to the end of the teeth 67b, and the comb 66a is generally flush or perhaps slightly below the outside surface of the housing 54, whereby the teeth 67a are at the second length as measured from the centre of the housing 54. The second length is shorter than the first length. It will be obvious that as the rotation of the housing 54 continues, the combs will not only be displaced angularly about the axis of the

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shaft 60 but also will move inwardly and outwardly with respect to the outside surface of the housing 54.

[20] By moving the switching lever 42, for example to the right as shown in FIG. 2, the second crown gear 36 will be disengaged from the pinion 32 and the third crown gear 38 will be placed in engagement with the pinion 32. This will cause an oppositely directed rotation of the first shaft 34, the pinion 40, the spur gear 52 and hence the second housing 54 together with the combs 66. In this position of the switching gear lever 42, the opposite side of the hair may be combed.

[21] From the foregoing it will be apparent that an improved hair treating device has been provided. The combs or brushes are not only angularly displaced but also move inwardly and outwardly with respect to the outside surface of the rotating housing in which the combs are mounted. Entanglement of the hair is therefore, prevented by the moveable combs or brushes, and the combs or brushes may be used with equal facility with each hand on both sides of the head. Switches are provided for reversing the direction of the gear train of the combs in order to permit the aforesaid ambidextrous usage. A heater having an associated thermostat and a fan driven by the motor may also be employed so that hot air may be discharged through the slots in which the combs or brushes are located. One or more combs or brushes may be used with the present invention.

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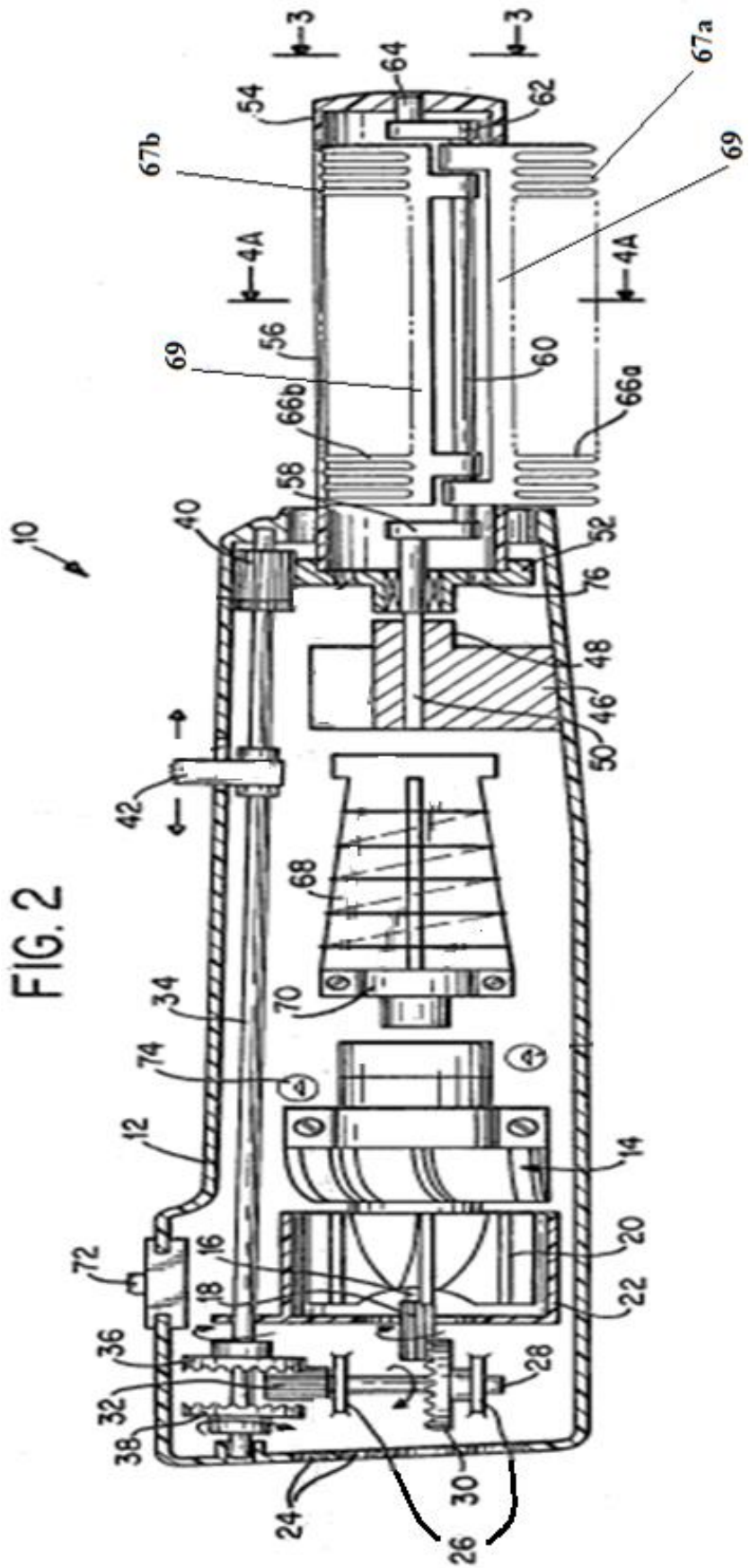
FIG. 2
10
3
3
64
62
54
67a
67b
69
69
4A
4A
56
60
66b
66a
58
40
52
76
48
46
50
42
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FIG.1

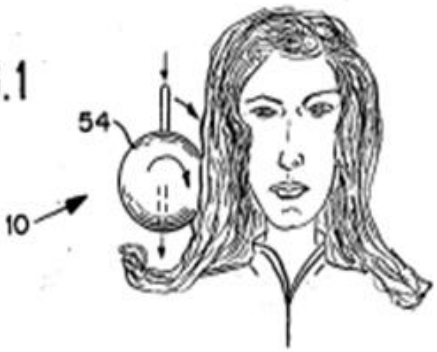


FIG.3

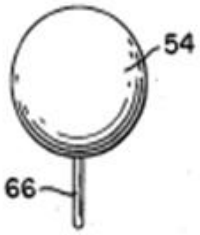


FIG. 4A

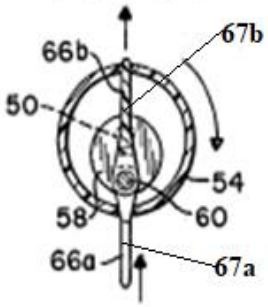


FIG.4B

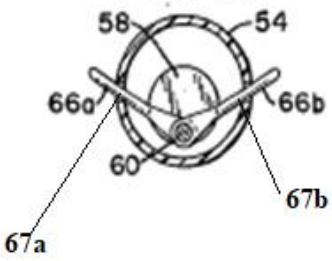
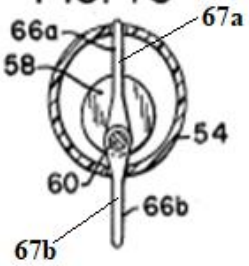


FIG.4C



* * *

PART B – Short Answer Questions (20 marks)

INSTRUCTIONS TO CANDIDATES

Provide an appropriate response to each question. Do not provide extraneous commentary if not directly relevant to the question. Note that statements of authorities or pertinent law (which may include case law and statutory and regulatory provisions) and analysis are required ONLY when requested.

MARKING GUIDE - PAPER B (2021)

PART A

QUESTION 1: [5.5 marks]

a) Name the leading Canadian Supreme Court case pertaining to novelty and obviousness. **[0.5 marks]**

Apotex Inc. v. *Sanofi-Synthelabo Canada Inc.,* 2008 SCC 61, [2008] 3 S.C.R. 265.

b) Evaluate the citability of D1-D3 in view of anticipation and obviousness. Provide reasons why the documents are citable or not, and apply and cite all the appropriate sections of the *Patent Act*. **[5.0 marks]**

- **D1** – Third party EP patent application '496 was published after the claim date of Canadian Patent No. 2,xxx,222. NOT citable for anticipation [28.2(1)*(b)*] and obviousness [28.3*(b)*].

- **D2** – Third party CA patent application '100 has a filing date that is before the claim date of Canadian Patent No. 2,xxx,222. Citable for anticipation [28.2(1)*(c)*]. Third party CA patent application '100 published before claim date. Citable for obviousness [28.3*(b)*].

- **D3** – Third party US patent '999 published before the claim date of Canadian Patent No. 2,xxx,222. Citable for anticipation [28.2(1)*(b)*] and obviousness [28.3*(b)*].

QUESTION 2: [14.0 marks]

Assuming that these elements are essential, construe the following selected claim terms or expressions of Canadian Patent No. 2,xxx,222:

a) "a core having a longitudinal axis" (claims 1 and 6) **[2.5 marks]**

- Brush end 14 (a brush, brush end, or brush portion) has a core 16, 56.

- Longitudinal axis 18, 58. A "longitudinal axis" means an (imaginary) line down the centre of the core 16, 56 along its length.

- The core of the brush end is generally of a cylindrical shape, but may comprise other shapes.

- The core may be comprised of a variety of materials including metal, for heat conduction, or plastic or wood, when heat conduction is not desired.

b) "a heating member for heating the core" (claims 1 and 6) **[2.5 marks]**

- Examples of the heating member can include i) a heating element within or integral with the core so the core may be heated while the rotating hair brush is in use, and/or ii) a heated blower within or integral with the handle, or otherwise situated to provide hot air to vent out from the core or otherwise blowing out hot air so the hair is heated with hot air while the rotating hair brush is in use.

- In Fig. 6, the heating member is a heated blower that can provide a substantially unobstructed flow of air through apertures 104 in the core 56 of the rotating hair brush 50. The heater assembly can extend from the fan assembly, to within the core 56 (current is supplied via a power cord 102 or other means, such as battery).

- The interior of the core 56 may also have other heating members such as heating elements so that air forced through the heating assembly can be heated and forced through the apertures 104 in the core 56 for the purpose of both drying and styling hair.

- The shape of the heating member may vary (paragraph [33]).

c) "a plurality of projections" (claims 1, 2 and 6) **[2.0 marks]**

- a plurality of projections 20, 62 (62a, 62b, 62c, and 62d) that extend radially outward from the core 16, 56 at a first distance 22, 64 from the longitudinal axis 18, 58.

- "Plurality" means more than one.

- Generally a type of hair brush bristle including boar bristles, nylon or other plastic bristles, or a combination of bristle types, such as boar and plastic bristles. The nylon or plastic bristles may have rounded or balled ends to prevent scratching of the scalp, and boar and plastic or nylon bristles may be combined in one brush for other hair brushing applications.

- The projections and the movable members are separate elements (e.g. movable members 66a and 66b and projections 62a and 62b). The movable members prevent hair from tangling in the brush projections.

d) "at least one pair of movable members" (claims 1 and 6) **[2.5 marks]**

- Movable members 24, 66; a first movable member 24a, 66a and a second movable member 24b, 66b.

- Distal ends of the movable members may be of varying shapes, such as rounded or an inverted rounded triangular shape (Figs. 3A and 3B), or other suitable shapes having a preferably rounded distal end.

- The movable members prevent hair from tangling in the brush projections.

- Capable of moving between retracted and extended positions; the pair of movable members move together between opposing positions.

- "pair" means two movable members and "at least one pair" means one or more pairs (e.g. one pair of movable members, two pairs of movable members, etc.).

e) "a retracted position" (claims 1 and 6) **[2.5 marks]**

- A retracted position 28, 70 where the distal end 26, 68 of the movable member 24, 66 is distant radially from the longitudinal axis 18, 58 at a second distance 30, 72 (e.g. retracted position) that is less than the first distance 22, 64 (e.g. intermediate position) (Figs. 1 and 4).

- A first movable member 24a is shown positioned in the retracted position 28 (FIG. 2A); the second movable member 24b is shown positioned in the retracted position 28

(FIG. 2B). The movable members 66a and 66b move between opposing positions including a retracted position 70 (Fig. 4, 5A, 5C).

- The rotating hair tool allows the bristles (projections) to freely engage a section of hair that is intended to be brushed when the movable member is in the retracted position.

- The movable member(s) 24, 66 smooth the bottom of the hair when the hair is in the retracted position 28, 70.

f) "a second distance that is less than the first distance" (claims 1 and 6) **[2.0 marks]**

- A retracted position 28, 70 where the distal end 26, 68 of the movable member 24, 66 is distant radially from the longitudinal axis 18, 58 at a second distance 30, 72 that is less than the first distance 22, 64 (Figs. 1 and 4).

- Intermediate position 70(i) in Fig. 5B can be considered the "first distance" and Fig. 5A shows the "second distance" for 66a as the retracted position 70.

- The second distance is the retracted position, which is shorter than the first distance (e.g. intermediate position).

<u>QUESTION 3:</u> [29.5 marks]

Are claims 1, 2, 3, 4, and 5 anticipated by any one of D1-D3? Provide detailed supporting arguments and references to the appropriate sections of the documents and figures. In the event that features are repeated in subsequent claims, it is acceptable to refer to analysis in previous claim(s).

Anticipation Breakdown **CA '222**	**D2 – CA '100**	**D3 – US '999**
Claim 1		

A **hair styling tool** comprising:	Yes, rotary hair styler 11 (Fig. 1)	Yes, hair treating device 10 (Figs. 1 & 2)
a) a handle;	Yes, a hollow handle 13 (Fig. 1)	Yes, first hollow housing 12 (Fig. 2)
b) a core having a **longitudinal axis** and **attached to the handle;**	Yes, a tube 57 (Fig. 1 & 5). The tube 57 is coupled to the hollow handle 13, along a lengthwise direction (paragraph [12], page 31, lines 5-6).	Yes, a second hollow housing 54 and in-line, longitudinally with the handle 12 (paragraph [13], page 39, lines 6-8) and the housing 54 is rigidly secured to the spur gear 52 of the housing.
c) a heating member for heating the core;	Yes, fan and heater unit 27 (Fig. 2) generates a flow of hot air which is received by conduit 47 and conducted through hollow center portion of drive shaft 45 (paragraph [11], page 30, lines 21-23). The openings 59 in the tube 57 are adapted to receive the flow of hot air which exits from the conduit 47 via the slot 49.	Yes, a conventional heater mechanism 68 and a thermostat 70. The heated air is passed over the combs 66 and outwardly of the housing 54 through the slots 56. (paragraph [15])
d) a motor for **rotating the core about** its **longitudinal axis relative** to **the handle;**	Yes, the electric motor 31 (Fig. 2). The motor shaft 35 extends from the motor 31 toward the brush end 37 of the handle 13. The tube 57 communicates rotatably at one end 61 with the drive shaft 45, which in turn is driven by the gears 43 and 46, the shaft 35 and the motor 31.	Yes, when the motor 14 is energized the gear train comprising the pinion 18, the first crown gear 30, the pinion 32, the second crown gear 36, the pinion 40 and the spur gear 52 will rotate. Since the housing 54 is rigidly secured to the spur gear 52 of the housing 12, the housing 54 will also rotate for example in clockwise direction in relation to the handle. (paragraph [17], page 40, lines 8-12)
e) a plurality of projections extending **radially outwardly** from the core **at a first fixed distance** from the **longitudinal axis;**	Yes, bristles 55 attached to a tube 57 and extending outwardly (paragraph [12], page 31, line 1). The bristles 55 can be any suitable length and, typically, all one fixed length from the core. The	No, the combs 66a and 66b are not considered a plurality of projections and are <u>not</u> at a <u>fixed</u> distance. The combs 66a and 66b move. (paragraph [18])

	bristles 55 are fixed to the tube 57.	
f) at least one pair of movable members comprising **a first movable member and a second movable member** and positioned at **opposing sides of the core and connected through the core** with **at least one connector**,	No movable members.	Yes, two combs 66a (first movable member) and 66b (second movable member) extend substantially completely outward of the housing 54 (core) and loosely mounted 180º apart (opposing sides) on the second shaft 60 (connector) (Figs. 2, 4A and 4C).
f) (cont.) the first movable member and the second movable member **each extending radially outward from the at least one connector to a distal end having a distal surface**,	No movable members.	Yes, two combs 66a (first movable member) and 66b (second movable member) extend substantially completely outward of the housing 54 (core) from the shaft 60 (connector). (Figs. 2, 4A and 4C). Each comb 66 has teeth 67 that each have a surface and ends that extend outwardly from the shaft 60. (paragraph [0014], page 39, lines 15-17).
f) (cont.) and wherein **the pair of movable members move together between opposing positions**, the opposing positions comprising:	No movable members.	Yes, as shown in Figs. 4Aand 4C, the combs 66a and 66b will move in the opposite relative direction. The comb 66a will be drawn inwardly relative to the outside diameter of the housing 54 and the comb 66b will move in just the opposite relative direction. (paragraph [18], page 40, lines 13-15).
f) (cont.) (i) a retracted position wherein the movable member **distal end is distant radially from the longitudinal axis** at **a second distance** that is **less than the first distance,** and	No movable members.	Yes, as shown, for the movement from Fig. 4A to Fig. 4B, the comb 66a (teeth 67a), which has a surface situated at a distance away from the centre of the housing 54, is drawn inwardly relative to the outside diameter of the housing 54. At this point, **the lengths for combs 66a and 66b,** as measured

		from the centre of the housing 54 (i.e. axis along shaft 50 and through the center of the housing) **(e.g. longitudinal axis)**, are essentially the same. **(e.g. the first distance**). Each of these lengths are **longer than the second length**…the second length for comb 66a shown in FIG. 4C. **(e.g. the second distance)**. Thus, the **second distance** is **less than the first distance.** In Fig. 4C, the comb 66a is at its most inward position relative to the outside diameter of the housing 54. (**e.g. retracted position**).
f) (cont.) (ii) an extended position wherein the movable member **distal end is distant radially from the longitudinal axis** at **a third distance** that is **more than the second distance**,	No movable members.	Yes, as shown, for the movement from Fig. 4B to Fig. 4C, the comb 66b is at its most relative outward position **(e.g. extended position**). The teeth 67b are now at the first length **(e.g. third distance)** as measured from the centre of the housing 54 **(e.g. longitudinal axis)**, to the end of the teeth 67b, and the comb 66a is below the outside surface of the housing 54, whereby the teeth 67a are at the second length **(e.g. second distance)** as measured from the centre of the housing 54 (**e.g. longitudinal axis)**, wherein the second length is shorter than the first length. Thus, the **third distance** is **more than the first distance.**
f) (cont.) whereby when **the first movable member moves from its extended position to its retracted position, the second**	No movable members.	Yes, the movements of comb 66a (first movable member) and comb 66b (second movable member) are shown in Figs. 4A to 4C. Comb 66a extends substantially

movable member moves together with the first movable member from its retracted position to its extended position, and		completely outward of the housing 54 (e.g. extended position) (Fig. 4A) to its most inward position relative to the outside diameter of the housing 54 (e.g. retracted) (Fig. 4C).
when **the second movable member moves from its extended position to its retracted position**, the **first movable member moves together with the second movable member from its retracted position to its extended position.**	No movable members.	Yes, the movements of comb 66a (first movable member) and comb 66b (second movable member) are shown in Figs. 4A to 4C. Comb 66b is generally flush or perhaps slightly below the outside surface of the housing 54 (e.g. retracted position) (Fig. 4A) and comb 66b is at its most relative outward position. (e.g. extended position) (Fig. 4C).
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[6.5 marks]	**[15.0 marks]**
Claim 2 (dep on 1)		
The hair styling tool according to claim 1 wherein at least a portion of the plurality of projections are positioned in a row extending parallel to a longitudinal length of the core and between the pair of movable members.	No, the bristles 55 are arranged in rows along the length of the tube 57 and each row is arranged equidistant from an adjacent row (parallel as shown in Fig. 1) but no movable members.	No, the combs 66a and 66b are not considered a plurality of projections but are, instead, the movable members.
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[1.0 mark]	**[1.0 mark]**
Claim 3 (dep on 1)		
The hair styling tool according to claim 1 wherein the distal end of the movable	No, there are no movable members.	No, the combs 66a and 66b have teeth 67a, 67b situated at a distance away from the centre of

member extends continuously along the entire length of the rotatable core.		the housing 54 (Fig. 1, 4A-4C paragraph [17]). The teeth 67 extend the length of each comb 66a and 66b but there are gaps between each tooth 67 so that the teeth do not extend the entire length of the housing 54 (paragraph [14]).
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[1.0 mark]	**[1.0 mark]**
Claim 4 (dep on 1)		
The hair styling tool according to claim 1 wherein the heating member is a heated blower.	Yes, fan and heater unit 27 (Fig. 2) generates a flow of hot air which is received by conduit 47 and conducted through hollow center portion of drive shaft 45 (paragraph [11], page 30, lines 22-24). The openings 59 in the tube 57 are adapted to receive the flow of hot air which exits from the conduit 47 via the slot 49.	Yes, a conventional heater mechanism 68 and a thermostat 70. The heated air is passed over the combs 66 and outwardly of the housing 54 through the slots 56.
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[1.0 mark]	**[1.0 mark]**
Claim 5 (dep on 1)		
The hair styling tool according to claim 1 wherein the projections are bristles.	Yes, bristles 55	No, the combs 66a and 66b are not considered a plurality of projections as construed. These are considered movable parts.
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[1.0 mark]	**[1.0 mark]**

QUESTION 4: [27.0 marks]

Is claim 6 obvious in view of D1-D3? Provide detailed supporting arguments, apply the appropriate test from the case law, and refer to the appropriate sections of the documents and figures.

A) POSITA and CGK **[1.0 mark]**

(i) Person skilled in art

- engineer or designer experienced in manufacture of hair styling tools.

(ii) Common general knowledge

- person skilled in the art would be familiar with a variety of hair styling tools, including, for example, those used in hair salons. Examples include roller brushes, hair dryers, and other such tools.

B) Inventive concept **[10.0 marks]**

Inventive concept is a combination of the following features:

a) Core [1.0 mark]

- The core is the central part of the brush end and has a longitudinal axis.
- The core is connected to the handle so that it may rotate relative (independent) to the handle.

b) Heating Member for Heating the Core [1.5 marks]

- The heating member is, for example, a heated blower or heating element that is capable of heating the core and thus, the hair while in use.
- Examples of the heating member include a heating element within or integral with the core so the core is heated while the rotating hair brush is in use, and/or a heated blower

member extends continuously along the entire length of the rotatable core.		the housing 54 (Fig. 1, 4A-4C paragraph [17]). The teeth 67 extend the length of each comb 66a and 66b but there are gaps between each tooth 67 so that the teeth do not extend the entire length of the housing 54 (paragraph [14]).
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[1.0 mark]	**[1.0 mark]**
Claim 4 (dep on 1)		
The hair styling tool according to claim 1 wherein the heating member is a heated blower.	Yes, fan and heater unit 27 (Fig. 2) generates a flow of hot air which is received by conduit 47 and conducted through hollow center portion of drive shaft 45 (paragraph [11], page 30, lines 22-24). The openings 59 in the tube 57 are adapted to receive the flow of hot air which exits from the conduit 47 via the slot 49.	Yes, a conventional heater mechanism 68 and a thermostat 70. The heated air is passed over the combs 66 and outwardly of the housing 54 through the slots 56.
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[1.0 mark]	**[1.0 mark]**
Claim 5 (dep on 1)		
The hair styling tool according to claim 1 wherein the projections are bristles.	Yes, bristles 55	No, the combs 66a and 66b are not considered a plurality of projections as construed. These are considered movable parts.
Enablement + Conclusion	No disclosure, no enablement	No disclosure, no enablement
	[1.0 mark]	**[1.0 mark]**

QUESTION 4: [27.0 marks]

Is claim 6 obvious in view of D1-D3? Provide detailed supporting arguments, apply the appropriate test from the case law, and refer to the appropriate sections of the documents and figures.

A) POSITA and CGK **[1.0 mark]**

(i) Person skilled in art

- engineer or designer experienced in manufacture of hair styling tools.

(ii) Common general knowledge

- person skilled in the art would be familiar with a variety of hair styling tools, including, for example, those used in hair salons. Examples include roller brushes, hair dryers, and other such tools.

B) Inventive concept **[10.0 marks]**

Inventive concept is a combination of the following features:

a) Core [1.0 mark]

- The core is the central part of the brush end and has a longitudinal axis.
- The core is connected to the handle so that it may rotate relative (independent) to the handle.

b) Heating Member for Heating the Core [1.5 marks]

- The heating member is, for example, a heated blower or heating element that is capable of heating the core and thus, the hair while in use.
- Examples of the heating member include a heating element within or integral with the core so the core is heated while the rotating hair brush is in use, and/or a heated blower

C) Differences **[3.0 marks]**

- D2 **[1.5 marks]**

  i) No movable members. The bristles are fixed to the tube 57.

  ii) Even if projections (bristles 55) were considered to be the movable members, these are not positioned at opposing sides of the tube 57 in pairs and connected through the core with a connector.

  iii) No movable members having distal ends that extend continuously along the entire length of the core.

- D3 **[1.5 marks]**

  i) No plurality of projections at a fixed distance from the longitudinal axis of the core.

  ii) The movable members do not extend continuously along the entire length of the core.

  iii) The movable members and the projections are not separate elements.

D) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require a degree of inventiveness? **[13.0 marks]**

a) Not obvious in view of D2 alone [2.0 marks]

i) No movable members. The bristles 55 in D2 are attached to the tube 57 and extend outwardly from the tube 57 (paragraph [0012], page 30, line 1). The bristles are fixed to the tube 57.

ii) No pairs of movable members and not connected through the core with a connector. The bristles 55 are equivalent to the "plurality of projections" and even if these were considered to be "movable members", these are not positioned at opposing sides of the tube 57 in pairs and connected through the core with a connector.

iii) No movable members having distal ends that extend continuously along the entire length of the core and move together between opposing positions (retracted and extended positions) to prevent tangling.

b) Not obvious in view of D3 alone [3.0 marks]

i) No plurality of projections at a first fixed distance. The combs 66a and 66b of D3 are not considered a plurality of projections and are not at a fixed distance. The combs 66a and 66b move (e.g. retract or extend) relative to the core.

ii) The movable members (two combs 66a (first movable member) and 66b (second movable member)) of D3 do not extend continuously along the entire length of the core. The teeth 67 extend the length of each comb 66a and 66b but there are gaps between each tooth 67 so that the teeth do not extend the entire length of the housing 54 (paragraph [14]).

iii) The movable members and the projections are not separate elements in D3. The movable elements are the projections themselves so that the movable members do not push hair away from the projections to keep hair from tangling in the projections as the movable members move to their extended position.

c) Not obvious when combining D2 and D3 [7.0 marks]

- **Not obvious to combine the movable combs of D3 with the projections (bristles) of D2.**

o D3 teaches only movable combs/brushes. As taught in D3 at paragraph [21], entanglement of the hair is prevented by the movable combs or brushes and therefore, teaches away from fixed combs or brushes. If D3 was combined with D2, the resulting device would be a rotating brush with projections, such as bristles, which move in and out. The claimed invention requires the combination of both projections at a "first fixed distance from the longitudinal axis" (i.e. non-movable) and "at least one pair of movable members".

o Neither D2 nor D3 teach or discloses at least one pair of movable members wherein “the distal ends of the movable members extend continuously along the entire length of the core." The movable members of D3 only project beyond the housing 54 at either end of the housing 54 (core), as can be seen in Figure 2 and D2 does not have any movable members. Moreover, the projections of D2 do not have “distal ends” that extend continuously along the entire length of the core. The feature of the movable members extending continuously

along the entire length of the core is advantageous because the movable members disengage the hair along the length of the core, in order to effectively prevent tangling. In use, the projections engage the user's hair, and in order to prevent tangling, the user's hair must be disengaged from the projections. The movable members serve this function by disengaging the user's hair and preventing tangling along the length of the core. D2 and D3 do not teach this feature.

E) Conclusion: Not obvious **[1.0 mark]**

QUESTION 5: [2.0 marks]

Apart from issues related to D1-D3, identify and briefly explain **two** potential issues that may affect the validity of Canadian Patent No. 2,xxx,222.

Any TWO answers from the following (each 1.0 mark):

- Issue of ownership – Weston invented the invention using tools in the repair shop while he was employed as a mechanic at Automobiles, Inc.
- Issue of whether proper inventors have been named – Nash is not an inventor and should not have been named as an inventor. His role was only to volunteer for testing of the hair styling tool.
- Issue of possible public disclosure before the grace period – The customer was present in the salon during testing of the hair styling tool before Weston filed a U.S. provisional patent application for the hair styling tool.

QUESTION 6: [2.0 marks]

Assuming that Weston filed his U.S. provisional on February 20, 2012 before he showed the hair styling tool to Wendy, identify and briefly explain one potential issue that may affect the validity of Canadian Patent No. 2,xxx,222 filed on February 12, 2013. Cite the relevant section of the *Patent Act*.

- Since the blow drying feature was Wendy's idea and it was a feature added in the subsequent Canadian Patent No. 2,xxx,222 filed on February 12, 2013, the claimed subject

matter to the hair styling tool is not entitled to the earlier US provisional filing claim date; February 20, 2012. Section 28.1(1) of the *Patent Act*.

- Additional art may be citeable since the earlier claim date is not applicable to the blow drying feature.

END OF QUESTIONS IN PART A

PART B – Short Answer Questions

QUESTION 7: [5.5 marks]

A Canadian patent application, CA 2AAABBB, relating to invention X was filed in January 2020. CA 2AAABBB includes two alternative embodiments: X1 and X2. Embodiment X1 is not sufficiently disclosed since essential technical information is missing. Embodiment X2 is sufficiently disclosed.

For each of the following statements (a)-(d), indicate whether the statement is true or false. Cite the relevant section of the *Patent Act* or *Patent Rules*:

(a) An objection from the Examiner regarding embodiment X1 can be overcome by filing additional technical information.

(b) If the Examiner does not raise any objections regarding lack of support, this will not be a valid ground for impeaching the patent granted on the basis of CA 2AAABBB.

(c) If the missing essential technical information regarding embodiment X1 is present only in the abstract, the essential technical information can be used to interpret the claims of CA 2AAABBB.

(d) An objection from the Examiner can be overcome by restricting CA 2AAABBB to embodiment X2.

ANSWER TO QUESTION 7: [5.5 marks]

a) FALSE – Section 27(3), Section 38.2, or Section 38.2(2) of the *Patent Act.*

b) FALSE - A valid ground to attack validity is lack of sufficiency of disclosure – Section 27(3) of the *Patent Act*. - It is irrelevant if the Examiner did not raise an objection.

c) FALSE – Subsection 55(8) of the *Patent Rules* states that the abstract "must not be taken into account for the purpose of interpreting the scope of protection sought or obtained."

d) TRUE – Since X2 is sufficiently disclosed, a patent may be granted based on X2. Section 27(3) of the *Patent Act* or Section 60 of the *Patent Rules.*

QUESTION 8: [2.0 marks]

Company Z filed a Canadian patent application CA 2XXXYYY on 30 January 2018, without claiming any priority. CA 2XXXYYY has eleven claims. Alina and Brittany are named as the inventors of CA 2XXXYYY.

Are the following statements true or false? Cite the relevant section of the *Patent Act* or *Patent Rules:*

a) The applicant can correct Alina's name to "Elina."

b) The applicant cannot continue prosecution if it is discovered that Brittany is not an inventor of CA2 XXXYYY.

ANSWER TO QUESTION 8: [2.0 marks]

a) True. Section 106 of the *Patent Rules* – An error in the name of an applicant or an inventor in an application for a patent must be corrected by the Commissioner on the request of the applicant if the request is made on or before the day on which the final fee set out in item 13 of Schedule 2 is paid or, if the final fee is refunded, on or before the day on which the final fee is paid again, and the correction does not result in a change in their identity.

b) False. Section 31(3) of the *Patent Act* – Where an application is filed by joint applicants and it subsequently appears that one or more of them has had no part in the invention, the prosecution of the application may be carried on by the remaining applicant or applicants on satisfying the Commissioner by affidavit that the remaining applicant or applicants is or are the sole inventor or inventors.

QUESTION 9: [2.5 marks]

The claimed invention of a patent application is directed to an explosive composition "comprising 60-90% solid ammonium nitrate, and 10-40% water-in-oil in which sufficient aeration is entrapped to enhance sensitivity to a substantial degree." The application discloses that the explosive requires both fuel (ammonium nitrate) and oxygen aeration to "sensitize the composition." A journal article, published more than two years before the effective filing date of the application, discloses explosive compositions containing water-in-oil emulsions having identical ingredients to those claimed, in ranges overlapping with the claimed composition. The only element of the claim not recited in the journal article is "sufficient aeration entrapped to enhance sensitivity to a substantial degree." The journal article does not recognize that sufficient aeration sensitizes the fuel to a substantial degree. In addition to the journal article, a magazine article printed three years ago contains test data demonstrating that "sufficient aeration" is necessarily an inherent element in the prior art explosive composition under the circumstances.

Which of the following statements are true? Cite the relevant case law.

(a) The journal article anticipates the claim because it discloses every limitation of the claim either explicitly or inherently.

(b) The journal article does not anticipate the claim because the journal article does not recognize an inherent property.

(c) The journal article does not anticipate the claim because the journal article does not recognize an inherent function of oxygen.

(d) The journal article does not anticipate the claim because the journal article does not recognize an inherent ingredient, oxygen.

(e) (b), (c) and (d).

ANSWER TO QUESTION 9: [2.5 marks]

Option (a) is true. An enabling disclosure is considered to disclose everything that would inevitably or necessarily occur or be done by a person practising the invention. Old and known subject-matter is not rendered novel simply by disclosing and claiming a feature which is inherently (i.e., necessarily present) or implicitly (i.e., suggested but not directly expressed) found in the prior art. The concepts of inherent and implicit disclosure are related.
Abbott Laboratories v. Canada (Minister of Health) 2006 FCA 187 at paragraphs 23 to 25; or
Calgon Carbon Corporation v. North Bay (City) 2006 FC 1373 at paragraphs 114 to 136.

QUESTION 10: [2.0 marks]

ABC Inc. is a research-based pharmaceutical company and owner of Canadian Patent X,XXX,123. The '123 patent has only one claim directed to the use of a known compound for the treatment of liver conditions X, Y and Z at a dosage of 200 mg/day.

Generic Co. sells the compound as a drug and publishes a document intended for medical practitioners, indicating that this drug may be used to treat liver conditions X, Y and Z at a dosage of 200 mg/day.

(a) Assuming the claim is valid, why would Generic Co. not be guilty of direct infringement of the '123 patent? Cite the relevant case law.

(b) Generic Co. determined that the treatment of liver conditions X, Y and Z requires a dosage of 300 mg/day. Does this affect the validity of '123 patent? Provide a reason and cite the relevant section of the *Patent Act* or *Patent Rules*.

ANSWER TO QUESTION 10: [2.0 marks]

(a) Generic Co. is not performing the actions covered by the claim.
Apotex Inc. v. Astrazeneca Canada Inc., 2017 FCA 9 (CanLII) or Weatherford Canada Inc. v. Corlac Inc., 2011 FCA 288

(b) YES. The claim would be held invalid for lack of utility. Section 2 of the *Patent Act*.

QUESTION 11: [4.0 marks]

Small Business Co. is owner of Canadian Patent X,XXX,456, having a filing date of November 7, 2009. As the owner of Small Business Co., Bob has been sending instructions to pay the maintenance fees for the '456 patent every year by e-mail, in reply to a reminder e-mail by his patent agent. In August 2020, Small Business Co.'s junk e-mail filter was updated by their internet service provider, which caused the patent agent's e-mails to erroneously get filtered out as junk. Having not received any reminder e-mails from his patent agent, Bob did not instruct the patent agent to pay the maintenance fee for the '456 patent that was due on November 7, 2020. However, on September 20, 2021, Bob decides to call his patent agent on a whim.

(a) What can the patent agent tell Bob about the status of the '456 patent, assuming that a Maintenance Fee Notice dated December 15, 2020 was sent by the Canadian Intellectual Property Office and timely received by the patent agent? Cite the relevant section of the *Patent Act.*

(b) What actions can be taken by Bob with respect to the '456 patent? Cite the relevant section of the *Patent Act* and *Patent Rules.*

(c) What argument can be made in favour of the actions proposed in part (b)?

ANSWER TO QUESTION 11: [4.0 marks]

(a) The patent is deemed expired on November 7, 2020. Section 46(4) of the *Patent Act*.

(b) The patent may be reinstated by payment of the maintenance fee, a late fee, and a reinstatement fee, as well as an explanation that the failure to pay the maintenance fee occurred despite "due care" being taken. Section 46(5) of the *Patent Act*, or Sections 115 and 116 of the *Patent Rules*.

(c) Due care may be established by showing that communication channels that were successfully used in the past (e-mails) could be reasonably relied on and there was no reason to expect them to fail.

QUESTION 12: [2.0 marks]

International Patent Application No. PCT/CA2019/XXXXX9 has a priority date of October 31, 2018 and was filed on October 31, 2019 by the Applicant, Kitty Classic Ltd. On October 15, 2021, the Applicant calls you in a panic advising that they missed the 30-month deadline for national phase entry in Canada for PCT/CA2019/XXXXX9 but they understand that they can still enter national phase late in Canada. Are you permitted to enter national phase late in Canada? Please explain the steps required, assuming regular requirements for national phase entry are met. Cite the relevant sections of the *Patent Rules*.

ANSWER TO QUESTION 12: [2.0 marks]

Yes. Pay the fee for reinstatement of rights set out in item 22 of Schedule 2 (i.e. $200) and request that the rights of the Applicant be reinstated and failure to enter the national phase by the 30-month due date was unintentional. Section 154(3) of the *Patent Rules*.

QUESTION 13: [2.0 marks]

Your client is Company A, Inc., the patentee of CA X,XXX,999. What steps would you take at the Canadian Intellectual Property Office for each of the following fact scenarios? Cite the relevant section of the *Patent Rules*.

(a) The name of Company A, Inc. was changed to Company A, Ltd. but did not result in a new legal entity.

(b) CA X,XXX,999 was assigned from Company A, Inc. to Company B.

ANSWER TO QUESTION 13: [2.0 marks]

(a) Request the recording of a name change under Section 125 of the *Patent Rules.*

(b) Request the recording of a transfer of the patent under Section 126 of the *Patent Rules*.

END OF QUESTIONS IN PART B

within or integral with the handle, or otherwise situated to provide hot air to vent out from the core or otherwise blowing out hot air so the hair is heated with hot air while the rotating hair brush is in use.

- The core can have apertures so that the heating member can blow air through the apertures to the hair.

c) <u>A Motor for Rotating the Core</u> [1.0 mark]

- The motor is used for rotating the core about its longitudinal axis relative to the handle. The motor rotates the core and therefore the brush itself.

- A rotating member can comprise the motor for rotating the core about its longitudinal axis relative to the handle.

d) <u>Plurality of Projections</u> [2.0 marks]

- The projections extend radially outward from the core at a first (fixed) distance from the longitudinal axis of the core. The projections do not move (e.g. retract or extend) relative to the core.

- The projections can be a type of hair brush bristle including boar bristles, nylon or other plastic bristles, or a combination of bristle types, such as boar and plastic bristles. The nylon or plastic bristles may have rounded or balled ends to prevent scratching of the scalp, and boar and plastic or nylon bristles may be combined in one brush for yet other hair brushing applications.

- The projections and the movable members are separate elements. The projections are capable of engaging hair.

e) <u>At Least One Pair of Movable Members</u> [4.5 marks]

- A first movable member and a second movable member are positioned at opposing sides of the core and connected through the core with at least one connector.

- The movable members have distal ends that extend radially outward from the core.

- Each of the movable members have distal ends that extend continuously along the length of the core.

- The pair of movable members move together between opposing positions. The first movable member moves from a retracted position to an extended position, and the second movable member moves together with the first movable member from its extended position to its retracted position, and vice versa.

- The movable member distal end is distant radially from the longitudinal axis at a second distance that is less than the first distance. The second distance is the retracted position, which is shorter than the first distance (e.g. intermediate position).

- The movable member distal end is distant radially from the longitudinal axis at a third distance that is more than the second distance. The second distance is the retracted position and the third distance is the extended position.

- The movable members prevent hair from tangling in the brush projections by moving between retracted and extended positions. The movable member(s) smooth the bottom of the hair when the hair is in the retracted position and push the hair outward when the movable member is in the extended position which makes the hair less likely to tangle.

- When the brush rotates, the movable member can be in the retracted position and the brush projections engage a section of hair that is intended to be brushed. As the brush end rotates, the hair encounters a movable member in the extended position and any hair currently engaged in the bristles adjacent to the extended movable member will be pushed out and away from the bristles, thus eliminating tangling in the area of the brush immediately adjacent to the extended movable member.

- The distal ends of the movable members can concentrate heat and smooth hair while under tension against hair as the brush end rotates.

C) Differences **[3.0 marks]**

- D2 **[1.5 marks]**

  i) No movable members. The bristles are fixed to the tube 57.

  ii) Even if projections (bristles 55) were considered to be the movable members, these are not positioned at opposing sides of the tube 57 in pairs and connected through the core with a connector.

  iii) No movable members having distal ends that extend continuously along the entire length of the core.

- D3 **[1.5 marks]**

  i) No plurality of projections at a fixed distance from the longitudinal axis of the core.

  ii) The movable members do not extend continuously along the entire length of the core.

  iii) The movable members and the projections are not separate elements.

D) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require a degree of inventiveness? **[13.0 marks]**

a) Not obvious in view of D2 alone [2.0 marks]

i) No movable members. The bristles 55 in D2 are attached to the tube 57 and extend outwardly from the tube 57 (paragraph [0012], page 30, line 1). The bristles are fixed to the tube 57.

ii) No pairs of movable members and not connected through the core with a connector. The bristles 55 are equivalent to the "plurality of projections" and even if these were considered to be "movable members", these are not positioned at opposing sides of the tube 57 in pairs and connected through the core with a connector.

iii) No movable members having distal ends that extend continuously along the entire length of the core and move together between opposing positions (retracted and extended positions) to prevent tangling.

b) Not obvious in view of D3 alone [3.0 marks]

i) No plurality of projections at a first fixed distance. The combs 66a and 66b of D3 are not considered a plurality of projections and are not at a fixed distance. The combs 66a and 66b move (e.g. retract or extend) relative to the core.

ii) The movable members (two combs 66a (first movable member) and 66b (second movable member)) of D3 do not extend continuously along the entire length of the core. The teeth 67 extend the length of each comb 66a and 66b but there are gaps between each tooth 67 so that the teeth do not extend the entire length of the housing 54 (paragraph [14]).

iii) The movable members and the projections are not separate elements in D3. The movable elements are the projections themselves so that the movable members do not push hair away from the projections to keep hair from tangling in the projections as the movable members move to their extended position.

c) Not obvious when combining D2 and D3 [7.0 marks]

- **Not obvious to combine the movable combs of D3 with the projections (bristles) of D2.**

o D3 teaches only movable combs/brushes. As taught in D3 at paragraph [21], entanglement of the hair is prevented by the movable combs or brushes and therefore, teaches away from fixed combs or brushes. If D3 was combined with D2, the resulting device would be a rotating brush with projections, such as bristles, which move in and out. The claimed invention requires the combination of both projections at a "first fixed distance from the longitudinal axis" (i.e. non-movable) and "at least one pair of movable members".

o Neither D2 nor D3 teach or discloses at least one pair of movable members wherein “the distal ends of the movable members extend continuously along the entire length of the core." The movable members of D3 only project beyond the housing 54 at either end of the housing 54 (core), as can be seen in Figure 2 and D2 does not have any movable members. Moreover, the projections of D2 do not have “distal ends” that extend continuously along the entire length of the core. The feature of the movable members extending continuously

along the entire length of the core is advantageous because the movable members disengage the hair along the length of the core, in order to effectively prevent tangling. In use, the projections engage the user's hair, and in order to prevent tangling, the user's hair must be disengaged from the projections. The movable members serve this function by disengaging the user's hair and preventing tangling along the length of the core. D2 and D3 do not teach this feature.

E) Conclusion: Not obvious **[1.0 mark]**

QUESTION 5: [2.0 marks]

Apart from issues related to D1-D3, identify and briefly explain **two** potential issues that may affect the validity of Canadian Patent No. 2,xxx,222.

Any TWO answers from the following (each 1.0 mark):

- Issue of ownership – Weston invented the invention using tools in the repair shop while he was employed as a mechanic at Automobiles, Inc.
- Issue of whether proper inventors have been named – Nash is not an inventor and should not have been named as an inventor. His role was only to volunteer for testing of the hair styling tool.
- Issue of possible public disclosure before the grace period – The customer was present in the salon during testing of the hair styling tool before Weston filed a U.S. provisional patent application for the hair styling tool.

QUESTION 6: [2.0 marks]

Assuming that Weston filed his U.S. provisional on February 20, 2012 before he showed the hair styling tool to Wendy, identify and briefly explain one potential issue that may affect the validity of Canadian Patent No. 2,xxx,222 filed on February 12, 2013. Cite the relevant section of the *Patent Act*.

- Since the blow drying feature was Wendy's idea and it was a feature added in the subsequent Canadian Patent No. 2,xxx,222 filed on February 12, 2013, the claimed subject

matter to the hair styling tool is not entitled to the earlier US provisional filing claim date; February 20, 2012. Section 28.1(1) of the *Patent Act*.

- Additional art may be citeable since the earlier claim date is not applicable to the blow drying feature.

END OF QUESTIONS IN PART A

PART B – Short Answer Questions

QUESTION 7: [5.5 marks]

A Canadian patent application, CA 2AAABBB, relating to invention X was filed in January 2020. CA 2AAABBB includes two alternative embodiments: X1 and X2. Embodiment X1 is not sufficiently disclosed since essential technical information is missing. Embodiment X2 is sufficiently disclosed.

For each of the following statements (a)-(d), indicate whether the statement is true or false. Cite the relevant section of the *Patent Act* or *Patent Rules*:

(a) An objection from the Examiner regarding embodiment X1 can be overcome by filing additional technical information.

(b) If the Examiner does not raise any objections regarding lack of support, this will not be a valid ground for impeaching the patent granted on the basis of CA 2AAABBB.

(c) If the missing essential technical information regarding embodiment X1 is present only in the abstract, the essential technical information can be used to interpret the claims of CA 2AAABBB.

(d) An objection from the Examiner can be overcome by restricting CA 2AAABBB to embodiment X2.

ANSWER TO QUESTION 7: [5.5 marks]

a) FALSE – Section 27(3), Section 38.2, or Section 38.2(2) of the *Patent Act.*

b) FALSE - A valid ground to attack validity is lack of sufficiency of disclosure – Section 27(3) of the *Patent Act*. - It is irrelevant if the Examiner did not raise an objection.

c) FALSE – Subsection 55(8) of the *Patent Rules* states that the abstract "must not be taken into account for the purpose of interpreting the scope of protection sought or obtained."

d) TRUE – Since X2 is sufficiently disclosed, a patent may be granted based on X2. Section 27(3) of the *Patent Act* or Section 60 of the *Patent Rules.*

QUESTION 8: [2.0 marks]

Company Z filed a Canadian patent application CA 2XXXYYY on 30 January 2018, without claiming any priority. CA 2XXXYYY has eleven claims. Alina and Brittany are named as the inventors of CA 2XXXYYY.

Are the following statements true or false? Cite the relevant section of the *Patent Act* or *Patent Rules:*

a) The applicant can correct Alina's name to "Elina."

b) The applicant cannot continue prosecution if it is discovered that Brittany is not an inventor of CA2 XXXYYY.

ANSWER TO QUESTION 8: [2.0 marks]

a) True. Section 106 of the *Patent Rules* – An error in the name of an applicant or an inventor in an application for a patent must be corrected by the Commissioner on the request of the applicant if the request is made on or before the day on which the final fee set out in item 13 of Schedule 2 is paid or, if the final fee is refunded, on or before the day on which the final fee is paid again, and the correction does not result in a change in their identity.

b) False. Section 31(3) of the *Patent Act* – Where an application is filed by joint applicants and it subsequently appears that one or more of them has had no part in the invention, the prosecution of the application may be carried on by the remaining applicant or applicants on satisfying the Commissioner by affidavit that the remaining applicant or applicants is or are the sole inventor or inventors.

QUESTION 9: [2.5 marks]

The claimed invention of a patent application is directed to an explosive composition "comprising 60-90% solid ammonium nitrate, and 10-40% water-in-oil in which sufficient aeration is entrapped to enhance sensitivity to a substantial degree." The application discloses that the explosive requires both fuel (ammonium nitrate) and oxygen aeration to "sensitize the composition." A journal article, published more than two years before the effective filing date of the application, discloses explosive compositions containing water-in-oil emulsions having identical ingredients to those claimed, in ranges overlapping with the claimed composition. The only element of the claim not recited in the journal article is "sufficient aeration entrapped to enhance sensitivity to a substantial degree." The journal article does not recognize that sufficient aeration sensitizes the fuel to a substantial degree. In addition to the journal article, a magazine article printed three years ago contains test data demonstrating that "sufficient aeration" is necessarily an inherent element in the prior art explosive composition under the circumstances.

Which of the following statements are true? Cite the relevant case law.

(a) The journal article anticipates the claim because it discloses every limitation of the claim either explicitly or inherently.

(b) The journal article does not anticipate the claim because the journal article does not recognize an inherent property.

(c) The journal article does not anticipate the claim because the journal article does not recognize an inherent function of oxygen.

(d) The journal article does not anticipate the claim because the journal article does not recognize an inherent ingredient, oxygen.

(e) (b), (c) and (d).

ANSWER TO QUESTION 9: [2.5 marks]

Option (a) is true. An enabling disclosure is considered to disclose everything that would inevitably or necessarily occur or be done by a person practising the invention. Old and known subject-matter is not rendered novel simply by disclosing and claiming a feature which is inherently (i.e., necessarily present) or implicitly (i.e., suggested but not directly expressed) found in the prior art. The concepts of inherent and implicit disclosure are related.
Abbott Laboratories v. Canada (Minister of Health) 2006 FCA 187 at paragraphs 23 to 25; or
Calgon Carbon Corporation v. North Bay (City) 2006 FC 1373 at paragraphs 114 to 136.

QUESTION 10: [2.0 marks]

ABC Inc. is a research-based pharmaceutical company and owner of Canadian Patent X,XXX,123. The '123 patent has only one claim directed to the use of a known compound for the treatment of liver conditions X, Y and Z at a dosage of 200 mg/day.

Generic Co. sells the compound as a drug and publishes a document intended for medical practitioners, indicating that this drug may be used to treat liver conditions X, Y and Z at a dosage of 200 mg/day.

(a) Assuming the claim is valid, why would Generic Co. not be guilty of direct infringement of the '123 patent? Cite the relevant case law.

(b) Generic Co. determined that the treatment of liver conditions X, Y and Z requires a dosage of 300 mg/day. Does this affect the validity of '123 patent? Provide a reason and cite the relevant section of the *Patent Act* or *Patent Rules*.

ANSWER TO QUESTION 10: [2.0 marks]

(a) Generic Co. is not performing the actions covered by the claim.
Apotex Inc. v. Astrazeneca Canada Inc., 2017 FCA 9 (CanLII) or Weatherford Canada Inc. v. Corlac Inc., 2011 FCA 288

(b) YES. The claim would be held invalid for lack of utility. Section 2 of the *Patent Act*.

QUESTION 11: [4.0 marks]

Small Business Co. is owner of Canadian Patent X,XXX,456, having a filing date of November 7, 2009. As the owner of Small Business Co., Bob has been sending instructions to pay the maintenance fees for the '456 patent every year by e-mail, in reply to a reminder e-mail by his patent agent. In August 2020, Small Business Co.'s junk e-mail filter was updated by their internet service provider, which caused the patent agent's e-mails to erroneously get filtered out as junk. Having not received any reminder e-mails from his patent agent, Bob did not instruct the patent agent to pay the maintenance fee for the '456 patent that was due on November 7, 2020. However, on September 20, 2021, Bob decides to call his patent agent on a whim.

(a) What can the patent agent tell Bob about the status of the '456 patent, assuming that a Maintenance Fee Notice dated December 15, 2020 was sent by the Canadian Intellectual Property Office and timely received by the patent agent? Cite the relevant section of the *Patent Act.*

(b) What actions can be taken by Bob with respect to the '456 patent? Cite the relevant section of the *Patent Act* and *Patent Rules.*

(c) What argument can be made in favour of the actions proposed in part (b)?

ANSWER TO QUESTION 11: [4.0 marks]

(a) The patent is deemed expired on November 7, 2020. Section 46(4) of the *Patent Act*.

(b) The patent may be reinstated by payment of the maintenance fee, a late fee, and a reinstatement fee, as well as an explanation that the failure to pay the maintenance fee occurred despite "due care" being taken. Section 46(5) of the *Patent Act*, or Sections 115 and 116 of the *Patent Rules*.

(c) Due care may be established by showing that communication channels that were successfully used in the past (e-mails) could be reasonably relied on and there was no reason to expect them to fail.

QUESTION 12: [2.0 marks]

International Patent Application No. PCT/CA2019/XXXXX9 has a priority date of October 31, 2018 and was filed on October 31, 2019 by the Applicant, Kitty Classic Ltd. On October 15, 2021, the Applicant calls you in a panic advising that they missed the 30-month deadline for national phase entry in Canada for PCT/CA2019/XXXXX9 but they understand that they can still enter national phase late in Canada. Are you permitted to enter national phase late in Canada? Please explain the steps required, assuming regular requirements for national phase entry are met. Cite the relevant sections of the *Patent Rules*.

ANSWER TO QUESTION 12: [2.0 marks]

Yes. Pay the fee for reinstatement of rights set out in item 22 of Schedule 2 (i.e. $200) and request that the rights of the Applicant be reinstated and failure to enter the national phase by the 30-month due date was unintentional. Section 154(3) of the *Patent Rules*.

QUESTION 13: [2.0 marks]

Your client is Company A, Inc., the patentee of CA X,XXX,999. What steps would you take at the Canadian Intellectual Property Office for each of the following fact scenarios? Cite the relevant section of the *Patent Rules*.

(a) The name of Company A, Inc. was changed to Company A, Ltd. but did not result in a new legal entity.

(b) CA X,XXX,999 was assigned from Company A, Inc. to Company B.

ANSWER TO QUESTION 13: [2.0 marks]

(a) Request the recording of a name change under Section 125 of the *Patent Rules.*

(b) Request the recording of a transfer of the patent under Section 126 of the *Patent Rules*.

END OF QUESTIONS IN PART B

CANADIAN PATENT AGENT QUALIFYING EXAMINATION

2021

PAPER C - PATENT OFFICE PRACTICE

This examination is four (**4**) hours in length.

This examination is composed of two parts:

Part A, comprising question C1 (**75** pts); and

Part B, comprising questions C2 to C12 (**25** pts).

For Part A, you will be evaluated on the following:

Dealing correctly with all issues; and

Appropriate statutory/regulatory citations, where applicable.

Note that salutations, signatures and other formalities of correspondence are not required in your answers; substance is important.

For Part B, you will be rated on the correctness and clarity of the answers.

PART A: Question C1 (75 marks)

C1. You are the patent agent responsible for the prosecution of Canadian patent application no. 3,XXX,999. You are provided with the following documents:

1. A copy of the patent examiner's examination report dated 15 November 2021.
2. A copy of application 3,XXX,999 that is the object of the office action.
3. A copy of each of the three prior art documents cited in the examination report. Although these documents are based on actual documents, note that they have been altered for the purposes of this examination.

Instructions to Candidates

Provide a response to the examination report. Your response must include:

- a set of claims drafted with due consideration to their allowability and the rights of your client; marks will be deducted for any unnecessary limitations in independent claim(s); marks will also be deducted for introducing new formality defects [33 pts including 20 pts for claim 1 and 13 pts for other claim amendments];
- a clear indication of where support can be found for each amended feature [9 pts];
- a discussion of the novelty [8 pts] and inventiveness [8 pts] of your amended claims with respect to each prior art document cited; and
- a discussion of every other defect raised in the examination report, including a statement explaining how each defect has been corrected (note that it is not required to physically amend the description) [17 pts].

15 November 2021 (15-11-2021)

RAY AGENT
ipmail@ra.com

Application No.:	**3,XXX,999**
Owner:	M-PROTECT INC.
Title:	**MASK**
Classification:	A41D 13/11 (2006.01)
Your File No.:	**WXYZ-000**
Examiner:	J.-P. Belmondo

YOU ARE HEREBY NOTIFIED OF A REQUISITION BY THE EXAMINER IN ACCORDANCE WITH SUBSECTION 86(2) OF THE *PATENT RULES*. IN ORDER TO AVOID ABANDONMENT UNDER PARAGRAPH 73(1)(*a*) OF THE *PATENT ACT*, A WRITTEN REPLY MUST BE RECEIVED WITHIN **FOUR (4)** MONTHS AFTER THE ABOVE DATE.

This application has been examined as originally filed.

The number of claims in this application is 9.

Documents Cited:

D1:	US 4,856,111 A	Williams	1 August 1989 (01-08-1989)
D2:	JP 2002-065222 A	Matsumoto	6 February 2002 (06-02-2002)
D3:	WO 97/23333 A2	James	3 June 1997 (03-06-1997)

The examiner has identified the following defects in the application:

Lack of Novelty

Claims 1-4, 6 and 9 encompass subject-matter that was disclosed in D1 before the claim date and do not comply with paragraph 28.2(1)(b) of the *Patent Act*.

Regarding claim 1, document D1 discloses a face mask (10 in figure 1) comprising a chemical (i.e., an antimicrobial agent) capable of rapidly destroying biological agents such as microbes and viruses (paragraph 1).

Regarding claim 2, document D1 discloses a mask wherein the central portion (12 in figure 1) of the body (11 in figure 1) is configured to be placed over the mouth and at least part of the nose of a user in such a way that respiration air is drawn through said body portion (paragraphs 32, 33, 36).

Regarding claim 3, document D1 discloses a fastening member (18 in figure 1) for attaching the body portion of the face mask to the user (paragraph 36).

Regarding claim 4, document D1 discloses that the antimicrobial agent is citric acid (see, for instance, paragraphs 9, 33, 37).

Regarding claim 6, document D1 discloses the antimicrobial agent may be applied by spraying (paragraphs 3, 4, 47).

Regarding claim 9, document D1 discloses a tissue layer subjacent a nonwoven web (paragraph 32).

Claims 1-6 encompass subject-matter that was disclosed in D2 before the claim date and do not comply with paragraph 28.2(1)(b) of the *Patent Act*.

Regarding claim 1, document D2 discloses a face mask (10 in figure 1) comprising an antimicrobial agent (abstract), wherein said agent rapidly inhibits and controls the growth of a broad spectrum of microorganisms (paragraph 18).

Regarding claim 2, document D2 discloses a body portion (12 in figure 1) configured to be placed over the mouth and at least part of the nose of a user in such a way that respiration air is drawn through said body portion (paragraph 15).

Regarding claim 3, document D2 discloses a fastening member (14 in figure 1) for attaching the body portion of the face mask to the user (paragraph 15).

Regarding claims 4 and 5, document D2 discloses that the antimicrobial agent is polyhexamethylene biguanide, PHMB (paragraphs 7, 18-26).

Regarding claim 6, document D2 discloses the antimicrobial agent may be applied by spraying (paragraph 37).

Obviousness

Claims 7 and 8 do not comply with section 28.3 of the *Patent Act*. These claims are directed to subject-matter that would have been obvious at the claim date to a person skilled in the art or science to which it pertains having regard to D1 in view of D3.

Document D1 discloses all the features of the claims except for a layer of nonwoven webs being spunbond webs, meltblown webs or spunbond/meltblown/spunbond webs, and the material being polyolefin such as polyethylene or polypropylene.

Document D3 discloses a face mask (abstract) comprising a layer of spunbond webs, meltblown webs or spunbond/meltblown/spunbond webs (paragraph 24) consisting of polyolefin, in particular of polyethylene or polypropylene (paragraph 26).

Thus these features are known design features as shown by document D3 and would have been obvious to incorporate into the face mask of document D1.

Lack of Support

Claim 4 does not comply with section 60 of the *Patent Rules*. There is no support in the description for the antimicrobial agent being “a dithiocarbamate”.

Other Defects in the Claims

Claim 1 is indefinite and does not comply with subsection 27(4) of the *Patent Act*. The elements and components making up the face mask are not defined, thus creating ambiguity about its structure.

Claim 1 is indefinite and does not comply with subsection 27(4) of the *Patent Act*. The inclusion of the relative expression “rapidly” defines the scope of the claimed subject-matter in uncertain terms.

Claim 3 is indefinite and does not comply with subsection 27(4) of the *Patent Act.* The terms “body portion” and “user” have no antecedents in claim 1.

Claim 4 is indefinite and does not comply with subsection 27(4) of the *Patent Act*. The underlined term (second occurrence “of”) in the expression “The face mask of <u>of</u> claim 3" must be deleted. Furthermore, in accordance with the accepted Markush format, the conjunction “or” before the term “chlorhexidine gluconate (CHG)” should be replaced with “and”.

Claim 6 is a dependent claim that refers to more than one claim not in the alternative and does not comply with subsection 63(3) of the *Patent Rules*. A preamble such as “according to any one of claims” would make it clear that the above claim depends upon each claim in the alternative only.

Claim 6 is indefinite and does not comply with subsection 27(4) of the *Patent Act*. The term “germicidal agent” has no antecedent.

Claim 7 is indefinite and does not comply with subsection 27(4) of the *Patent Act*. The use of the subjective expression “such as” appears to direct the claim simultaneously to both broad and narrow embodiments, causing a lack of clarity as to the intended scope of this claim.

Claim 8 is indefinite and does not comply with subsection 27(4) of the *Patent Ac*t. Uncommon abbreviations should be fully defined on their first occurrence in a claim. The abbreviations “PE” and “PP” should be defined as “polyethylene” and “polypropylene”, respectively.

Claim 9 does not comply with subsection 63(2) of the *Patent Rules*. A dependent claim must refer to a preceding claim or claims.

Defects in the Title, Description and Drawings

The title of the invention is not precise and does not comply with paragraph 56(1)(a) of the *Patent Rules*.

The description does not contain a concise description of all the figures and does not comply with paragraph 56(1)(e) of the *Patent Rules*. Specifically, a description of figure 4 is not included in the section “Brief description of the drawings”.

Figures 1 and 3 of the drawings do not comply with section 59 of the *Patent Rules*. Reference characters not mentioned in the description should not appear in the drawings, and vice versa. Reference character 46 is not described in the description.

The description contains a statement that incorporates by reference another document and does not comply with subsection 57(1) of the *Patent Rules*. Such a statement is found at paragraph 12 and should be removed.

The description does not comply with section 52 of the *Patent Rules*, which requires that trademarks mentioned in the application be identified as such. If “Velcro” in paragraph 12 is a trademark, it must be so identified.

In view of the foregoing defects, the applicant is requisitioned, under subsection 86(2) of the *Patent Rules*, to amend the application in order to comply with the *Patent Act* and the *Patent Rules* or to provide arguments as to why the application does comply.

Under section 102 of the *Patent Rules*, any amendment made in response to this requisition must be accompanied by a statement explaining the purpose of the amendment and identifying the differences between the new page and the replaced page.

J.-P. Belmondo
Patent Examiner
819-555-1342

(21) **CA 3,XXX,999**
(12) APPLICATION FOR CANADIAN PATENT

(54) TITLE: MASK
(22) FILING DATE: 2018/01/23
(41) PUBLICATION DATE: 2019/02/14
(51) INT. CL.: A41D 13/11 (2006.01)
(71) APPLICANT: M-PROTECT INC..
(72) INVENTOR: YOUNG, N.

TITLE OF THE INVENTION

MASK

ABSTRACT

A face mask for reducing the amount of microbes to which a wearer is exposed is provided. The face mask includes a body portion having a layer that has has been treated with a germicidal agent in an effective amount. The treated layer may be a nonwoven fabric like a spunbond or meltblown layer and may be a laminate of such layers. The face mask having such a germicidal treatment can result in a reduction in microbial activity as compared to another face mask, identical but for the germicidal agent.

BACKGROUND OF THE INVENTION

[0001] Face masks find utility in a variety of medical, industrial and household applications by protecting the wearer from inhaling dust and other harmful airborne contaminates through their mouth or nose. The use of face masks is a recommended practice in the healthcare industry to help prevent the spread of disease. Face masks worn by healthcare providers help reduce infections in patients by filtering the air exhaled from the wearer, thus reducing the number of harmful organisms or other contaminants released into the environment. Additionally, face masks protect the healthcare worker by filtering airborne contaminants and microorganisms from the inhaled air.

[0002] The section of the face mask that covers the nose and mouth is typically known as the body portion. The body portion of the mask may be comprised of several layers of material. At least one layer may be composed of a filtration material that prevents the passage of germs and other contaminants therethrough but allows for the passage of air so that the user may comfortably breathe. The porosity of the mask refers to how easily air is drawn through the mask and a more porous mask is, of course, easier to breathe through. The body portion may also contain multiple layers to provide additional functionality for the face mask. Face masks may, for example, include one or more layers of material on either side of the filtration material layer. Further components may be attached to the mask to provide additional functionality.

[0003] The recent outbreak of severe acute respiratory syndrome (SARS) has elevated interest in a germicidal mask which will deactivate microbes contacting a face mask so that they are not

inhaled by a wearer and so that they are not transferred to another surface by inadvertent contact of the mask - on other surfaces or the hands.

SUMMARY OF THE INVENTION

[0004] A face mask comprising an antimicrobial agent, wherein said agent rapidly inhibits and controls the growth of a broad spectrum of microorganisms. The face mask of the invention generally comprises a body portion configured to be placed over the mouth and at least part of the nose of the user in such a way that respiration air is drawn through said body portion. A fastening member is used for attaching the body portion to the user.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Figure 1 is a perspective view of a face mask in accordance with one exemplary embodiment that has an absorbent element located on the inner surface.

[0006] Figure 2 is a perspective view of the face mask of Figure 1 shown on a user.

[0007] Figure 3 is a back view of the face mask of Figure 1.

DETAILED DESCRIPTION

[0008] Reference will now be made in detail to embodiments of the invention, examples of which are illustrated in the data tables, which show the efficacy of different antimicrobial compositions, and in the drawings. Each example is provided by way of explanation of the invention, and not meant as a limitation of the invention. For example, features illustrated or described as part of one embodiment can be used with another embodiment to yield still a third embodiment.

[0009] It is to be understood that the ranges and limits mentioned herein include all ranges located within, and also all values located under or above the prescribed limits. Also, all ranges mentioned herein include all subranges included in the mentioned ranges. For instance, a range from 100-200 also includes ranges from 110-150, 170-190, and 153-162. Further, all limits mentioned herein include all other limits included in the mentioned limit. For example, a limit of up to about 7 also includes a limit of up to about 5, up to about 3, and up to about 4.5.

[0010] One exemplary embodiment provides for a face mask **10** that has a body portion **12** with an outer surface **16** and an oppositely disposed inner surface **18**.

[0011] Figure 1 is a perspective view of the face mask **10** in accordance with one exemplary embodiment. The face mask **10** includes a body portion **12** that has an inner surface **18** that is configured for facing and contacting the face of a user **14** (Figure 2) when the face mask **10** is worn. The mask may include a plurality of folds **28** and may also include a malleable member **22**. The malleable member **22** is provided so that the top binding **52** of the body **12** can be configured to closely fit the contours of the nose and upper cheeks of the wearer. The malleable member **22** is preferably constructed from a metal strip with a rectangular cross-section, but may be a moldable or a malleable metal or alloy, plastic, or any combination thereof.

[0012] Figure 2 is a perspective view of the face mask **10** of Figure 1 shown attached to the face of the user **14**. The body portion **12** can be of a variety of styles and geometries, such as, but not limited to, flat half masks, pleated face masks, cone masks, duckbill style masks, trapezoidally shaped masks, etc. The styles shown in the Figures are for illustrative purposes only. The body portion **12** may be configured as that shown in U. S. Patent 6,484,722 to Bostock, et al., the entire contents of which are incorporated by reference herein in their entirety for all purposes. As shown in Figure 2, the face mask **10** may isolate the mouth and the nose of the user **14** from the environment. The face mask **10** may be attached to the user **14** by a fastening member **20** that may be a pair of manual tie straps **38** that are wrapped around the head of the user **14** (and a hair cap **42** if worn by the user **14**) and are connected to one another. It is to be understood, however, that other types of fastening members **20** are employed in accordance with various exemplary embodiments. Instead of the manual tie straps **38**, for example, the face mask **10** may be attached to the user **14** by a fastening member **20** that may be ear loops **40** (Figure 4), elastic bands wrapped around the head of the user **14**, a hook and loop type fastener arrangement (e.g. Velcro fasteners), or a connection directly attaching the face mask **10** to the hair cap **42**.

[0013] Additionally, the configuration of the face mask **10** is different in accordance with various exemplary embodiments. In this regard, the face mask **10** can be made in order to cover both the eyes, hair, nose, throat, and mouth of the user **14**. As such, the present invention includes face masks **10** that cover areas above and beyond simply the nose and mouth of the user **14**. The face mask **10** may also incorporate any combination of known face mask **10** features, such as visors or shields, sealing films, beard covers, etc. Exemplary face masks and features incorporated into face masks are described and shown, for example, in the following U. S. Patents: 4,802,473; 4,969,457; 5,322,061; 5,383,450; 5,553,608; 5,020,533; and 5,813,398.

[0014] The body portion **12** of the face mask **10** may be made of inelastic materials. Alternatively, the material used to construct the body portion **12** may be comprised of elastic materials, allowing for the body portion **12** to be stretched over the nose, mouth, and/or face of the user **14** (Figure 2). The face mask **10** of the present invention may be made of an elastic material that allows the face mask to stretch in one or more directions. The use of an elastic material incorporated into the body portion **12** may allow for fuller coverage of the user's **14** face and provide for more flexibility in accommodating variously sized faces of the users **14**. Alternatively, the body portion **12** may be made of an inelastic material. As such, the material that makes up the face mask **10** may exhibit elastic or inelastic characteristics depending upon the user's **14** needs.

[0015] It is known in the art to configure the body portion of a face mask so that it stretches across the face of a user. In the present invention, the body portion **12** of the face mask **10** may be configured so that it is capable of stretching across the face of the user **14** (Figure 2) from ear to ear and/or nose to chin. The ability of the body portion **12** to stretch and recover may provide the face mask **10** with better sealing capabilities and a more comfortable fit than face masks **10** that have an inelastic body portion **12**. In order for the body portion **12** to stretch and recover, the body portion **12** may have at least one layer or a material that has stretch and recovery properties.

[0016] Figure 3 shows the inner surface **18** of the body portion **12** of an exemplary embodiment of the face mask **10**. The body portion **12** is typically provided with a plurality of folds **28** that extend across the horizontal length **24**. The folds **28** may be opened by the user **14** so as to adjust the size of the body portion **12** in the vertical length **26**. The folds **28** allow for adjustment of the

body portion **12** so as to allow for a better fit on the face of the user **14** and formation of a breathing chamber. The body portion **12** may form a breathing chamber with the perimeter of the chamber sealing to the face of the user **14** in certain exemplary embodiment. Although shown as extending across the entire horizontal length **24**, the folds **28** may extend only part way across the body portion **12**. Additionally, the folds **28** may be provided in any number and may be oriented at any angle on the body portion **12**. For instance, the folds **28** may run at a 45° angle to the horizontal length **24**. Alternatively or additionally, the folds **28** may run along the vertical length **26** of the body portion **12**. Such variations in mask design are known to the skilled person. It is also to be understood that folds **28** are not required to be present in the practice of the invention and are merely shown for illustrative purposes.

[0017] Bindings (Figures 1 and 3) **48** and **50** may act to limit the vertical extension of the edges of the body portion **12** when the folds **28** are unfolded. As such, bindings **48** and **50** may be present in order to help provide for a desired shape of the body portion **12**. Additionally, bindings **52** and **54** may also act to limit extension of the edges of the body portion **12** when folds **28** are unfolded. This may also be the case if folds **28** are provided in orientations along both the horizontal and vertical lengths **24** and **26** of the body portion **12**. As such, bindings **52** and **54** may also be employed in order to achieve a desired shape of the body portion **12**.

[0018] The folds **28** in the body portion **12** may be of any type commonly known to those having ordinary skill in the art. Figure 3 shows bindings **48** and **50** on either side of the body portion **12** used in order to constrain unfolding of the folds **28**. Additionally, binding **52** may be located on the top edge of the body portion **12** and binding **54** may be located on the bottom edge of the body portion **12**. The bindings **48**, **50**, **52** and **54** may be of any type commonly known to one having ordinary skill in the art.

[0019] In Figure 4, the body portion **12** is shown as being made of a plurality of layers **32**, **34** and **36**. Layer **32** may be an inner layer of the body portion **12** and have the inner surface **18** defined thereon. Layer **36** may be a protective, on-filtration outer layer of the body portion **12** and have the outer surface **16** defined thereon. Further, layer **34** may be an intermediate layer located between the layers **32** and **36**. It is to be understood, however, that the body portion **12** may be made of any number of layers in accordance with the teachings herein. For instance, the body portion **12** can be made of a single layer in accordance with one exemplary embodiment.

[0020] The intermediate layer **34**, as shown in Figure 4, may be a filtration media configured to prevent the passage of pathogens through the body portion **12** while still allowing for the passage of air in order to permit the user **14** (Figure 2) to breath.

[0021] The layers **32**, **34** and **36** may be constructed from various materials known to those skilled in the art. Layer **36** of the body portion **12** protects the inner filtration medium from physical damage and may be any nonwoven web, such as spunbond webs, meltblown webs, spunbond/meltblown/spunbond webs, a bonded carded web, or a wetlaid polyester web or wetlaid composite provided it does not function as a filter. The layer **36** of the body portion **12** and layer **32** may be a necked nonwoven web or a reversibly necked nonwoven web. The layers **32**, **34** and **36** may be made of the same material or of different materials. A tissue layer (not shown) may be located subjacent the outer most layer of the face mask.

[0022] Many polyolefins are available for nonwoven web production, for example polyethylenes such as Dow Chemical's ASPUN® 6811A linear polyethylene. Fiber forming polypropylenes include, for example, Exxon Chemical Company's Escorene® PD 3445 polypropylene. Many other suitable polyolefins are commercially available as are known to those having ordinary skill in the art. Other thermoplastic resins can also be used.

[0023] In an exemplary embodiment where an elastic film is used on or in the body portion **12**, the film may be sufficiently perforated to ensure that the user **14** (Figure 2) can breathe through the body portion **12** if the face mask **10** is desired to be breathable in this location.

[0024] The intermediate layer **34** is configured as a filtration layer and may be a meltblown nonwoven web and, in some embodiments, is electret treated. Electret treatment results in a charge being applied to the intermediate layer **34** that further increases filtration efficiency by drawing particles to be filtered toward the intermediate layer **34** by virtue of their electrical charge. Electret treatment can be carried out by a number of different known techniques.

[0025] The intermediate layer **34** may be made of an expanded polytetrafluoroethylene (PTFE) membrane. The expanded polytetrafluoroethylene membrane may be incorporated into a multi-layer composite, including, but not limited to, an outer nonwoven web layer **36**, an extensible and retractable layer, and an inner layer **32** comprising a nonwoven web.

[0026] SMS may be used to comprise the layers **32**, **34** and **36**. SMS is a material that is made of meltblown fibers between two spunbond layers made of spunbonded fibers. Spunbonded fibers are small diameter fibers which are formed by extruding molten thermoplastic material as filaments from a plurality of fine, usually circular capillaries of a spinneret with the diameter of the extruded filaments then being rapidly reduced to fibers. Spunbond fibers are generally continuous and have diameters generally greater than about 7 microns, more particularly, between about 10 and about 40 microns. Meltblown fibers are fibers formed by extruding a molten thermoplastic material through a plurality of fine, usually circular, die capillaries as molten threads or filaments into converging high velocity, usually hot, gas (e.g. air) streams which attenuate the filaments of molten thermoplastic material to reduce their diameter, which may be to microfiber diameter. Thereafter, the meltblown fibers are carried by the high velocity gas stream and are deposited on a collecting surface to form a web of randomly disbursed meltblown fibers. Such a process is known in the art. Meltblown fibers are microfibers which may be continuous or discontinuous with diameters generally less than 10 microns.

[0027] Multiple layers of the face mask **10** may be joined by various methods, including adhesive bonding, thermal point bonding, or ultrasonic bonding. Although shown as having three layers **32**, **34** and **36**, it is to be understood that in other exemplary embodiments of the present invention, that the body portion **12** and/or the entire face mask **10** may be made of any number of layers.

[0028] While the germicidal treatment may be applied to all types of face masks, surgical and infection control face masks are particularly useful. Surgical and infection control face masks may have a bacterial filtration efficiency (BFE) of greater than or equal to about 85-90% as measured according to ASTM F2101. More particularly, the mask exhibits a BFE of greater than or equal to about 95%. Still more particularly, the mask possesses a BFE of greater than or equal to about 99%. The face mask may exhibit a differential pressure less than or equal to 8 mm water/cm^2 as

measured by ASTM F2101 to ensure the respiratory comfort of the product. Desirably, the differential pressure is less than or equal to 5 mm water/cm^2 and more desirably less than or equal to 2.5 mm water/cm^2. The face mask can have a particle filtration efficiency (PFE) of greater than or equal to about 85-90% as measured by Latex Particle Challenge testing (ASTM F2299). More particularly, the PFE is greater than or equal to 95%. Still more particularly, the PFE is greater than or equal to 99%. The face mask may have a fluid penetration resistance of greater than or equal to about 80 mm Hg against synthetic blood as measured according to ASTM F1862. More particularly, the mask exhibits a fluid penetration resistance of greater than or equal to about 120 mm Hg. Still more particularly, the mask exhibits a fluid penetration resistance of greater than or equal to about 160 mm Hg.

[0029] The germicidal agent of the instant invention may be present on the outermost layer of the face mask, not the filtration layer. Locating the germicidal agent on the outermost layer provides the additional benefit of reducing the contact transfer of microbes, in addition to reducing their passage through the mask. Furthermore, the location of the germicidal agent on the outer layer of the mask reduces the possibility that the germicidal agent will pass through the mask and be inhaled by a wearer. The germicidal agent may be applied by dipping and squeezing, spraying, ink jet printing or combinations thereof.

[0030] The terms “germicidal agent”, “biocidal agent” and “antimicrobial agent” are used herein as synonyms and refer to substances that either kill (deactivate) or slow the growth of microbes. Among the antimicrobial agents in use today are antibacterial agents (which kill bacteria), antiviral agents (which kill viruses), antifungal agents (which kill fungi), and antiparasitic drugs (which kill parasites).

[0031] Some known examples of biocides include biguanides (such as polyhexamethylene biguanide (PHMB), chlorohexadine, alexidine, and relevant salts thereof); quaternary ammonium compounds (such as benzalkonium chloride, cetrimide, cetyl pyridinium chloride, quaternized cellulose and other quaternized polymers); quaternary ammonium siloxanes; polyquaternary amines; metal-containing species and oxides thereof (either in particle form or incorporated into a support matrix or polymer); halogens; halogen-releasing agents; hydrogen peroxide; stabilized oxidants such as chlorine dioxide; stabilized peroxides (such as urea peroxide, mannitol peroxide); sulfides (such as sodium metabisulfite); bisphenols (such as triclosan, hexachlorophene); various "naturally occurring" agents such as polyphenols from green or black tea extract; citric acid; chitosan; bamboo extract; neem oil; hydrotropes (strong emulsifiers); and chaotropic agents (alkyl polyglycosides) or combinations thereof. As shown below, certain biocides or combinations thereof are particularly useful as antimicrobials for the purpose of the invention.

[0032] Depending on substrate material (polyolefin vs. cellulosic-based materials) and the method of incorporation into the product (topical vs. grafting), many of the above biocides could be used alone or in concert to achieve the properties of interest.

[0033] The face mask having the germicidal agent should rapidly inhibit and control the growth of microbes. This means that there should be a reduction in the concentration of a broad spectrum of microorganisms by a magnitude of at least 1 $\log_{10}$ within 30 minutes of contact as measured by the Liquid Droplet Test as described below. More particularly, it should result in a reduction in

microbial concentration by a magnitude of 3 $\log_{10}$ within 30 minutes. Still more particularly, it should result in a reduction in microbial concentration by a magnitude of 4 $\log_{10}$ or more within minutes. The Liquid Droplet Test gives an indication of what proportion and how quickly microbes in a liquid contacting the layer treated with a germicidal agent are killed.

[0034] A "broad spectrum of microorganisms" includes Gram positive and Gram negative bacteria, including resistant strains thereof, for example methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant Enterococci (VRE) and penicillin-resistant Streptococcus pneumoniae (PRSP) strains. More particularly, it includes all bacteria (Gram +, Gram - and acid fast strains) and yeasts such as Candida albicans. Still more particularly, it includes all bacteria (Gram +, Gram -, and acid fast), yeasts, and both envelope and naked viruses such as human influenza, rhinovirus, poliovirus, adenovirus, hepatitis, HIV, herpes simplex, SARS, and avian flu.

[0035] Microbes used for testing are grown in 25mL appropriate broth medium for about 24 ± 2 hours at 37 ± 2°C in a wrist action shaker. The bacterial culture is then transferred by placing about 100 µL aliquot in 25 mL of broth and grown again for about 24 ± 2 hours at 37 ± 2°C. The organisms are then centrifuged and washed three times with phosphate buffered saline (PBS). The organisms are then suspended in PBS to obtain an inoculum of approximately $1x10^8$ CFU/mL.

[0036] The test articles and control swatches are exposed to an ultraviolet light source for about 5-10 minutes per side before testing to assure that the swatches are sanitized prior to inoculation with the bacteria. The test materials are brought into contact with a known population of test bacteria from the inoculum for a specified period of time. A sample is then plated at the end of the exposure time to enumerate the surviving bacteria. The $\log_{10}$ reduction from the control material and the original population is calculated using the following formula:

$$\text{Log}_{10} \text{ CFU (control swatch)} - \text{Log}_{10} \text{ CFU (test swatch)} = \text{Log}_{10} \text{ Reduction}$$

[0037] After exposing the bacteria to the surface of a treated piece of face mask for a designated amount of time (10-30 minutes), the substrate is placed in a flask and a buffer solution is added to elute the microorganisms off the substrate prior to plating them to see how many are left alive. This buffer solution contains a chemical to de-activate or "neutralize" the antimicrobial agent to (a) stop the active agent from killing the organisms after the designated time period and (b) to prevent artifacts that may arise from exposing the microorganisms to the antimicrobial in solution rather than solely on the substrate. Because each chemical used as an antimicrobial agent is different (ie: cationic, nonionic, metal, etc), a different neutralizer was added in each case to shut off the antimicrobial at the desired end point of the experiment. These neutralizers are pre-screened to make sure that they do not affect the microorganisms and adequately neutralize the biocidal effect of the antimicrobial agent. The neutralizer employed may be selected from a list that is commonly used in the field.

[0038] In the Liquid Droplet Test, a defined quantity of microorganisms suspended in a buffered-saline solution is placed onto a substrate with or without an antimicrobial coating. The microbial suspension (250 µL for bacteria; 200 µL for viruses) is spread over a 32 cm^2 area for 1 minute using a Teflon® spreading device. Following spreading, the substrate is allowed to sit for a specified contact time. Following the contact time, the substrate is placed into an appropriate

neutralizer and shaken and vortexed thoroughly. Samples are taken from the neutralizer and plated on appropriate media as noted above to obtain the number of viable microbes recovered. The number of microbes recovered from an untreated substrate is compared to the number recovered from a treated substrate to determine the effectiveness of the antimicrobial coating. This is carried out using bacteria and viruses and the data is shown in Tables 3 and 4.

[0039] Table 1 lists various biocides and processing aids that may be used to treat the face mask. It also lists their common or commercial names and chemical names. Quaternary ammonium compounds are commercially available under the name of Crodacel. The surfactant “alkyl-polyglycosides” is available commercially under the name Glucopon®. Chitosan glycolate is available under the name Hydragen®. These components can significantly enhance the efficacy of polyhexamethylene biguanide (PHMB). The biocides and processing aids described herein may be used singly or in combination.

Table 1. Biocides and Processing Aids

Biocide / Processing Aid	Brand Name / Common Name	Additional Information
Polyhexamethylene biguanide	PHMB	Antimicrobial
Chitosan glycolate	Hydagen®	Antioxidant
Alkyl Polyglycosides	Glucopon®	Surfactant
PG-hydroxyethylcellulose cocodimonium chloride	Crodacel	Quaternary ammonium compound
2-hydroxybenzoic acid	Salicylic acid	Antimicrobial
2-hydroxy-1,2,3-propanetricarboxylic acid	Citric acid	Antimicrobial
Benzenecarboxylic acid	Benzoic acid	Antimicrobial
Xylitol	Xylitol	Antioxidant
Polyvinyl pyrrolidone-Iodine complex	PVP-Iodine	Antimicrobial
Chlorhexidine gluconate	CHG	Antimicrobial

[0040] Additional active antimicrobial agents may also be present.

[0041] Table 2 shows a number of composition examples containing various combinations of compounds listed in Table 1. Each reagent is presented in terms of weight percent (wt%) of the active ingredients of the formulation. The respective formulations are then diluted in an aqueous solution such that the desired amount of active agents can be applied to a substrate for incorporation into the mask. The compositional examples of Table 2 can be used as topical coatings over an organic or inorganic substrate.

Table 2. Antimicrobial Composition Examples (wt%)

Ingredient	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7	Ex. 8	Ex. 9	Ex. 10
PHMB	10	10	25	25	50		55		20	
Hydagen®								20	10	5
Glucopon®	10	15	15	20		15	20	20	5	15

Salicylic acid		20	25						5	15
Citric acid	50			30	50	30	25	30	25	25
Xylitol	30	55	35	25		55		30	35	40

[0042] Examples 1-10 illustrate formulations that contain a mixture of at least two or three helpful active antimicrobial agents or processing aids. Examples 1-5, 7 and 9 show formulations that contain PHMB at significant levels. In addition to exhibiting some antimicrobial properties, surfactants such as Glucopon® aid in wetting the treated substrate materials. It is suspected that this may help provide a more uniform treatment surface for PHMB on the substrate when used in combination with other ingredients. It is also thought that an enhanced wettability of the material permits the targeted organism to come into better proximity and contact with the active moieties of the antimicrobial agents on the surface of the material. A material treated with a solution combining various agents may exhibit a greater organisms kill efficacy than with PHMB alone.

[0043] As shown in Table 3, aqueous solutions of PHMB at various concentrations lower the quantity of viable microbes, for a variety of microbes.

Table 3. Relative inhibition of a selection of microorganisms by PHMB at various concentrations.

PHMB wt%	Staphylococcus aureus	Klebsiella pneumoniae	Candida albicans	Influenza A	Rhinovirus 1A
0.05 %	++	n.t.	+	+	-
0.1 %	+++	-	+	n.t.	+
0.5 %	n.t.	+	++	n.t.	+

* The observed antimicrobial activity increases with the number of “+”; “-“ : no antimicrobial activity observed; “n.t.”: not tested.

[0044] In certain embodiments, the antimicrobial composition present on the face mask includes a combination of biocide active agents that work against both bacteria and viruses; see Tables 2 and 4. The compositions have a pH in a range of about 2 to about 5 or 6, depending on the desired, particular environmental conditions for use.

[0045] The antimicrobial composition should be odorless to humans. This characteristic is important for face masks and other substrates that come into close proximity of nose.

[0046] The substrate tested for the data in Table 4 was a spunbond polypropylene fabric with a basis weight of 0.9 osy (or 30.5 gram per square meter, gsm). In the examples described in Table 4, the spunbond fabrics were treated with various compositions using a saturation treatment technique. The composition of the active agents in Example 1 consists of 10 wt% PHMB, 10 wt% Glucopon®, 50 wt% citric acid and 30 wt% xylitol. This relative ratio of actives was achieved and diluted with water. The aqueous formulation was then thoroughly mixed for about 20 minutes. After the aqueous composition (or bath) was mixed and homogenized, it was poured into a Teflon® coated or glass pan. Then, typically an 8" x 11" hand sheet substrate was immersed into the bath for saturation. After full saturation, the substrate was nipped between two rollers. The saturated and nipped sample was then placed in an oven for drying at about 80 °C for about 30 minutes or until a constant weight was reached.

[0047] Each fabric tested in the Liquid Droplet Test contained 10 wt% of the dry composition. This level of dilution was chosen to obtain the desired amount of solids loading on the spunbond web. For instance, in the case of Example 1, the treated fabric contained the following “percent solids add-on”: 1 wt% PHMB, 1 wt% Glucopon®, 5 wt% citric acid and 3 wt% xylitol.

[0048] The antimicrobial properties of fabric samples treated with the compositions of Examples 1-10 (see Table 2) are illustrated in Table 4. It was found that a fabric treated in this fashion with Composition Ex. 1 provided a $\log_{10}$ reduction against Staphylococcus aureus of 3.4 and a $\log_{10}$ reduction against Influenza A virus of 2.2 after 30 minutes as measured using the Liquid Droplet Test protocol.

Table 4. Log_{10} reduction values in the Liquid Droplet Test (30 min contact) for the compositions described in Table 2

Microorganism	**Ex. 1**	**Ex. 2**	**Ex. 3**	**Ex. 4**	**Ex. 5**	**Ex. 6**	**Ex. 7**	**Ex. 8**	**Ex. 9**	**Ex. 10**
Staphylococcus aureus	3.4	<1	0.5	>4	0.7	<0.1	3.3	0.5	2.6	<1
Influenza A	2.2	1.5	0.9	2.6	1.2	0.9	1.8	1.0	1.8	1.2

*The larger the $\log_{10}$ reduction value, the higher the antimicrobial activity; formulations with values greater than 1 are considered to be useful for the inhibition of a given microorganism.

[0049] As can be seen from the data of Table 4, a face mask substrate having a suitable combination of germicidal agents rapidly inhibits and controls the growth of microbes. The data shows that with certain compositions, there was a reduction in the concentration of two different microorganisms by a magnitude of at least 1 $\log_{10}$ within minutes as measured by the Liquid Droplet Test.

[0050] While the present invention has been described in connection with certain preferred embodiments, it is to be understood that the subject matter encompassed by way of the present invention is not to be limited to those specific embodiments. On the contrary, it is intended for the subject matter of the invention to include all alternatives, modifications and equivalents as can be included within the spirit and scope of the following claims.

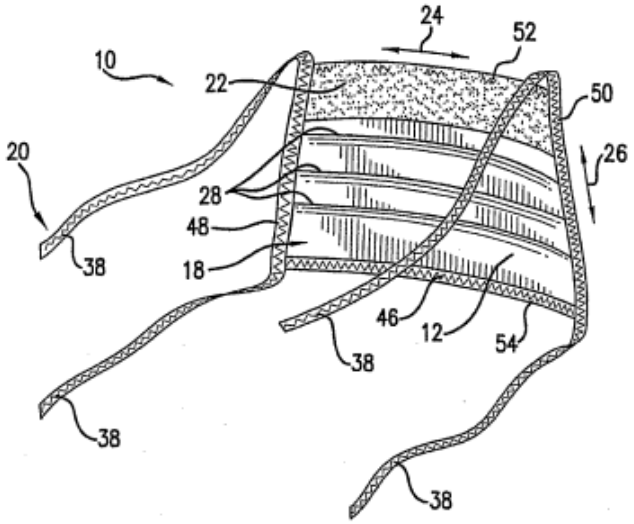


Figure 1

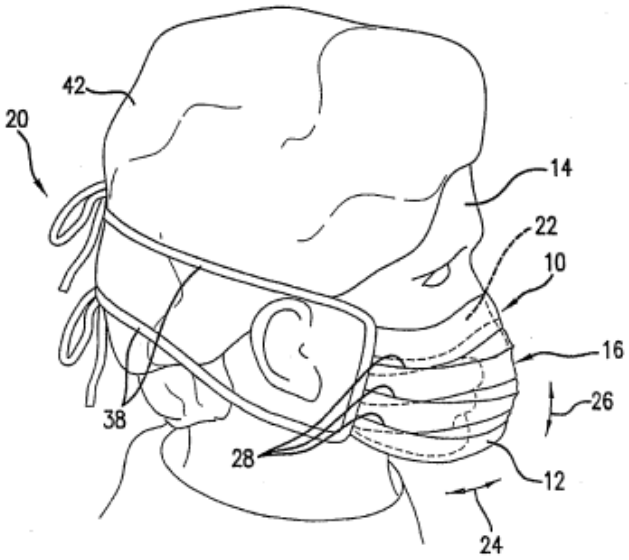


Figure 2

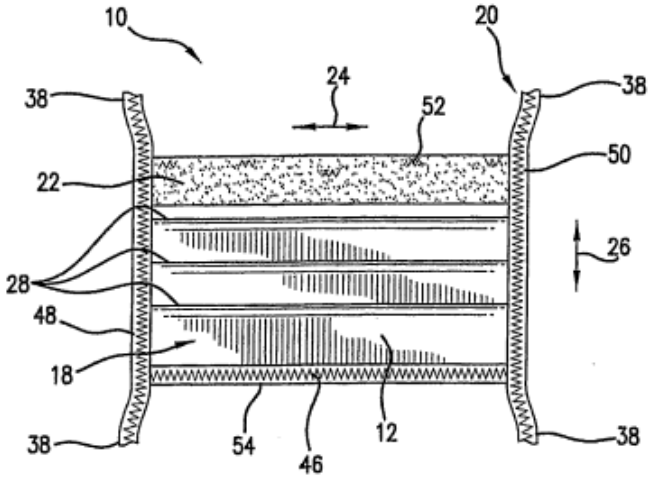


Figure 3

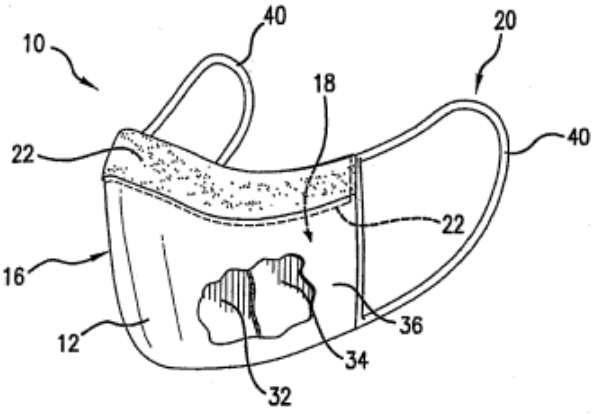


Figure 4

CLAIMS

1. A face mask comprising an antimicrobial agent, wherein said agent rapidly inhibits and controls the growth of a broad spectrum of microorganisms.

2. The face mask of claim 1 comprising a body portion configured to be placed over the mouth and at least part of the nose of a user in such a way that respiration air is drawn through said body portion.

3. The face mask of claim 1 or claim 2 comprising a fastening member for attaching the body portion of the face mask to the user.

4. The face mask of of claim 3, wherein the antimicrobial agent is selected from the group consisting of a biguanide, chitosan glycolate, a dithiocarbamate, alkyl polyglycosides, PG-hydroxyethylcellulose cocodimonium chloride, salicylic acid, citric acid, benzoic acid, xylitol, polyvinyl pyrrolidone-Iodine complex, or chlorhexidine gluconate (CHG).

5. The face mask of claim 4, wherein the antimicrobial agent is polyhexamethylene biguanide (PHMB).

6. The face mask of any of claims 1 to 6, wherein application of the germicidal agent is by a method selected from the group consisting of dipping and squeezing, spraying, ink jet printing and combinations thereof.

7. The face mask of claim 6, wherein said layer consists of nonwoven webs such as spunbond webs, meltblown webs or spunbond/meltblown/spunbond webs.

8. The face mask of claim 7, wherein the nonwoven webs are polyolefin nonwoven webs comprising PE or PP.

9. The face mask of claim 9, further comprising a tissue layer subjacent a nonwoven web.

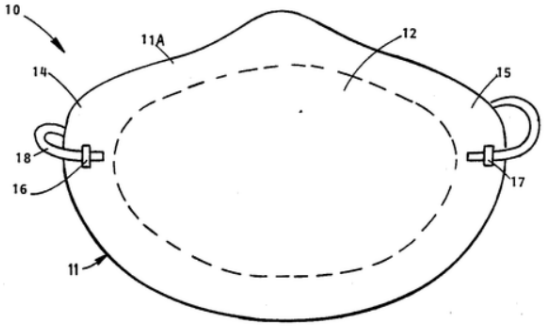
D1

[19] UNITED STATES PATENT
[11] **US 4,856,111 A**
[22] Filing Date: 8 July 1985 (08-07-1985)
[43] Publication Date: 1 August 1989 (01-08-1989)
[51] Int. Cl.: A61L
[71] Applicant: Masks and More Inc.
[76] Inventor: R. Williams

[54] Title: Face Mask and Method

Abstract

This invention relates to improvements in face masks, particularly for use in preventing the spread of disease such as colds, influenza and the like wherein a select portion or portions of such mask contain a disease or viral destroying chemical or biological agent, such as an acid or other material impregnating or forming part of a portion of the mask, such as that portion which extends across the nasal and mouth portions of the face of a wearer. In one form, the chemical or biological agent is in the form of a solid, such as a coating or a multitude of particles or crystals disposed against a porous portion of the mask or an insert which is attachable to and replaceable with respect to a mask frame or holding unit. In another form, such chemical is in the form of a liquid. In a third form, such chemical is disposed within a multitude of micro capsules which are ruptured or otherwise activated when the mask is used and which dispense their contents during such use and distribute the same throughout a select portion of the mask. In a particular form, the mask is impregnated with a viral killing chemical, such as citric acid, to prevent passage of viral agents either from a person using the mask or from the atmosphere.



Description

FIELD OF THE INVENTION

[0001] This invention concerns a face mask and a method for destroying bacteria and viruses which may travel in either direction with air inhaled or exhaled through the mask. In particular, the invention concerns a face mask which is porous in structure and contains, either disposed within an outer or central layer of the mask, a chemical, such as citric acid, which is capable of rapidly

destroying biological agents, such as microbes and viruses, which pass into the mask and flow either therethrough or through a porous attachment to the mask.

DESCRIPTION OF THE PRIOR ART

[0002] The prior art consists of a variety of face masks used by medical personnel and sometimes applied to patients, to prevent the spread of disease. Such masks have been generally made of porous paper, such as filter-type paper or other nonwoven breathable material and are exemplified by such U.S. Pat. No. 2,012,505. The prior art merely attempts to trap microscopic bacteria and the like in and against the walls of the cells of the porous material of which the mask is made. However, with prolonged use, such masks do permit the passage of certain microscopic disease causing material, such as viruses and the like carried on microscopic particles of dust and in aerosoled particles of liquid such as created when a person sneezes or coughs.

SUMMARY OF THE INVENTION

[0003] The principal object of the present invention is to provide new and improved structures in face masks and methods for preventing the spread of disease such as those carried on particles of dust or in aerosoled particles of body fluids. In particular, the invention employs one or more chemicals applied in the form of a liquid, vapor or solid particles or a combination of same, impregnating or sprayed against the outer surface of the mask or coating a film or sheet of porous material which is secured into the mask. In a preferred form, such a disease germ killing chemical is applied to a central portion of the mask between the outer and inner surfaces thereof to prevent general contact of the disease germ killing agent with either the skin of the face or the hands or is encapsulated prior to use of the mask.

[0004] If the disease germ killing chemical or agent is applied as a liquid, it is sprayed, roller coated or otherwise applied to the outer surface of the mask, which mask may be packaged in a sealed container to prevent evaporation of the liquid from the mask. Alternatively, a coating of such chemical may be applied to the outer surface of the mask, over which a coating of a film of non-porous plastic may be applied and adhesively bonded to the mask in a manner to permit such film to be peeled off the mask when it is ready to be used or retained if the film is porous.

[0005] In yet another form, liquid disease germ killing chemicals may be disposed in a multitude of microminiature rupturable capsules, such as plastic micro balloons or the like, which capsules may be applied to the outer surface and/or an inner layer of the porous sheet material of which the mask is fabricated. Such rupturable capsules may be ruptured by hand or otherwise caused to release their chemical contents into the surrounding cells of the mask to permit such chemical to receive and destroy bacteria and viral agents flowing into the cells or pores of the mask.

[0006] Accordingly it is a primary object of this invention to provide a new and improved medical mask which is capable of destroying bacteria and/or viral agents passing through the mask.

[0007] Another object is to provide a low cost face mask for use in medical applications and the like, which contains a chemical coating or impregnation within a portion of the mask through which portion or portions air flows to and from the nostrils and mouth of the user of the mask, wherein

such chemical containing portion or portions serve to destroy disease agents, such as bacteria and viruses flowing through the mask when a person wearing the mask breathes.

[0008] Another object is to provide a face mask which is particularly useful in medical applications and in preventing the spread of disease agents by a chemical which impregnates a portion of the mask.

[0009] Another object is to provide a medical mask useful in preventing disease germs and viruses from passing through the mask in either direction when a person wearing the mask breathes and incorporating a disease germ killing agent in the form of a mild acid, such as citric acid.

[0010] Another object is to provide an improved face mask made of a porous sheet-like material and containing a disease germ killing agent encapsulated within micro or miniature cells of the mask or disposed within cells of the mask wherein such capsules may be manipulated or ruptured to permit their contents to be released to the cells of the mask so as to effect the destruction of germs and viruses passing through the mask when a person wearing the mask breathes.

[0011] Another object is to provide a medical mask for use in preventing the spread of disease, which mask is made of a lightweight porous sheet material and is adapted to cover the end of the nose and mouth of a person wearing the mask, wherein a central portion of the mask aligned with the mouth and end of the nose contains a disease killing agent coating or impregnating same.

[0012] Another object is to provide an improved structure in a disposable face mask which not only serves to filter bacteria from the air passed therethrough but also serves to kill such bacteria within the wall of the mask. Another object is to provide an improved disposable face mask capable of destroying viruses such as retrovirus, carried on dust and droplets of water vapor, saliva and the like passed through the wall of the mask during breathing and coughing.

[0013] Another object is to provide an improved face mask for use in preventing the spread of disease by or to the user thereof wherein a disease germ killing agent is supported within a layer of material between the outer layers of the wall of the mask and is thereby prevented from contacting the skin of the face of the wearer and surfaces, such as the skin of the hands, exterior of the mask.

[0014] Another object is to provide a face mask which is particularly useful in preventing the spread of cold viruses and the like.

[0015] Another object is to provide a face mask containing a disease germ killing agent in the form of a chemical or biological material contained within open cells or interstices of the mask and operable to destroy bacteria and viruses carried on the breath and on particles such as body fluid, vapor, and dust particles passed into and entrapped by the mask.

[0016] Another object is to provide a face mask with a filter element containing a disease germ destroying agent permeating the interstices or open cells of the filter which agent forms a vapor within the mask cells when the mask is in use which vapor is effective in destroying or deactivating disease germs and the like which are airborn in the air passing through the mask.

[0017] Another object is to provide a face mask with a filter element containing a disease germ destroying or deactivating agent in the form of solid particles, such as crystals or otherwise constructed fine particles entrapped in at least a portion of the cells or secured to fibers of the filter and operable to receive dust and vapor particles containing virus and germs and to kill or deactivate same.

[0018] Another object is to provide a face mask with a filter element supporting a disease germ destroying or deactivating agent which volatizes when the mask is used and fills the interstices or open cells of the mask filter in a manner to kill or deactivate bacteria and viruses which are airborn and pass into the mask.

[0019] Another object is to provide a face mask with a chemical disease germ killing agent impregnating the mask in a solid form or encapsulant and is released therefrom as a result of a reaction between the breath of a person wearing the mask and breathing through the mask.

[0020] Another object is to provide a face mask with a liquid disease germ killing or deactivating agent encapsulated within micro balloons secured within or across at least a portion of the mask filter element which liquid is releasable from such micro balloons when they are ruptured by pressure applied to the mask by hand.

[0021] Another object is to provide a porous face mask and filter for the breath and air breathed through the nose which filter contains a disease germ killing or deactivating liquid chemical encapsulated within micro capsules or a material impregnating the cells of the mask, wherein the micro capsules are caused to slowly release their chemical contents by the heat and vapor of the breath of the person wearing the mask and breathing therethrough.

[0022] Another object is to provide a face mask made of a sheet-like filter material and a film of porous or perforated plastic resin containing a disease germ killing or deactivating chemical.

[0023] Another object is to provide a face mask made of a sheet-like filter material and having a strip of plastic film bonded to a portion of the mask which extends across the nostrils and mouth of the wearer, wherein filter material and/or a strip of plastic contain or retain one or more blisters or capsules contain a disease germ killing liquid which is released when the strip is pulled off the filter material to which it is sealed or bonded.

[0024] Another object is to provide a face mask having a filter material extending across the mouth and nostrils of the wearer when the mask is properly worn, which filter material contains a disease germ killing or deactivating agent, such as a mild acid, or a biological agent such as an antibiotic, a portion of which may be inhaled by a person using the mask.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] Fig. 1 is a front elevational view of a face mask for use in preventing the spread of disease.

[0026] Fig. 2 is a fragmentary side elevational view of the mask of Fig. 1.

[0027] Fig. 3 is a fragmentary cross sectional view of the wall of another form of face mask having a disease germ killing chemical or biological agent disposed between outer and inner layers of material which forms the wall of the mask.

[0028] Fig. 4 is a fragmentary cross sectional view of the wall of a mask, the major portion of which is made of porous material impregnated with a disease germ killing agent, wherein the inside surface of the mask is coated with a porous film of plastic adapted to prevent the flow of the disease germ killing agent to the skin of the wearer of the mask.

[0029] Fig. 5 is a fragmentary cross sectional view of the wall of a mask made of a lamination of two sheets or layers of porous or cellular material, between which layers is disposed a layer of disease germ killing chemical.

[0030] Fig. 6 is a front elevational view of another embodiment of a mask of the invention having a frame.

[0031] Fig. 7 is a fragmentary cross sectional view of the mask of FIG. 6 showing how the components thereof are assembled together.

DETAILED DESCRIPTION

[0032] Fig. 1 shows a face mask **10** having a body **11** formed of a suitable porous material, such as gauze, plastic impregnated gauze, open cell foamed plastic, nonwoven fibrous material, porous paper or the like material which is capable of being die, pressure or vacuum formed to a shape conforming to the nose and mouth portions of a person wearing such mask and the portion of the face immediately surrounding such nose and mouth portions. For instance, the boby **11** may comprise different materials such as adjacent layers of a tissue and a nonwoven web.

[0033] Central portion **12** of the mask base **11** is directly aligned with and may extend a peripheral distance from the nostrils of the nose and the mouth of a person wearing the mask. Such central portion **12** as defined by the dashed profile is fully or at least partially impregnated or coated with a chemical and/or biological agent or agents capable of killing bacteria and/or viruses which may pass through the mask in either direction during breathing. Various acidic chemicals, such as citric acid, acetic acid or other chemicals may be employed, for example, as an impregnating or coating material disposed against or within the filaments or cell structure of central portion **12** for destroying a variety of different disease causing or carrying bacteria or viruses such as retrovirus, tubercular bacteria, etc.

[0034] A chemical **13** is impregnated within or forms part of a porous member, such as porous tissue paper, gauze or plastic which is bonded or laminated to either the outside layer of the material forming base **11** of the mask or disposed within one or more layers of such material in alignment with central mask portion **12**.

[0035] In Fig. 2, side mask portion **14** contains hole **16** cut or molded therein. An elastic string or rubber band **18** or a plurality of same may be secured to mask portion **14** through opening **16** and another opening **17** at the other end **15** of mask **10** against the face of the wearer.

[0036] Face mask holding body **11** may be formed of a woven textile or plastic material such as gauze or plastic impregnated gauze or laminates of two or more of such materials. The sheet-like body **11** of Fig. 1 is molded to a cup-like shape having a circumscribing rim **11A** adapted to abut and conform to the face of the wearer when an elastic band or strap **18** is secured to the side end mask portions **14** and **15** by respective fasteners or staples **16** and **17**. Strap **18** tightly draws rim **11A** around the mouth and nose of the wearer, so that all of the ambient air used in breathing through the mouth or nose of the person must pass through the pores of the mask.

[0037] Central portion **12** may contain a capping sheet of such an agent capable of killing bacteria and/or viruses which may pass through the mask in either direction during breathing. The various acidic chemicals, may be disposed within certain filaments or micro capsules which biodegrade or otherwise release such chemicals, such as when compressed, to permit the chemicals to receive and kill or deactivate disease germs passing through the mask, such as when contacted by the vapor of the chemicals. Citric acid, for example, is effective in killing a variety of disease bacteria or viruses, such as retrovirus, tubercular bacteria, etc. The band-like peripheral mask portion or rim **11A** surrounding the chemical containing portion **12** thereof need not be impregnated or coated with the chemical or bacterial agent contained in portion **12**. If the entire mask body **11** contains such a chemical, the inside surface of portion or rim **11A** may be coated or laminated to an annular formation of non-porous plastic film which abuts the skin of the face of the wearer and prevents the chemical from contacting the same.

[0038] The central portion **12** shown in Fig. 2 includes a plurality of parallel rib-like formations **12R** extending across mask body **11** for providing rigidity to retain its cup-like shape. An additional reinforcing element (not shown), such as a strip of plastic or metal, may extend across mask **10** and be welded or secured thereto, for example, by staples **16** and **17** which secure the ends of the strap or rubber band **18** as shown in Fig. 1.

[0039] The third embodiment in Fig. 3 comprises a mask of the type described with a central portion **12** formed of a cellular or fibrous material **21** containing a multitude of fibers **21F** which are bonded together. Central portion **12** also contains a multitude of micro capsules **22**, each containing a quantity of a liquid chemical and/or biological agent of the type described for killing or rendering bacteria and/or viruses inactive. When pressure and/or heat is applied to mask **10**, micro capsules **22** rupture or melt releasing their contents to the surrounding fibrous material. The micro capsules **22** are shown bonded to those filaments or cell walls of the porous base material **21** which make up the outer layer **21A** of the mask base so that when the contents thereof are released by rupturing or melting the walls of the micro capsules, such chemical or bacterial agent will not normally make contact with the skin of the face of the person wearing the mask.

[0040] While the mask structure of Fig. 3 may comprise a single layer or sheet of porous or fibrous material having the micro balloons or micro capsules **22** retained within the sheet by the fibers or bonded to the fibers, it may also contain a layer or film of porous plastic secured to the inside surface **23** thereof or coated thereon and/or coated or laminated to outer surface **24**. As described above, such porous plastic or film may coat the entire surface or surfaces of the mask or just central portion **12** of the mask. In other words, if micro capsules **22** and merely disposed within the central portion **12**, then the protective film may be disposed only across central portion **12** to prevent the liquid released from capsules **22** from contacting the skin of the face and/or the hands. Otherwise the micro capsules **22** and film may extend throughout the entire mask configuration.

[0041] The embodiment of Fig. 4 comprises a mask **30** with a central porous portion **31** impregnated with solid or liquid disease germ killing material coating the walls of the cells or fibers **32** which form central portion **12**. Central portion **31** may also contain rupturable or otherwise releasable micro capsules **22** bonded to such cell walls or fibers with adhesive or simply held within the cells or interstices defined by the fibers. Laminated to or coated on the inside and outside surfaces of central portion **31** are respective sheets or layers **35B** and **35A** of porous plastic film which protect the skin of the face and hands from the disease germ killing agent when released via the environmental conditions as described herein.

[0042] The embodiment of Fig. 5 comprises mask body **36** having two sheets **37** and **38** of cellular filter-type paper or plastic laminated together by heat sealing. Alternatively, adhesive may be disposed around the periphery of the mask adjacent the outer rim thereof and/or applied at a plurality of spot-like locations of the interface of the mask so as to not interfere with the general flow of air through the mask. Outer sheet **38** may be totally impregnated with a bacteria, germ and virus killing chemical. Sheet **38** may contain micro capsules or micro balloons disposed within its structure and bonded to its cells or fibers as with respect to the earlier embodiments.

[0043] Such chemicals may be described or disposed along the interface **36A** between the inner and outer sheets **37** and **38**. If so located at interface **36**, micro capsules or otherwise formed chemical agents will be kept from contact with the skin of the hands and the face permitting mask body **36** to be pressed between the fingers to release the disease germ killing chemicals from the micro capsules when they rupture or otherwise activate such chemical or chemicals.

[0044] In a particular form, such disease germ killing chemicals may be a solid material which sublimes when exposed to the air or slightly heated by the heat of the breath or which vaporizes when activated by the vapor and/or heat of the breath passing through the mask. Thus, the chemical is in a state whereby it will effect a disease germ killing action in addition to killing those disease germs which pass through the mask and alight or deposit on the fibers or walls of the cells containing such chemical.

[0045] Various techniques are known in the art for encapsulating liquids in rupturable or volatizable micro balloons or micro capsules and for forming solid or porous materials containing medications and disease killing agents which may be released therefrom when heated and/or subjected to vapor, such as the vapor of the breath. Centrifugal casting of rupturable capsules from various synthetic and natural resins containing liquid materials has been developed by the Southwest Research Institute as well as other organization. Capsules varying from about 100 microns to to about 10,000 microns or more may be disposed within the cells or interstices of the porous or cellular filter material **21** of Fig. 3, central portion **31** of the mask **30** of FIG. 4, or at the interface **36A** between the porous sheets **37** and **38** of the mask body **36** FIG. 5.

[0046] Particles of disease germ killing or deactivating material, varying from a micron or less in diameter to several microns or more, such as crystals of citric acid or a mixture of such material in a volatizable material such as a natural or synthetic wax or other material such as glyceryl monostearate, camphor, methyl salicylate and the like having a low boiling or subliming temperature at atmospheric pressure to permit them to vaporize at temperatures in the range of 90° to 100° in the range of body temperature or the temperature of the breath. Further, such

disease germ killing material may be formed and incorporated within the cells of the filter mask material, coated thereon and impregnated for a select depth therein or disposed between layers thereof such as the layers defining the sandwich structure of Fig. 4 or the two-layer laminate of Fig. 5.

[0047] In yet another mask construction, droplets of such volatile material containing or defining the disease germ killing agent may be sprayed or electrostatically applied to space separated portions of the outer surface of the filter portion of the mask, the respective faces of a porous plastic capping sheet such as layers **35A** or **35B** of Fig. 4, or the interface **36A** between two layers of filter material. As indicated above, the disease germ killing agent in a liquid, crystal or powder form may also be provided in a large blister-like container or containers made of heat sealed plastic film and bonded against the outer surface of the mask filter element, between layers thereof or between a porous capping sheet.

[0048] While a volatile encapsulant or matrix material of the types described may be employed to slowly release the disease germ killing or deactivating agent, matrices such as open cell cellular plastic materials made of polyethylene, polypropylene, ethylene vinyl acetate copolymer, and the like may be employed such materials slowly release their contents of disease germ killing liquid chemicals such as citric acid, through the cells or through one or more laser drilled holes in a membrane containing the same. The release of the contents takes place when the heat of the breath causes pressure to be applied thereto or by gravity. If the chemical contents are in a solid volatile form, the vapor thereof may be slowly released to the interstices or cells of the mask filter material to fill the same and kill or deactivate disease germs which have flowed therein while breathing therethrough.

[0049] To trigger or hasten the release of the disease germ destroying or deactivating agent from encapsulation or solid form, certain arrangements may employ water soluble encapsulants which are released so as to saturate central portions **12** or **51** of the mask when water is applied to the mask or the portion thereof containing the solid water soluble material.

[0050] In another form, the mask filter material may contain a reaction material which changes color or becomes visible from an invisible form, when it receives one or more disease germ, which culture in the cells or interstices of the mask filter element and multiply to effect a chemical reaction which becomes visible for detection and diagnostic purposes. The mask may also contain means for culturing and/or collecting disease germ in the cells or interstices thereof which cultures are used in further tests after the mask is worn for a while.

[0051] Porous films, employed as described to cover select portions of the outer surface or surfaces of the mask filter material, or to cover crystals or otherwise formed particles of disease germ destroying or deactivating material impregnated into the mask cells, may be made in accordance with the teachings of U.S. Pat. No. 3,059,379 and other U.S. Patents.

[0052] In addition to the use of solid encapsulants which sublime and release their contents by flow or volatization, capsules made of crystalling polymers, such as polyolefins, containing such agents and medications as described may be made in accordance with the teachings of U.S. Pat. No. 3,423,389.

[0053] Homogeneous mixtures of crush resistant porous capsules containing a liquid disease germ destroying or deactivating agent and rupturable capsules containing a solvent or other liquid for causing the contents of the porous capsules to be released by osmotic action or by dissolving non-porous coatings on the porous capsules when the liquid is released from the crushed or ruptured capsules, may also be applied to the surfaces or cells of the mask filter materials described.

[0054] The embodiment of Figs. 6 and 7 comprises a mask assembly **40** formed of a frame **41** made of two circumscribing frame elements **43** and **44** with a porous, sheet-like central portion **50** extending across and supported by the frame. The rim or border of the porous material **50** may be made in any of the configurations described above and is held by friction, heatsealing or adhesive across frame **41** when frame elements **43** and **44** are assembled together as shown in Fig. 7.

[0055] Frame elements **43** and **44** may be formed by injection molding the same from plastic to configurations permitting them to properly fit together compressing the porous mask body **50** therebetween in a manner such that frictional assembly of elements **43** and **44** will retain mask body **50** with frame **41**. Alternatively, when elements **43** and **44** are assembled, compressed and heat sealed or otherwise bonded together, such mask body **50** will have its rim portion **52** secured between frame elements **43** and **44**.

[0056] Each respective border portion **45** and **47** of frame **41** is molded with respective holes or elongated openings **46** and **48** for receiving the ends of a strap or rubber band which may be tied or otherwise secured to mask frame **41** after passing through openings **46** and **48** to retain same in assembly therewith. Frame **41** may also be made of a single molding shaped to accommodate the rim portion **52** of the porous mask **50** which may be bonded thereto or may be formed of two annular elements which frictionally assemble together to support the mask **50** and permit it to be replaced with a new filter element when the frame elements **43** and **44** are pried apart for disassembly permitting the old mask **50** to be removed therefrom, replaced with a new mask when assembly is effected by pressing the two mask frame elements **43** and **44** together with the rim portion **52** of the mask base disposed therebetween.

[0057] In a modified form of mask **40**, the external contour of frame **41** may be that shown, while the rim portion thereof which supports the filter material is circular as is the filter itself with the rim portion of the mask frame **41** being molded with a threaded neck for receiving a circular annular cap employed to releasably hold the disc shaped filter element in place.

(**Claims omitted**)

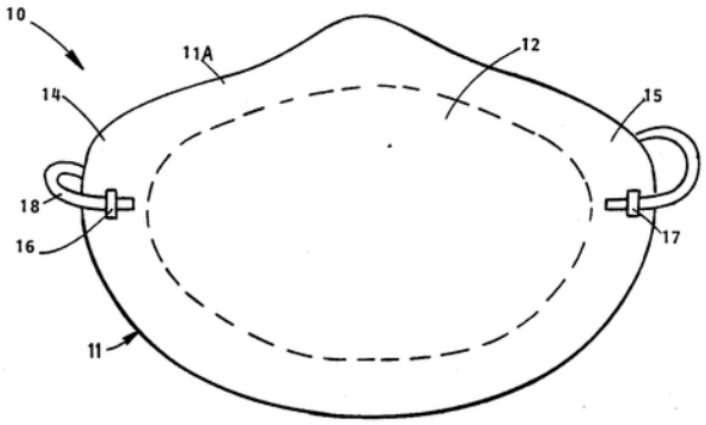


Figure 1

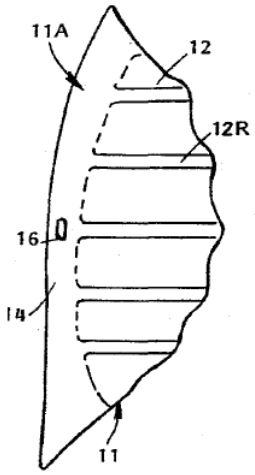


Figure 2

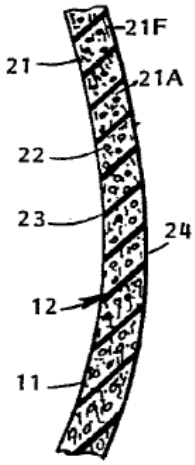


Figure 3

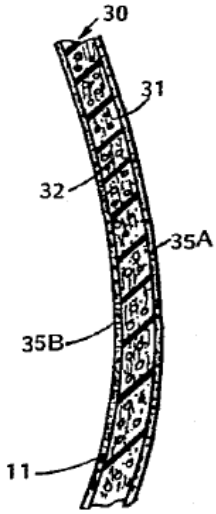


Figure 4

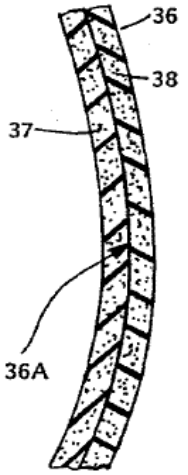


Figure 5

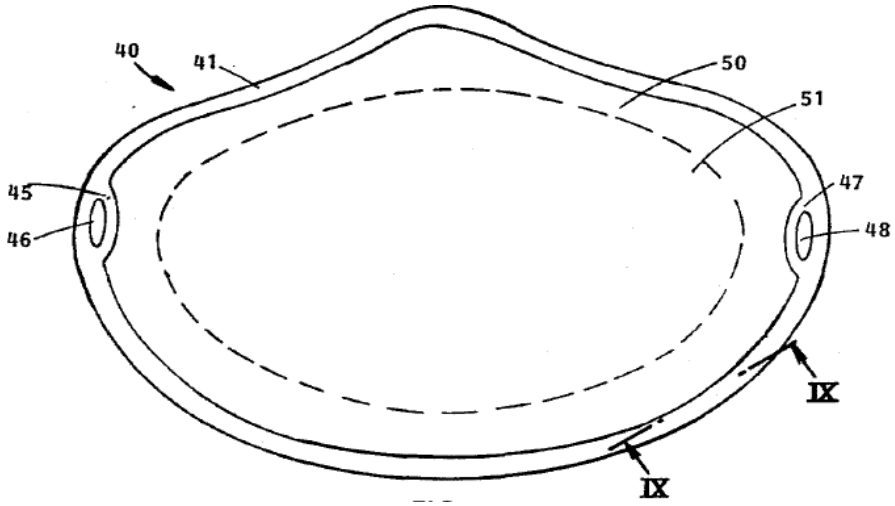


Figure 6

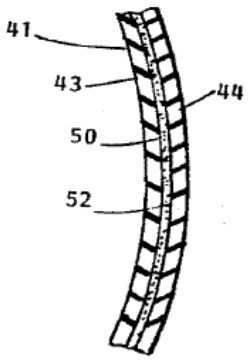


Figure 7

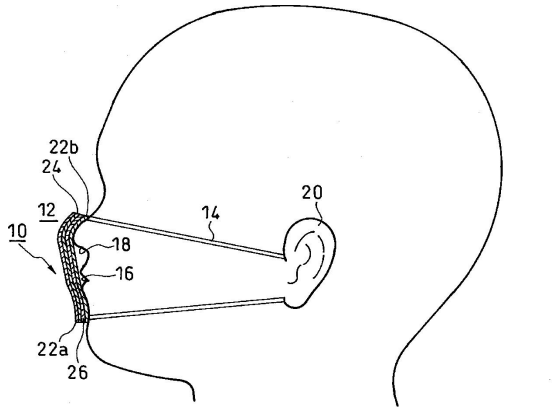
D2 (translation)

[19] Japan Patent Document
[11] **JP 2002-065222 A**
[22] Filing Date: 5 August 2000 (05-08-2000)
[43] Publication Date: 6 February 2002 (06-02-2002)
[51] Int. Cl.: A61L 2/16
[71] Applicant: Universal Masks Inc.
[72] Inventor: H. Matsumoto

[54] Title: Mask

Abstract

Problem to be solved: To provide a mask capable of positively catching microorganisms and showing the excellent pasteurization effect to the caught microorganisms. Solution: The mask **10** for covering a mouth **16** and a nose **18** is provided with a filter **24** carrying a biguanide-based antibacterial agent.



Description

TECHNICAL FIELD

[0001] The present invention relates to a mask, particularly to the selection of an antimicrobial agent suitable for preventing infection of pathogenic microorganisms that cause splashing or air infection, and to an improvement in the internal structure thereof.

BACKGROUND

[0002] Masks that cover the nose and mouth are conventionally used to trap fine particles floating in the air and prevent the scattering of microorganisms contained in sneezing and coughing. However, in recent years, life-related products such dishes and household appliances have been considered for antimicrobial functions, and various types of antimicrobial masks carrying antimicrobial agents have also been developed for masks (see, for example, Japanese Unexamined Patent Application Publication No. 11-200245).

[0003] In antimicrobial masks, plant extracts are commonly used as antimicrobial agents in order to avoid irritation to the skin and in consideration of safety to the human body. In such antimicrobial masks, the growth of adhered bacteria can be suppressed and the mask can be kept clean.

PROBLEM TO BE SOLVED

[0004] In medical and cosmetic fields, food cooking fields such as restaurants, processing fields, schools, hotels, and the like, hygiene management is essential. Specific examples include: (1) prevention of infection by pathogenic microorganisms (for example, influenza virus, tuberculosis, etc.) that float in air; (2) prevention of infection in hospitalized patients by pathogenic microorganisms residing in the oral cavity or nasal cavity of healthy individuals (medical personnel and visitors).

[0005] However, even with the known antimicrobial masks that use plant extracts, there remains room for improvement in the scavenging of pathogenic microorganisms from splashing or air infection, and in the efficient antimicrobial effect on the captured microorganisms. An object of the present invention is to provide a mask capable of actively capturing microorganisms and exhibiting an excellent antimicrobial effect on the captured microorganisms.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Fig. 1 is an example of a mask as worn by a user according to the first embodiment of the present invention; Fig. 2 is an exploded perspective view of the mask shown in FIG. 1; Fig. 3 is an explanatory diagram of the action of the mask shown in Fig. 1.

MEANS FOR SOLVING THE PROBLEM

[0007] As a result of diligent research on antimicrobial agents suitable for use in masks, the present inventors have found a positive scavenging effect against pathogenic microorganisms resulting from splashing or air infection, and an excellent antimicrobial effect against trapped microorganisms. Biguanide-based antimicrobial agents, particularly polyhexamethylene biguanide (PHMB), were found to be preferable from the perspectives of obtaining a wide antimicrobial spectrum, excellent durability of the antimicrobial effect, extremely little undesired effects on the human body.

[0008] Furthermore, the present inventors studied the amount of biguanide-based antimicrobial agent supported on, or impregnated within, a filter using aqueous solutions of biguanide-based antimicrobial agent prepared to a predetermined concentration within a range of 150 ppm to 5000 ppm. Supporting the biguanide-based antimicrobial agent on the filter by drying is suitable for use in a mask. In order to achieve the object described above, a mask according to the present invention covers the mouth and nose and is provided with a filter carrying a biguanide-based antimicrobial agent.

[0009] Furthermore, in the present invention, the biguanide-based antimicrobial agent is preferably supported on the filter by impregnating the filter with an aqueous solution of the biguanide-based antimicrobial agent prepared to a predetermined concentration in a range of 150

to 5000 ppm, and drying. That is, when the concentration of the biguanide-based antimicrobial agent aqueous solution is lower than 150 ppm, the capturing effect against pathogenic microorganisms from splashing or air infection, and the antimicrobial effect against the captured microorganisms, may not be sufficiently high.

[0010] On the other hand, when the concentration is higher than 5000 ppm, the capturing effect and antibacterial effect of the mask are sufficient, but negative aspects may be increased, such as an increase in manufacturing cost, an antibacterial agent becoming prone to falling off, and undesired effects on the human body such as skin irritation and the like. Furthermore, in the present invention, the biguanide-based antimicrobial agent is preferably supported in an amount such that the amount of the biguanide-based antimicrobial agent relative 1 cm^3 of the filter during use is from 0.1 g to 1.0 g.

[0011] In the present invention, it is preferable but optional that the filter includes a base portion that sandwiches the filter from both sides thereof. In addition, when it is desired to prevent the scattering of microorganisms to the outside, a fine particle capturing layer is preferably provided on the face side between the antimicrobial agent-carrying filter and the base layer. In addition, when it is desired to prevent intrusion of microbes from the outside, it is preferable but optional to provide a fine particle capturing layer on the exterior side between the antimicrobial agent-carrying filter and the base portion. Therefore, the antimicrobial agent-carrying filter could be the outermost layer of the mask.

[0012] Furthermore, in the present invention, in order to prevent the scattering of microorganisms to the outside and the intrusion of microorganisms from the outside, it is preferable to provide a microparticle capturing layer on each of the face side and the exterior side between the antimicrobial agent-carrying filter and the base portion. Here, the fine particle capturing layer is capable of capturing fine particles other than microbes.

[0013] The term "filter that carries a biguanide-based antimicrobial agent" refers to a filter in which the antimicrobial agent-carrying filter described above is sandwiched between base portions, a filter in which the antimicrobial agent is directly carried on the base portions, and the like. Examples of the filter used in an embodiment of the present invention include nylon, polyester, paper, gauze cloth, and the like having a fine mesh that prevents bacteria from passing through.

[0014] Various types of microorganisms on which the biguanide-based antimicrobial agent is efficient include e. coli, enterohemorrhagic e. coli, Staphylococcus aureus, multidrug-resistant Staphylococcus aureus, Pseudomonas aeruginosa, Candida albicans, and the like. In addition, examples of the fine particle capturing layer used in the present invention include filters made of paper, cloth, and the like, which are very fine in size compared to the base layer described above.

[0015] Preferred embodiments of the present invention will be described below with reference to the drawings. Fig.1 illustrates an example of a mask worn by a user according to an embodiment of the present invention, and Fig. 2 illustrates an exploded perspective view of the mask according to the embodiment. The mask **10** shown in the figure includes a mask body **12** configured with dimensions of, for example, a length of 95 mm and a width of 125 mm, and earloops **14**. Then, in a state where the mask body **12** covers the mouth **16** and nose **18** of a human, the earloops **14** are hung on the ears **20**.

[0016] In the present embodiment, the mask body **12** is provided with, in order from the exterior side to the face side when worn on a human, gauzes **22a** and **22b** (base portion), and an antimicrobial agent-impregnated filter (antimicrobial agent-carrying filter) **24** having a thickness of 0.5 mm, and a microparticle capturing material (microparticle capturing layer) **26** having a very fine particle size compared to gauzes **22a** and **22b**, between the gauzes **22a** and **22b**. By configuring the mask as described above, fine particles floating in the air can be captured, microorganisms contained in sneezing or coughing of the user can be prevented from scattering, and the mask can be kept clean by the antimicrobial agent impregnated filter.

[0017] However, plant extracts are typically used as the antimicrobial agent supported on antimicrobial agent-impregnated filters, but it is often difficult to actively capture pathogenic microorganisms that cause infections and to maintain antimicrobial effects on captured microorganisms.

[0018] Therefore, the first characteristic of the present embodiment is that the antimicrobial agent carried on the antimicrobial agent-impregnated filter **24** of the mask **10** can have one or more of a capturing effect against microorganisms and an antimicrobial effect. Biguanide-based antimicrobial agents such as polyhexamethylene biguanide (PHMB) rapidly inhibit the growth of microbes; they also have excellent durability of the antimicrobial effect and a wider range of antimicrobial spectrum than other antimicrobial agents such as quaternary ammonium salts.

[0019] To this end, in the present embodiment, the antimicrobial agent-impregnated filter **24** obtained by diluting PHMB to 2000 ppm with sterile distilled water, impregnating the filter with this aqueous solution, and drying the diluted PHMB, is placed between the gauzes **22a** and **22b** of the mask **10**.

[0020] The biguanide-based antimicrobial agent used in the present invention is a compound having a biguanide group, specifically polyhexamethylene biguanide (PHMB). Because it can be positively charged, it has a capturing effect of extremely efficiently binding to negatively charged microparticles, such as microorganisms, by ionic bonding.

[0021] As a result, as illustrated in Fig.3, the PHMB supported on the antimicrobial agent impregnated filter **24** of the present embodiment has a capturing effect of bonding extremely efficiently to negatively charged microparticles such as microorganisms or pollen by ionic bonding. In addition, the PHMB carried on the antimicrobial agent impregnated filter **24** of the present embodiment not only captures pathogenic microorganisms, but also captures pollen, which causes allergic rhinitis, bronchitis, and the like. The present invention also exhibits a useful effect in capturing negatively charged microparticles such as house dust and the like, and compared to a case where a plant extract is used as an antimicrobial agent for the mask, pathogenic microorganisms are kept securely and continuously captured by the mask for a long period of time.

[0022] In the antimicrobial agent impregnated filter **24** of the present embodiment, PHMB acts on the captured pathogenic microorganisms membrane to exert its antimicrobial effect. That is, PHMB exhibits an antimicrobial effect by an antimicrobial mechanism similar to that of quaternary

ammonium salts, which disrupts the cell membrane of microorganisms and causes leakage of potassium ions from the cytoplasm.

[0023] Therefore, the antimicrobial agent impregnated filter **24** of the present embodiment exhibits a higher antimicrobial effect against pathogenic microorganisms that cause smearing infection and air infection, compared to a filter using a plant extract as an antimicrobial agent.

[0024] The antimicrobial effect conferred by PHMB on the filter **24** of the present embodiment is superior in durability compared to the case where a plant extract such as an essential oil is used. Further, in the present embodiment, both sides of the filter **24** are sandwiched by the gauzes **22a** and **22b**, and thus the PHMB is firmly held without falling off the filter **24**. As a result, the microbe capturing effect and antimicrobial effect with respect to the captured microbe are exhibited over a long period of time.

[0025] The PHMB-impregnated filter **24** of the present embodiment also has a wider antimicrobial spectrum than quaternary ammonium salts and the like, and exhibits antimicrobial properties against, for example, e. coli, enterohemorrhagic e. coli, Staphylococcus aureus, multidrug-resistant Staphylococcus aureus, Pseudomonas aeruginosa, Candida albicans, and the like.

[0026] The PHMB-impregnated filter **24** of the present embodiment has extremely high safety with regard to cytotoxicity, mutagenicity, acute toxicity, and the like, and is therefore highly preferable for use in masks.

[0027] When the antimicrobial agent impregnated filter **24** of the present invention is produced by immersing the filter in a biguanide-based antimicrobial agent aqueous solution as described above, if the concentration of the aqueous solution is lower than 150 ppm, the capturing effect against pathogenic microorganisms, and the antimicrobial effect against the captured microorganisms, may not be sufficiently exhibited. On the other hand, when the concentration of the aqueous solution is higher than 5000 ppm, the capturing effect and antimicrobial effect of the mask are sufficient, but negative aspects may be increased, such as an increase in manufacturing cost, the antimicrobial agent becoming prone to falling off, and skin irritation and other effects on the human body may occur.

[0028-0036] Deleted

[0037] In each of the configurations described above, the antimicrobial agent-supporting filter medium was produced by immersing the filter medium in an aqueous solution of a certain concentration of an antimicrobial agent. However, the mask of the present invention can also be produced by a method comprising spraying an aqueous solution of the antimicrobial agent at a certain concentration on the filter medium.

[0038 – 0057] Deleted

(**Claims omitted**)

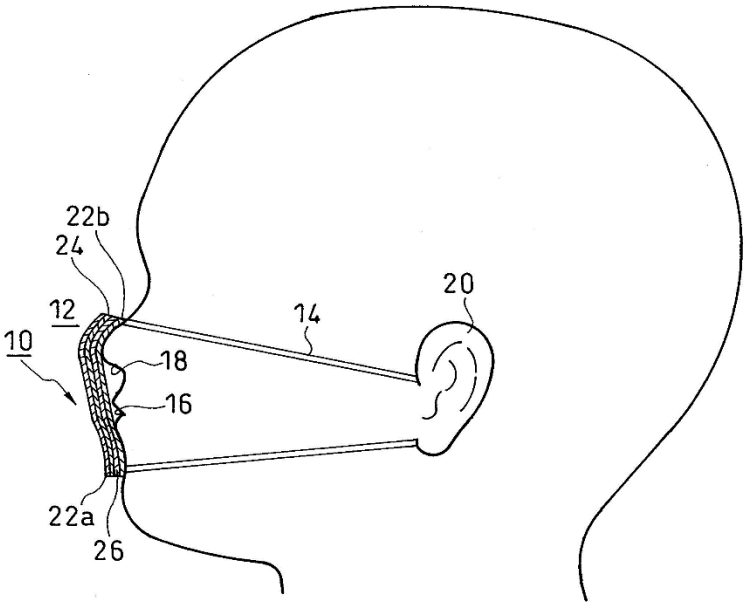


Figure 1

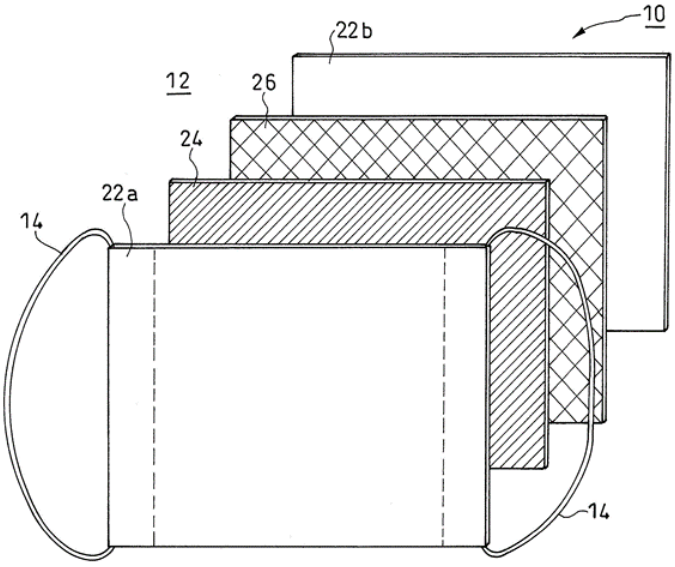


Figure 2

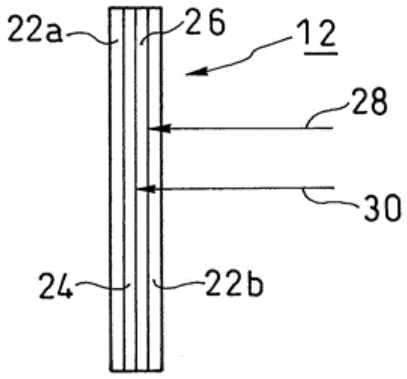


Figure 3

D3

[19] PCT INTERNATIONAL APPLICATION
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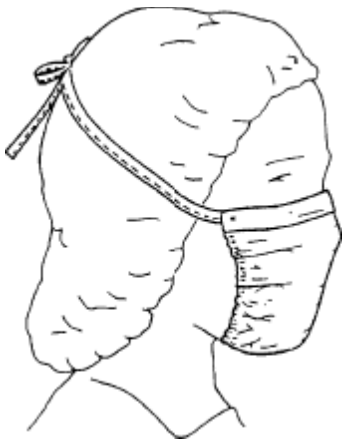
[43] Publication Date: 03 June 1997 (03-06-1997)
[51] Int. Cl.: A61L
[71] Applicant: World Mask Inc.
[72] Inventor: H. James

[54] Title: Breathing Mask

Abstract

A breathing mask fabric is provided which has between 50 and 95 weight percent of a through-air bonded, electret treated, nonwoven microfiber first web of fibers where the fibers have an average diameter of between about 10 and 25 microns and where the first web has a Frazier Permeability above about 100 CFM/SF, a density of between about 0.015 and 0.15 gms/cc, and a basis weight between about 67 gsm and about 340 gsm, and between about 5 and 50 weight percent of an electret treated microfiber second web of fibers where the fibers have an average diameter of less than about 10 microns.



Description

BACKGROUND OF THE INVENTION

[0001] This invention relates generally to a nonwoven fabric or web which is formed from microfibers of a thermoplastic resin, and laminates using such a web as a component which have been made into a filter for use in breathing masks such as, for example, a face mask or a respirator.

[0002] Thermoplastic resins have been extruded to form fibers, fabrics and webs for a number of years. The most common thermoplastics for this application are polyolefins, particularly polypropylene. Other materials such as polyesters, polyetheresters, polyamides and polyurethanes are also used to form nonwoven microfiber fabrics.

[0003] Nonwoven fabrics or webs are useful for a wide variety of applications such as diapers, feminine hygiene products, towels, recreational or protective fabrics and as geotextiles and filter media. The nonwoven webs used in these applications may be simply spunbond fabrics but are often in the form of nonwoven fabric laminates like spunbond/spunbond (SS) laminates or spunbond/meltblown/spunbond (SMS) laminates. Laminates with other materials are also possible such as with films and tissue.

[0004] As filter media, some of the desired characteristics of nonwoven fabrics are that they be permeable to the fluid being filtered yet have a high filtration efficiency. Permeability to the fluid being filtered is quite important as low permeability could result in a high pressure drop across the filter. In an application such as a breathing mask, a high pressure drop would mean the wearer would have a difficult time drawing enough air to breath comfortably. One example of a previous attempt at a breathable mask is taught in US Patent no. 4,547,420 to Krueger et al. which describes bicomponent meltblown webs which may be electrically charged. Meltblown webs unfortunately tend to have small pore sizes due to high densities and smaller fibers and therefore pressure drops which are undesirably high.

[0005] Filtration efficiency for fabrics is commonly expressed in terms of NaCl penetration using particles of about 0.1 micron. A NaCl efficiency above 80 percent is usually required for breathing mask applications and even above 95, 99 or 99.97 percent for certain medical applications.

[0006] In many applications, filtration materials are required which have structural integrity by themselves and can be converted into various shapes and which will then hold that shape. Breathing masks are often made into a pleated shape which gives far more surface area for filtration than a non-pleated shape in the same space.

[0007] While there have been previous attempts to produce microfiber breathing masks, there remains a need for such a breathing mask having a low pressure drop (i.e. high permeability) and high NaCl efficiency.

[0008] It is an object of this invention to provide a microfiber polymer nonwoven fabric or web for use as a filter medium which has a high permeability and high filtration efficiency. It is a further object of this invention to provide a breathing mask which may be a face mask for medical or other use and a respirator for industrial/commercial use.

SUMMARY OF THE INVENTION

[0009] The objects of this invention are achieved by a breathing mask fabric which has between 50 and 95 weight percent of a through-air bonded, electret treated, nonwoven microfiber first web of fibers where the fibers have an average diameter of between about 10 and 25 microns and where the first web has a Frazier Permeability above about 100 CFM/SF, a density of between about 0.015 and 0.15 gms/cc, and a basis weight between about 100 gsm and about 340 gsm, and between about 5 and 50 weight percent of an electret treated microfiber second web of fibers where the fibers have an average diameter of less than about 10 microns.

[0010] BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 is a schematic drawing of a process line for making a filter medium of this invention. Figure 2 is a drawing of a typical face mask. Figure 3 shows a face mask on a wearer.

DEFINITIONS

[0012] As used herein the term "nonwoven fabric or web" means a web having a structure of individual fibers or threads which are interlaid, but not in an identifiable manner as in a knitted fabric. Nonwoven fabrics or webs have been formed from many processes such as, for example, meltblowing processes, spunbonding processes, and bonded carded web processes. The basis weight of nonwoven fabrics is usually expressed in ounces of material per square yard (osy) or grams per square meter (gsm) and the fiber diameters useful are usually expressed in microns. (Note that to convert from osy to gsm, multiply osy by 33.91).

[0013] As used herein the term "microfibers" means small diameter fibers having an average diameter not greater than about 75 microns, for example, having an average diameter of from about 0.5 microns to about 50 microns, or more particularly, microfibers may have an average diameter of from about 2 microns to about 40 microns. Another frequently used expression of fiber diameter is denier, which is defined as grams per 9000 meters of a fiber and may be calculated as fiber diameter in microns squared, multiplied by the density in grams/cc, multiplied by 0.00707. A lower denier indicates a finer fiber and a higher denier indicates a thicker or heavier fiber. For example, the diameter of a polypropylene fiber given as 15 microns may be converted to denier by squaring, multiplying the result by 89 g/cc and multiplying by 0.00707. Thus, a 15 micron polypropylene fiber has a denier of about 1.42 (15^2 x 0.89 x .00707 = 1.415). Outside the United States the unit of measurement is more commonly the "tex", which is defined as the grams per kilometer of fiber. Tex may be calculated as denier/9.

[0014] As used herein the term "spunbonded fibers" refers to small diameter fibers which are formed by extruding molten thermoplastic material as filaments from a plurality of fine, usually circular capillaries of a spinneret with the diameter of the extruded filaments then being rapidly reduced as by, for example, in US Patent no. 4,340,563 to Appel et al. Spunbond fibers are generally not tacky when they are deposited onto a collecting surface. Spunbond fibers are generally continuous and have average diameters (using a sample size of at least 10) larger than 7 microns, more particularly, between about 10 and 25 microns.

[0015] As used herein the term "meltblown fibers" means fibers formed by extruding a molten thermoplastic material through a plurality of fine, usually circular, die capillaries as molten threads or filaments into converging high velocity, usually hot, gas (e.g. air) streams which attenuate the filaments of molten thermoplastic material to reduce their diameter, which may be to microfiber diameter. Thereafter, the meltblown fibers are carried by the high velocity gas stream and are deposited on a collecting surface to form a web of randomly disbursed meltblown fibers. Such a process is disclosed, for example, in US Patent no. 3,849,241 to Butin. Meltblown fibers are microfibers which may be continuous or discontinuous, are generally smaller than 10 microns in averagediameter (using a sample size of at least 10), and are generally tacky when deposited onto a collecting surface.

[0016] As used herein the term "monocomponent" fiber refers to a fiber formed from one or more extruders using the same polymer. This is not meant to exclude fibers formed from one polymer to which small amounts of additives have been added for coloration, anti-static properties,

lubrication, hydrophilicity, etc. These additives, e.g. titanium dioxide for color, are generally present in an amount less than 5 weight percent and more typically about 2 weight percent.

[0017] As used herein the term "conjugate fibers" refers to fibers which have been formed from at least two polymers extruded from separate extruders but spun together to form one fiber. Conjugate fibers are also sometimes referred to as multicomponent or bicomponent fibers. The polymers are usually different from each other though conjugate fibers may use the same polymer from each extruder. The polymers are arranged in substantially constantly positioned distinct zones across the cross-section of the conjugate fibers and extend continuously along the length of the conjugate fibers. The configuration of such a conjugate fiber may be, for example, a sheath/core arrangement wherein one polymer is surrounded by another or may be a side by side arrangement, a segmented configuration wherein the polymers are arranged like slices of a pie, or an "islands-in-the-sea" arrangement.

[0018] As used herein, through air bonding or "TAB" means a process of bonding a nonwoven conjugate fiber web in which air which is sufficiently hot to melt one of the polymers of which the fibers of the web are made is forced through the web. The air velocity is between 100 and 500 fpm (30-152 m/min.) and the dwell time may be as long as 60 seconds. The air temperature may be between about 230 and 325°F (110- 162$^{\beta}$C), depending on the melting points of the polymers used. The melting and resolidification of the polymer provide the bonding. TAB requires the melting of at least one component to accomplish bonding so it is restricted to webs with at least two components like conjugate fibers or those which include an adhesive.

[0019] As used herein, "ultrasonic bonding" means a process performed, for example, by passing the web between a sonic horn and anvil roll as illustrated in US Patent 4,374,888 to Bornslaeger.

TEST METHODS

[0020] Frazier Permeability: A measure of the permeability of a fabric or web to air is the Frazier Permeability which is performed according to Federal Test Standard No. 191 A, Method 5450 dated July 20, 1978, and is reported as an average of 3 sample readings. Frazier Permeability measures the air flow rate through a web in cubic feet of air per minute per square foot of web or CFM/SF.

[0021] NaCl Efficiency: The NaCl Efficiency is a measure of the ability of a fabric or web to stop the passage of small particles through it. A higher efficiency is generally more desirable and indicates a greater ability to remove particles. NaCl efficiency is measured in percent according to the TSI Inc., Model 8110 Automated Filter Tester Operation Manual, at a flow rate of 32 liters per minute using 0.1 micron sized NaCl particles and is reported as an average of 3 sample readings.

DETAILED DESCRIPTION

[0022] The microfibers of the through-air bonded web used in the practice of this invention may be made by the spunbond process. The spunbond process generally uses a hopper which supplies polymer to a heated extruder. The extruder supplies melted polymer to a spinneret where the polymer is fiberized as it passes through fine openings arranged in one or more rows in the spinneret, forming a curtain of filaments. The filaments are usually quenched with air at a low pressure, drawn, usually pneumatically and deposited on a moving foraminous mat, belt or

"forming wire" to form the nonwoven web. Polymers useful in the spunbond process generally have a process melt temperature of between about 400°F to about 610°F (200°C to 320°C).

[0023] The fibers produced in the spunbond process are usually in the range of from about 10 to about 40 microns in average diameter, depending on process conditions and the desired end use for the webs to be produced from such fibers. For example, increasing the polymer molecular weight or decreasing the processing temperature results in larger diameter fibers. Changes in the quench fluid temperature and pneumatic draw pressure can also affect fiber diameter.

[0024] The fabric of this invention is a multilayer laminate. An example of a multilayer laminate may be an embodiment wherein some of the layers are spunbond and some meltblown such as a spunbond/meltblown/spunbond (SMS) laminate as disclosed in US Patent no. 4,041,203 to Brock et al. or as a spunbond/spunbond laminate. An SMS laminate may be made by sequentially depositing onto a moving conveyor belt or forming wire first a spunbond web layer, then a meltblown web layer and last another spunbond layer and then bonding the laminate in a manner described above. Alternatively, the three web layers may be made individually, collected in rolls, and combined in a separate bonding step. Such fabrics usually have a basis weight of from about 0.1 to 12 osy (6 to 400 gsm), or more particularly from about 0.75 to about 3 osy.

[0025] It is preferred that the fibers of the through-air bonded web used in the practice of this invention have a high bulk or loft since a low loft fabric will generally have a higher pressure drop. Loftiness may be expressed as a function of web density and web density for the fabric used herein is preferably between about 0.015 and 0.15 grams/cc, more particularly between about 0.015 and 0.08 gms/cc or still more particularly between about 0.015 and 0.04 gms/cc.

[0026] One type of spunbond fibers which may be used to produce the through-air bonded web of this invention are conjugate fibers, such as side-by-side (S/S) fibers. The polymers used to produce the fibers may be any of those known in the art to be fiberizable. Fiberizable polymers include polyurethane, polyvinylchloride, expanded polytetrafluoroethylene, polystyrene, polyethylene terephathalate, polyamides, polycarbonates, and polyolefins like, for example, polybutylene, polypropylene and polyethylene. As these conjugate fibers are produced and cooled, the differing coefficients of expansion of the polymers, the differing densities of the polymers as they go through the phase change to a solid, and other factors cause these fibers to bend and ultimately to crimp, somewhat akin to the action of the bimetallic strip in a conventional room thermostat. The crimp may be enhanced by the use of the hot air used to draw the fibers to activate the fiber latent crimp, which is discussed in detailin US Patent no. 5,382,400 to Pike et al. Crimped fibers have an advantage over uncrimped fibers in that they produce a more bulky web which therefore increases fabric or web permeability.

[0027] As spunbond fiber webs are produced they are generally treated with a compaction roll or hot air knife to give the web sufficient integrity for further processing. This is not strictly required since it is possible, with great care, to take the web directly to a more substantial bonding process without either of these treatments. After formation and the optional compaction roll or hot air knife treatment the web is subjected to through-air bonding. Through-air bonding provides the capability of producing a loftier web since it does not compact the web and reduce the bulk density as do other methods such as thermal point bonding. Through-air bonding has the added benefit as compared to thermal point bonding, of not producing bond points which restrict the air flow, an important point for a breathing mask.

[0028] After through-air bonding the web may be electret treated. Electret treatment further increases filtration efficiency by drawing particles to be filtered toward the fibers of the filter by virtue of their electrical charge. Electret treatment can be carried out by a number of different techniques. For instance, Tsai describes a process whereby a web or film is sequentially subjected to a series of electric fields such that adjacent electric fields have substantially opposite polarities with respect to each other. Thus, one side of the web or film is initially subjected to a positive charge while the other side of the web or film is initially subjected to a negative charge. Then, the first side of the web or film is subjected to a negative charge and the other side of the web or film is subjected to a positive charge. Such webs are produced with a relatively high charge density. The process may be carried out by passing the web through a plurality of dispersed non-arcing electric fields like, for example, between a charging wire or bar and a charged roller at a certain gap, where the field and gap may be varied over a range depending on the charge desired in the web. The web may be charged at a range of about -30 kVDC/cm to 30 kVDC/cm or more. The gap may be about 0.25 inch (6.5 mm) to about 2 inches (51 mm).

[0029] Deleted

[0030] Many polyolefins are available for fiber production, for example polyethylenes such as Dow Chemical's ASPUN® 6811A linear low density polyethylene, 2553 LLDPE and 25355 and 12350 high density polyethylene are such suitable polymers. The polyethylenes have melt flow rates in g/10 min. at 190°F and a load of 2.16 kg, of about 26, 40, 25 and 12, respectively. Fiber forming polypropylenes include Exxon Chemical Company's ESCORENE® PD 3445 polypropylene and Himont Chemical Co.'s PF-305. Many other polyolefins are commercially available.

[0031] Turning to Figure 1, a process line **10** for preparing an embodiment of the present invention is disclosed. The process line **10** is arranged to produce conjugate continuous filaments, but it should be understood that the present invention comprehends nonwoven fabrics made with multicomponent filaments having more than two components. For example, the fabric of the present invention can be made with filaments having three or four components. The process line **10** includes a pair of extruders **12a** and **12b** for separately extruding a polymer component A and a polymer component B. Polymer component A is fed into the respective extruder **12a** from a first hopper **14a** and polymer component B is fed into the respective extruder **12b** from a second hopper **14b**. Polymer components A and B are fed from the extruders **12a** and **12b** through respective polymer conduits **16a** and **16b** to a spinneret **18**. Spinnerets for extruding conjugate filaments are well-known to those of ordinary skill in the art and thus are not described herein detail. Generally described, the spinneret **18** includes a housing containing a spin pack which includes a plurality of plates stacked one on top of the other with a pattern of openings arranged to create flow paths for directing polymer components A and B separately through the spinneret. The spinneret **18** has openings arranged in one or more rows. The spinneret openings form a downwardly extending curtain of filaments which the polymers are extruded through the spinneret. For the purposes of the present invention, spinneret **18** may be arranged to form side-by-side or eccentric sheath/core conjugate filaments.

[0032] The process line **10** also includes a quench blower **20** positioned adjacent the curtain of filaments extending from the spinneret **18**. Air from the quench air blower **20** quenches the filaments extending from the spinneret **18**. The quench air can be directed from one side of the filament curtain as shown in Fig. 1, or both sides of the filament curtain.

[0033] A fiber draw unit or aspirator **22** is positioned below the spinneret **18** and receives the quenched filaments. Fiber draw units or aspirators for use in melt spinning polymers are well-

known as discussed above. Suitable fiber draw units for use in the process of the present invention include a linear, fiber aspirator of the type shown in US Patent No. 3,802,817 and eductive guns of the type shown in US Patent No. 3,692,618.

[0034] Generally described, the fiber draw unit **22** includes an elongate vertical passage through which the filaments are drawn by aspirating air entering from the sides of the passage and flowing downwardly through the passage. A heater **24** supplies hot aspirating air to the fiber draw unit **22**. The hot aspirating air draws the filaments and ambient air through the fiber draw unit and may be used to produce crimp.

[0035] An endless foraminous forming surface **26** is positioned below the fiber draw unit **22** and receives the continuous filaments from the outlet opening of the fiber draw unit. The forming surface **26** travels around guide rollers **28**. A vacuum **30** positioned below the forming surface **26** where the filaments are deposited draws the filaments against the forming surface.

[0036] The process line **10** as shown also includes a hot-air knife **34** which is positioned above the web on the forming surface **26**. A hot air knife is a device which focuses a stream of heated air at a very high flow rate, generally from about 1000 to about 10000 feet per minute (fpm) directed at the nonwoven web immediately after its formation. The air temperature is usually in the range of the melting point of at least one of the polymers used in the web, generally between about 200 and 550°F (93 and 290°C) for the thermoplastic polymers commonly used in spunbonding. The control of air temperature, velocity, pressure, volume and other factors helps avoid damage to the web while increasing its integrity. The HAK's focused stream of air is arranged and directed by at least one slot of about 1/8 to 1 inches (3 to 25 mm) in width, particularly about 3/8 inch (9.4 mm), serving as the exit for the heated air towards the web, with the slot running in a substantially cross-machine direction over substantially the entire width of the web. In other embodiments, there may be a plurality of slots arranged next to each other or separated by a slight gap. In addition, the process line includes a bonding apparatus which is a through-air bonder **36**. After passing through the through-air bonder, the web is passed between a charging wire or bar **48** and a charged roller **42** and then between a second charging wire or bar **50** and roller **44**. Lastly, the process line **10** includes a winding roll **46** for taking up the finished fabric.

[0037] To operate the process line **10**, the hoppers **14a** and **14b** are filled with the respective polymer components A and B. Polymer components A and B are melted and extruded by the respective extruders **12a** and **12b** through polymer conduits **16a** and **16b** and the spinneret **18**. Although the temperatures of the molten polymers vary depending on the polymers used, when polypropylene and polyethylene are used as components A and B respectively, the preferred temperatures of the polymers range from about 370° to about 530° F.

[0038] As the extruded filaments extend below the spinneret **18**, a stream of air from the quench blower **20** at least partially quenches the filaments to develop a latent helical crimp in the filaments at an air temperature of about 45° to about 90° F. and an air velocity from about 100 to about 400 feet per minute.

[0039] After quenching, the filaments are drawn into the vertical passage of the fiber draw unit **22** by a flow of hot air from the heater **24** through the fiber draw unit. The fiber draw unit is preferably positioned 30 to 60 inches below the bottom of the spinneret **18**. The temperature of the air supplied from the heater **24** is sufficient that, after some cooling due to mixing with cooler ambient air aspirated with the filaments, the air can heat the filaments to a temperature required to crimp

the fibers, in the case of crimpable fibers, by activating the latent crimp. The temperature required to activate the latent crimp of heat crimpable filaments ranges from about 110° F to a maximum temperature less that the melting point of the lower melting component which for through-air bonded materials is the second component B. The temperature of the air from the heater **24** and thus the temperature to which the filaments are heated can be varied to achieve different levels of crimp. Generally, a higher air temperature produces a higher number of crimps. The ability to control the degree of crimp present in crimpable filaments is particularly advantageous because it allows one to change the resulting density and pore size distribution of the fabric by simply adjusting the temperature of the air in the fiber draw unit.

[0040] After extrusion, the filaments are deposited through the outlet opening of the fiber draw unit **22** onto the traveling forming surface **26**. The vacuum **30** draws the filaments against the forming surface **26** to form an unbonded, nonwoven web of continuous filaments. The web is then given a degree of integrity by the hot-air knife **34** and through-air bonded in the through-air bonder **36**.

[0041] In the through-air bonder **36**, air usually having a temperature above the melting temperature of component B and below the melting temperature of component A is directed from the hood **40**, through the web, and into the perforated roller **38**. Note that it is possible to use air above the melting temperature of component A with careful control and attention that the web temperature itself never exceeds the melting temperature of component A. Alternatively, the through-air bonder may be a flat arrangement wherein the air is directed vertically downward onto the web. The operating conditions of the two configurations are similar, the primary difference being the geometry of the web during bonding. The hot air melts the lower melting polymer component B and thereby forms bonds between the conjugate filaments to integrate the web. When polypropylene and polyethylene are used as polymer components A and B respectively, the air flowing through the through-air bonder usually has a temperature ranging from about 230$^{\beta}$F to about 325°F (110$^{\beta}$C to 162°C). and a velocity from about 100 to about 500 feet per minute. It should be understood, however, that the parameters of the through-air bonder depend on factors such as the type of polymers used and thickness of the web.

[0042] The web is then passed through the charged field between the charging bar or wire **48** and the charging drum or roller **42** and then through a second charged field of opposite polarity created between charging bar or wire **50** and charging drum or roller 44. The web may be charged at a range of about -5 kVDC/cm to 25 kVDC/cm.

[0043] Lastly, the finished web is wound onto the winding roller **46** and is ready for further treatment or use.

[0044] The key attributes for filter fabric for a breathing mask are Frazier Permeability and NaCl efficiency. It is believed that the larger fiber layer of such a fabric should have a Frazier Permeability of greater than 100 CFM/SF and the overall fabric a NaCl efficiency of greater than 80 percent. The fabric suitable for use as a breathing mask desirably has a basis weight between about 100 and 340 gsm.

[0045] While it has been found that an electret treated through-air bonded spunbond fabric alone will provide the desired NaCl efficiency and Frazier Permeability, the resulting breathing mask is relatively expensive to produce because of the thickness of material needed. The inventors have found that a layer of finer microfibers used adjacent to and in conjunction with a larger fiber web allows for the use of a much lighter larger fiber web while retaining the desired NaCl efficiency

and Frazier Permeability. This novel invention results in a lighter and lower cost breathing mask than one having only spunbond fibers. More particularly, a fabric comprised of between 50 and 95 weight percent of a through-air bonded, electret treated, nonwoven microfiber first web of fibers where the fibers have an average diameter of between about 10 and 25 microns and where the first web has a Frazier Permeability above about 100 CFM/SF, a density of between about 0.015 and 0.15 gms/cc, and a basis weight between about 100 gsm and about 340 gsm, combined with between about 5 and 50 weight percent of an electret treated microfiber second web of fibers where the fibers have an average diameter of less than about 10 microns, results in a fabric which is sufficiently light in weight, permeable, yet which possesses the requisite filtration efficiency.The finer fiber web used in conjunction with the larger fiber web should also be electret treated. This electret treatment is carried out in the same manner as the electret treatment of a spunbond web. The finer fiber web may be electret treated at a charge having the same range as that given above for the spunbond web. The finer fiber web may be made of any polymer known to those skilled in the art to be suitable for fine fiber production and electret treatment. Polyolefins are particularly desired and more particularly polypropylene.

[0046] The fabric of this invention may be made into a breathing mask by any method known in the art to be effective. A typical face mask, for example, is shown in Figure 2 and on a wearer in Figure 3. Further information concerning face masks may be found in US Patent no. 4,662,005. In the construction of a breathing mask using more than one layer, for example, a spunbond and meltblown layer, the spunbond and meltblown layers are not bonded together across the entire fabric area as is conventionally done in many nonwoven applications, but merely ultrasonically bonded about the edges since bonding generally reduces the area available for air flow through the fabric. That is, there is no bond between the layers across the majority of the fabric formed by the layers, but they only are in physical proximity held in place adjacent to each other by peripheral ultrasonic bonding.

[0047] It is also possible to laminate a tissue or film to the webs of this invention for various specialty applications. Tissues are used in known breathing masks in order to increase softness of the mask against the skin. Films are used for increased splash protection and must, of course, be breathable for this application.

[0048] Although only a few exemplary embodiments of this invention have been described in detail above, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention.

(**Claims omitted**)

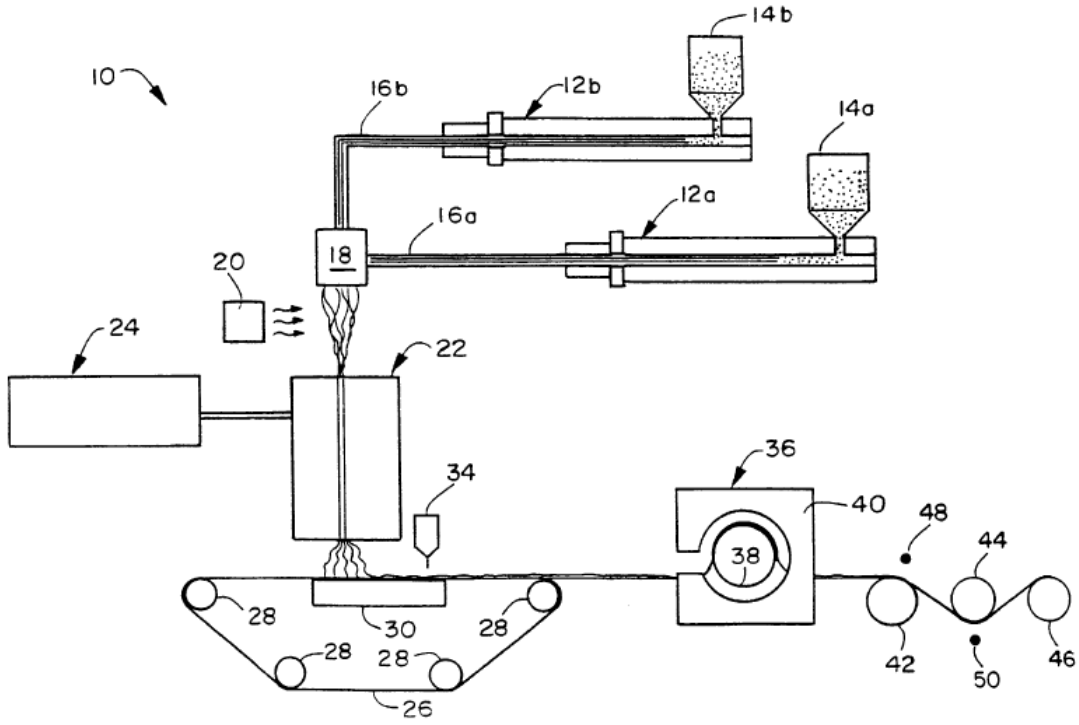


Figure 1

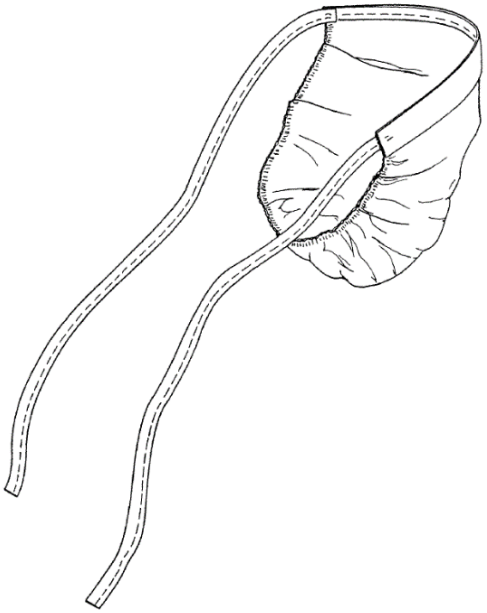


Figure 2

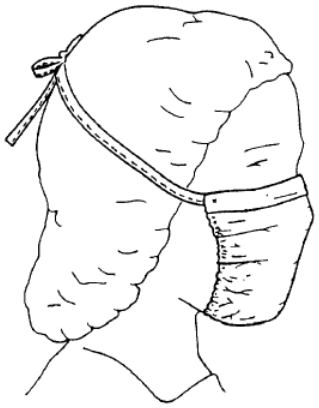


Figure 3

PART B: Questions C2 to C12 (25 Marks)

C2. For each of the following three Canadian patent applications, state whether the prior art document would, or would not, be citable with regards to anticipation. If citable, indicate the relevant subsection of the *Patent Act*. [1 pt each]

(i) A patent application filed by applicant Y on September 17, 2014, having valid priority dates of September 13, 2013 and April 17, 2014, and published on March 13, 2015.

Prior art: A patent application filed in the United States by the same applicant Y on March 8, 2013, having a priority date of March 16, 2012 and published on September 16, 2013.

(ii) A patent application filed by applicant X, published on August 2, 2018, and having a filing date of January 8, 2018 and a valid priority date of January 24, 2017.

Prior art: A non-patent document published by the same applicant X on January 15, 2017.

(iii) A patent application filed on May 18, 2017 and having a valid priority date of May 25, 2016 and a publication date of November 30, 2017.

Prior art: A canadian patent application filed by a different applicant on May 22, 2017 with a priority date of May 24, 2016, and published on November 24, 2017.

C3. To what extent can an application be amended after a notice of allowance has been sent by CIPO? [1 pt]

C4. A document cited in an International Search Report (ISR) includes all the elements defined in the claims of the application under examination. The cited document has been published prior to the international filing date but later than the priority date claimed. What code(s) (A, E, L, O, P, T, X, Y) will the International Searching Authority (ISA) use to identify the citation as? [1 pt]

C5. If an application examined under the Patent Prosecution Highway (PPH) is abandoned in accordance with subsection 73(1) of the *Patent Act*, will it receive accelerated examination under the PPH once the application is reinstated? [1 pt]

C6. What is the time limit to request examination for divisional applications? [1 pt]

C7. Describe the Office practice in the event that a non-compliant abstract is all that prevents allowance of an application. [1 pt]

C8. List the three (3) requirements to request extension of time to respond to an examiner's requisition. [3 pts]

C9. What is the time limit to correct an obvious error in the specification or drawings of a patent? [1 pt]

C10. Describe a situation where new subject-matter may be added to the specification and drawings of a patent application. [1 pt]

C11. State whether or not the following claims are acceptable (Y/N). For those that are not acceptable, briefly state the reason. [1 pt each]

(a) The method of claim 1 or the use of claim 10 wherein the adhesive composition further comprises a thickener.
(b) A process for preparing a hard surface cleaning composition from the composition defined in claim 1 and an additional anionic surfactant.
(c) A transaction device comprising: transmitting, by a terminal device, to a transaction server, a remittance request signal for remitting cryptocurrency kept in an electronic wallet.
(d) A computer program downloadable from a communications network characterized in that the computer program comprises program code instructions to execute the method of claim 1.
(e) Use of compound X for the prevention or treatment of tooth decay. (note: assume that compound X is properly defined)

C12. True or false [1 pt each]
(a) A document is submitted electronically to the Patent Office on a day on which the Office is closed to the public. The document is deemed received on the day the Office is next open to the public.
(b) An abstract may contain a mathematical formula.
(c) A PPH request submitted to CIPO can be based on two corresponding U.S. patents.
(d) Payment of the application fee is a requirement to secure a filing date for a regular patent application submitted to CIPO.
(e) A Final Action will be issued in a situation where an examiner considers that the claims lack unity of invention and the applicant declines to limit their claims to a single invention (after at least two reports).
(f) Under Rule 91 of the PCT (Rectification of Obvious Mistakes), a mistake in the abstract can be rectified by the applicant.
(g) A claim to a kit must include instructions defining the use.

CANADIAN PATENT AGENT QUALIFYING EXAMINATION 2021
MARKING GUIDE for PAPER C – PATENT OFFICE PRACTICE

Part A – Question C1 [total of 75 pts]

EXAMPLE CLAIMS

1. A face mask comprising a fastening member for attaching a body portion of the face mask to a user, said body portion joined to the fastening member and configured to be placed over the mouth and at least part of the nose of the user in such a way that respiration air is drawn through said body portion, the body portion comprising a layer [or at least one layer] having an antimicrobial composition, wherein the antimicrobial composition comprises a mixture of polyhexamethylene biguanide (PHMB), citric acid and alkyl polyglycosides.

2. The face mask of claim 1, wherein the body portion comprises a plurality of layers.

3. The face mask of claim 2, wherein the antimicrobial composition is in the outermost layer.

4. The face mask of any one of claims 1 to 3, wherein the antimicrobial composition further comprises an additional ingredient selected from the group consisting of chitosan glycolate, a dithiocarbamate, PG-hydroxyethylcellulose cocodimonium chloride, salicylic acid, benzoic acid, xylitol, polyvinyl pyrrolidone-Iodine complex and chlorhexidine gluconate (CHG).

5. The face mask of any one of claims 1 to 4, wherein application of the antimicrobial composition is by a method selected from the group consisting of dipping and squeezing, spraying, ink jet printing or combinations thereof.

6. The face mask of claim 3, wherein the outermost layer consists of nonwoven webs.

7. The face mask of claim 6, wherein the nonwoven webs are spunbond webs, meltblown webs or spunbond/meltblown/spunbond webs.

8. The face mask of claim 6, wherein the nonwoven webs are polyolefin nonwoven webs comprising polyethylene (PE) or polypropylene (PP).

9. The face mask of any one of claims 6 to 8, further comprising a tissue layer subjacent said nonwoven web.

Amendments to claim 1 [20 pts]

- a fastening member for attaching a body portion of the face mask to a user [2 pts] (support: original claim 3; or paragraph 4)
- said body portion joined to the fastening member and configured to be placed over the mouth and at least part of the nose of the user in such a way that respiration air is drawn through said body portion [2 pts] (support: original claim 2; or paragraph 4)
- the body portion comprising a layer/at least one layer [2 pts] (support: paragraphs 15, 19-21, 24-27, 29)
- the antimicrobial composition comprises a mixture of polyhexamethylene biguanide (PHMB), citric acid and alkyl polyglycosides [14 pts**;** 6 pts for any other combination] (support: Tables 2 & 4)

Additional features in dependent claims [4 pts]

- the body portion comprising a plurality of layers [2 pts; 1 pt if in claim 1] (support: paragraph 19)
- the antimicrobial composition is in the outermost layer [2 pts; 1 pt if in claim 1] (support: paragraph 29)

Other claim amendments [9 pts]

Correction of the following:

- Claim 1: “rapidly” [1 pt]
- Claim 3: antecedents [1 pt]
- Claim 4: “of of” [1 pt]
- Claim 4: Markush [1 pt]
- Claim 6: “according to any one of claims” [1 pt]
- Claim 6: antecedent [1 pt]
- Claim 7: “such as” [1 pt]
- Claim 8: abbreviations [1 pt]
- Claim 9: dependency [1 pt]

Introduction of new formality defects (-1 per defect; maximum -3)

Response to examination report [42 pts]

- Discussion of novelty wrt D1 [4 pts]
- Discussion of novelty wrt D2 [4 pts]
- Discussion of obviousness [8 pts]
- Discussion of support for claim amendments
    - fastening member [1 pt]
    - body portion [1 pt]
    - a layer/at least one layer [1 pt]
    - antimicrobial composition comprising a mixture of polyhexamethylene biguanide (PHMB), citric acid and alkyl polyglycosides [4 pts]
    - the body portion comprising a plurality of layers [1 pt]

    - the antimicrobial composition is in the outermost layer [1 pt]
- Discussion of the following defects
    - Claim 1: structure of the mask [1 pt]
    - Claim 1: “rapidly” [1 pt]
    - Claim 3: antecedents [1 pt]
    - Claim 4: support for “dithiocarbamate” [1]
    - Claim 4: “of of” [1 pt]
    - Claim 4: Markush [1 pt]
    - Claim 6: “according to any one of claims” [1 pt]
    - Claim 6: antecedent [1 pt]
    - Claim 7: “such as” [1 pt]
    - Claim 8: abbreviations [1 pt]
    - Claim 9: dependency [1 pt]
- Provision of a new title [2 pts]
- Brief description of figure 4 [1 pt]
- Reference character 46 [1 pt]
- Incorporation by reference [1 pt]
- Trademark [1 pt]

Part B – Questions C2 – C12 [25 pts]

C2.

(i) Not citable. [1 pt]
(ii) Not citable. [1 pt]
(iii) Citable for anticipation under paragraph 28.2(1)(d) of the *Patent Act*. [1 pt]

C3. Amendments after allowance are not permitted as per subsection 100(1) of the *Patent Rules*, except to correct an obvious error under subsection 100(2) of the *Patent Rules*. [1 pt] (MOPOP 25.01.01)

C4. X, P [1 pt]

C5. Yes. If a PPH application has been abandoned in accordance with subsection 73(1) of the *Patent Act*, the application will still be advanced for examination out of routine order, once it is reinstated. [1 pt] (Frequently Asked Questions about the Patent Prosecution Highway, https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr01295.html)

C6. The later of: (i) the four year period following the filing date of the application; or (ii) the three-month period after the presentation date of the divisional application. [1 pt] (MOPOP 11.01.01)

C7. The examiner writes a new abstract. [1 pt] (MOPOP 13.03)

C8. (i) A request from the default correspondent must be submitted before the expiry of the time limit (i.e. the due date as it may fall on the first non-designated or non-prescribed date after the original time limit, if applicable); (ii) payment of the prescribed fee; and (iii) a justification, rationale, or description of circumstances that will satisfy the Commissioner that the extension should be granted. [3 pts] (MOPOP 2.03.03e)

C9. 12 months from the issue date. [1 pt] (MOPOP 28.05)

C10. Matter pertaining to prior art with respect to the application may be added to the specification and the drawings; however the applicant must acknowledge in the specification that any such matter is prior art. [1 pt] (MOPOP 20.01.01)

C11.

(a) N; each claim must be directed to a single category of claims. [1 pt]
(b) N; a process must include explicit steps. [1 pt]
(c) N; the device is defined in terms of method steps. [1 pt]
(d) N; a computer program is claimed, and there is no indication it is stored on a physical computer readable medium. [1 pt]
(e) Y. [1 pt]

C12. [1 pt each]

(a) False (for electronic submission, it is the day it is actually received; MOPOP 2.03.01c)
(b) True (MOPOP 13.01)

(c) True (Frequently Asked Questions about the Patent Prosecution Highway, http://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr01295.html)
(d) False (MOPOP 3.02)
(e) False (MOPOP 21.07.06)
(f) False.
(g) False. (MOPOP 23.03.03b)

PATENT AGENT EXAMINATION 2021

PAPER D – PATENT INFRINGEMENT

This examination comprises **Part A** (analytical questions) and **Part B** (short questions).
Part A comprises Questions A1 to A4 and also includes documents D1 and D2.
Part B comprises Questions B1 to B6.

Instructions

Provide an appropriate answer to the following questions. Answers in point form are acceptable.

Unless expressly indicated otherwise, every answer must include a discussion and/or reasoning appropriate to the mark allocation. Do not provide irrelevant or extraneous commentary. Answer only what is asked and do not assume any facts that are not expressly stated.

Citations to legal authority (case law, statutory provisions, and/or regulatory provisions) are only required when explicitly requested and should be clear and precise. No marks will be awarded for boilerplate language.

Your infringement analyses must address all elements of the claims on their own merits. Do not simply conclude that a claim is uninfringed by virtue of its dependency on an uninfringed claim. However, when a claim refers to a previous claim by number, you may incorporate your earlier analysis of the previous claim by reference rather than repeat your analysis. Any incorporation must be specific and relevant to the question at hand, and the location of the incorporated matter in your earlier analysis must be clearly and unambiguously identified.

PART A – TOTAL 74 MARKS

The following two documents are included in Part A:

D1: Canadian Patent No. 2,XXX,189 (the '189 patent) issued to Good Cups Inc. (the subject patent).

D2: Description and Drawings of the Tea Bag Brewing Bubble Lid (the allegedly infringing device).

One duplicate set of '189 Patent claims are at the end of this paper for your optional use.

Question A1 [40.5 Marks Total]

A1A. For each of the following elements of the '189 Patent, provide a **mapping** of that element to the corresponding element described in the '189 Patent and a brief explanation of the **function** of that element. **(3 marks) [1.5 marks each]**

(i) support structure (claim 1);

(ii) bag blocking element (claim 6).

A1B. Provide a construction of each of the following terms that you would present <u>if representing the indicated party in an infringement action</u>, and after providing such construction, explain how your construction supports a finding that the essential elements of each construed term <u>are</u> present in D2 (if representing the patentee) or are <u>not</u> present in D2 (if representing the alleged infringer). **[37.5 marks total]**

Support your construction with appropriate explanation, having regard to the essential features of each claim term as construed, explaining why a feature is considered to be essential or non-essential. If you rely on a citation to a specific portion of the '189 Patent to support your construction, you must specifically cite the relevant portion <u>and</u> explain how that citation supports your construction. No marks are awarded for merely citing

portions of or repeating passages of the '189 Patent without explaining how and why they support your answer.

No marks are awarded for mapping to the corresponding element of the '189 Patent in this sub-question.

(i) representing the patentee and explaining how your construction supports a finding this element is present in D2, "an openable [support structure]" (claim 3) **(7.5 marks)**;

(ii) representing the alleged infringer and explaining how your construction supports a finding this element is not present in D2, "an open [support structure]" (claim 2) **(7.5 marks)**; and

(iii) representing the patentee and explaining how your construction supports a finding this element is present in D2, "a vent" (claim 5) **(7.5 marks)**;

(iv) representing the alleged infringer and explaining how your construction supports a finding this element is not present in D2, "bag blocking element" (claim 6) **(7.5 marks)**;

(v) representing the patentee and explaining how your construction supports a finding this element is present in D2, "a depressed wall section" (claim 7) **(7.5 marks)**.

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Question A2 [13.5 Marks Total]

A2. Using the claim constructions from Part A1(b)(i)-(iv) (regardless of which party you were representing), explain whether claims 1 **(3.0 marks)**, 2 **(2.0 marks)**, 3 **(2.0 marks)** 5 **(2.5 marks)**, or 6 **(4.0 marks)** of the '189 Patent are infringed, including a mapping to the accused device to each element of these claims and a brief explanation of how that element is or is not present. No further exposition on claim construction needs to be provided for the additional claim elements (i.e. you may assume a literal construction for any claim elements not already construed in question A1(b)).

Question A3 [15 Marks Total]

You represent Able Imports Inc. ("Able Imports"), which sells the Tea Brewing Bubble Lid (D2) in Canada. Able has just received a demand letter from GoodCups Inc. ("GoodCups"), alleging infringement of the '189 patent and has asked you to answer the questions below so they can understand their position.

By way of background, Able Imports advises you that it purchases the Tea Brewing Bubble Lid from Mega Manufacturing Co. in Taiwan. Mega Manufacturing Co. manufactures the Tea Brewing Bubble Lid in Taipei, and ships the product to Able Imports in Vancouver, Canada. Able Imports takes title to and possession of the products in Vancouver (i.e. the product is shipped F.O.B. Vancouver). From there, Able Imports distributes and sells the lids to various coffee shops throughout Canada. The coffee shops use the lids to prepare hot tea beverages for their customers, by passing the tags of the tea bags through the scored lines I and J on the lids, dropping the tea bag into hot water in a cup, and securing the lids onto the cup and passing them to the customer. The customers then drink the tea once it has been steeped, and choose whether or not to pull the tea bag up through the scored lines I and J to secure the tea bag in place once the brewing process has finished.

Able Imports advises you that the Tea Brewing Bubble Lid has been a good success over the years, as consumer interest in consuming tea-based beverages has remained relatively constant, steadily averaging sales volumes of about 1000 lids per month since about 2012.

A3A. Assuming that the Tea Brewing Bubble Lid infringes claim 1 of the '189 Patent, advise Able Imports which parties from the fact pattern are or are not liable for direct infringement and briefly state why. Cite statutory authority. **(5.0 marks)**

A3B. Based on the sales information provided to you by Able Imports, advise as to the potentially available damages assuming that GoodCups commences an infringement action against Able Imports on December 1, 2021. In explaining the available damages, specify only the general nature of the damages available—do not explain in detail how those damages would be quantified. Cite statutory authority. **(5.0 marks)**

A3C. Able Imports advises you that it believes that the Tea Brewing Bubble Lid was sold in Taiwan on a limited scale starting as early as 2007. They provide you with a copy of a product catalogue released by Mega Manufacturing Co. that is dated December, 2007, which includes cross-sectional views showing all structural features of the Tea Brewing Bubble Lid. Based on this information, state two ways that Able Imports might be able to challenge the validity of the '189 patent, and briefly explain how invalidity would be shown in each. Cite statutory authority supporting both of your answers. **(5.0 marks)**

Question A4 [5.0 marks total]

Able Imports advises you that it is aware that GoodCups does not actually sell any product in Canada, but rather Mega Mean Corporation manufactures and sells tea brewing lids in Canada under the '189 Patent for GoodCups. Able Imports is not sure of the exact arrangement and whether it is exclusive or non-exclusive but is certain there is an agreement that exists. Able Imports advises that Mega Mean Corporation has a long history of being litigious against other players in the industry.

A4A. If an action is brought by GoodCups alone against Able Imports and GoodCups seeks an interlocutory injunction to prevent Able Imports from selling the Tea Brewing Bubble Lid pending a decision at trial, advise Able Imports as to the likelihood the interlocutory injunction would be granted. Cite case law authority. **(3.0 marks)**

A4B. Advise Able Imports if there is a risk that Mega Mean Corporation could sue Able Imports directly for infringement of the '189 Patent. Cite statutory and case law authority. **(2.0 marks)**

END OF QUESTIONS IN PART A

PART B – TOTAL 26.0 MARKS

B1. State whether each of the following are true or false. Cite statutory authority. **[6.0 marks total]**

B1A. A Canadian patent issued from a patent application filed on or after October 1, 1989 can have a term of protection that is more than 20 years. **(2.0 marks)**

B1B. The Commissioner of Patents can authorize a third-party to use an invention covered by a claim of a Canadian Patent without being liable for patent infringement. **(2.0 marks)**

B1C. In an infringement action, the patentee always has the burden of proving that a claim of the patent is infringed. **(2.0 marks)**

B2. Company A holds Canadian Patent No. 3,xxx,789 with claims covering a waffle maker. The waffle maker includes a pair of special non-stick hot plates for making waffles while ensuring the dough does not stick. The '789 Patent does not include any claims covering just the hot plates as a component separate from the waffle maker. The hot plates are designed to be replaceable by the consumer and Company A sells replacement hot plates as a separate part, because the hot plates are known to lose their non-stick properties over time. Answer the following questions, providing a brief statement explaining your answer and including a citation to case law authority. **[4.5 marks total]**

B2A. Is Company B whose business is to replace the hot plates for customers liable for patent infringement? **(1.5 marks)**

B2B. Is Company C who manufactures and sells replicas of the hot plates liable for patent infringement? **(1.5 marks)**

B2C. Would your answer change if Company C, in its dealing with customers, provides its customers with a brochure illustrating how to assemble the hot plates into the waffle maker? **(1.5 marks)**

B3. If a patentee is successful in an infringement suit, the patentee can elect a remedy in the form of either damages or an account of profits. Briefly explain what "damages" compensates for and what "an account of profits" compensates for. List one circumstance under which you might elect damages or list one circumstance under which you might you elect an account of profits. **(3.0 marks)**

B4. George, a resident of the United States, installed an aftermarket gas monitoring and regulating device that is supposed to provide an energy economy. The device is subject to a Canadian patent but is not patented in the United-States. George visits the Eastern township every year and this year crosses the Canadian border with the new device installed in his car.

Is George liable for patent infringement for these actions (cite statutory authority)? Can George sell his vehicle in Canada? Briefly state why or why not. **(3.0 marks)**

B5. Company A built a single "Superbike", which contained an innovative new bicycle drive train, on September 1, 2010. Subsequently, and independent from Company A and prior to any public use or sale of the Superbike by Company A, Company B filed a patent application without a priority claim on December 1, 2010 that subsequently issued as Canadian Patent No. 2,xxx,382 on January 1, 2021, with claims covering the innovative new bicycle drive train. Answer the following questions, citing statutory authority. **[4.5 marks total]**

B5A. Can Company A continue to use the Superbike given the issuance of the '382 Patent? **(1.5 marks)**

B5B. Company A is bought by one of its competitors, Company C. Can Company C continue using the Superbike without infringing the '382 Patent? **(1.5 marks)**

B5C. Company A sells the Superbike to Company D. Can Company D re-sell the Superbike without infringing the ‘382 Patent? **(1.5 marks)**

B6. Company E has a patent application 3,xxx,288 covering a method of producing a chemical compound. However, the ‘288 application becomes abandoned for failure to pay the maintenance fee but within three months, Company E proceeds to reinstate the ‘288 application by filing the applicable request and paying the reinstatement fee and the maintenance fee.

During its IP monitoring, Company F notices the abandonment of the ‘288 application and in good faith believing the application has been abandoned, starts using the method to produce the same compound during the three-month period of abandonment. **[5.0 marks total]**

B6A. Can company F continue using the patented method once the patent application is reinstated and eventually issued? Cite stautory authority. **(2.0 marks)**

B6B. The chemical synthesis line of business of Company F is acquired by Company G after the ‘288 application is reinstated. Can Company G continue using the patented method? Can Company F continue using the patented method? Cite statutory authority. **(3.0 marks)**

END OF QUESTIONS IN PART B

CA 2XXX189 C 2019/09/20
(11)(21) **2 XXX 189**
(12) **BREVET CANADIEN**
CANADIAN PATENT
(13) **C**

(22) Date de dépôt/Filing Date: 2009/01/15	(72) Inventeurs/Inventors:
(41) Mise à la disp. pub./Open to Public Insp.: 2009/07/15	GAGNE, LOUISE, CA
(45) Date de deliverance/Issue Date: 2020/12/01	WAITY, STEVEN, CA
(30) Priorité/Priority: 2008/01/15	(73) Propriétaires/Owners:
	GOODCUPS INC., CA

[REMAINDER OF COVER PAGE AND ABSTRACT, AND SUMMARY OMITTED]

CONTAINER LID FOR MAKING TEA FROM TEA BAG

Field of the Invention

[0001] The subject invention relates to container lids and methods that facilitate the controlled preparation of a beverage from one or more beverage bags within a variety of containers and the quick and sanitary storage of the bag or bags once the beverage preparation has been completed.

Background

[0002] Many liquid beverages are prepared by immersing a porous bag containing tea or coffee or other beverage preparation agent in a liquid for a given period of time. The immersion of the bag allows soluble components from the beverage preparation agent to go into solution thereby producing the beverage. This process is also termed "steeping" or brewing by infusion.

[0003] During the immersion process, the contents, such as ground coffee or shredded tea, take up the liquid, thereby swelling in size and increasing in weight. Generally, the longer the bag remains in the solution, the stronger the beverage becomes. However, particularly for tea, it is important not to steep the bag too long since the tea may become overly strong or bitter.

[0004] Beverage bags can be conventionally formed in a number of ways such as by the joining of two sheets of porous material at their edges such that the bag has opposing side walls and opposing edges, or simply by gathering and joining a single sheet into a pouch-like shape having a generally continuous surrounding wall.

[0005] Conventionally, a string is attached to the bag to allow the consumer to immerse a bag within the liquid and remove it without having to come into contact with the bag or the immersion liquid. A fingertip-sized tag may be attached to the string to better facilitate the removal of the bag by the string.

[0006] Many other apparatus such as lids for beverage containers facilitate the consumption, but not necessarily the preparation, of beverages. More specifically, cup lids may include openings that allow beverages to be consumed without removal of the lid. Some such cup lid openings allow the consumer to drink from the container by direct contact of the consumer's lips with the surface of the cup lid around a “drink through aperture”. Other lids may provide only an area in which a drinking straw may be inserted to allow a consumer to drink through the lid.

[0007] Some of such insertion areas are sized and shaped to allow a suitably stiff or reinforced straw to be inserted through the area. Conventionally, the straw insertion areas are formed by placing two equally sized and symmetrically crossing incisions through the lid. By forcing the tip of the suitably stiff/reinforced straw against and through the incised area, an opening is formed that is no larger than and generally shaped to correspond to the size and shape of the outer diameter of the straw. Such a limited size and shape of the straw insertion area is considered advantageous in that little, if any fluid can splash or spill out from the area between the straw and the lid and gases below the lid cannot be exchanged with the outside environment thereby slowing the change in the temperature of the fluid.

[0008] Because of the tight fit between straw and the straw insertion aperture, lids providing such an aperture must also provide a separate vent hole located elsewhere on the lid in order to prevent a vacuum from forming under the lid when the consumer draws liquid up through the straw. Such vent holes are conventionally taught as being pin hole size so that again little liquid can splash out from the hole while the cup is being carried or spill out in no more than minor amounts even if the cup is tipped over.

Description of the Drawings

[0009] FIG. 1A is a perspective view of an embodiment of the present invention showing a retainer and including a generally reduced profile bag retention structure.

[0010] FIG. 1B is a partial cross-sectional view of the embodiment of the invention of FIG. 1A.

[0011] FIG. 2A is a perspective view of an embodiment of the present invention showing a retainer including a full profile open retention structure having a shaped bag retention aperture.

[0012] FIG. 2B is a partial cross-sectional view of the embodiment illustrated in FIG. 2A.

[0013] FIG. 3A is an overhead view of an embodiment of the present invention showing a retainer having a generally even profile retention structure including a depression between the zig-zag patterned area and the drinking aperture.

[0014] FIG. 3B is an overhead view of the embodiment illustrated in FIG. 3A.

[0015] FIG. 3C is a cross sectional view of the embodiment illustrated in FIGS. 3A and 3B.

Detailed Description of the Invention

[0016] A beverage preparation and bag retention apparatus according to the present invention is identified in the drawings as **21A**, **21B**, **21D**, collectively referred to herein as **21**. The apparatus **21**—termed also “retainer”—is sized and shaped to be used in conjunction with a container **11**. The container **11** includes a surrounding container wall **12** having a composition and structure such that the container is suitable for holding a liquid **19**. The container wall **12** includes an outer surface and an inner surface that meet to form a lip **12C** that defines a mouth of container **11**.

[0017] The retainer **21** includes a cover panel **22** sized and shaped such that the cover panel **22** may extend over the container mouth in a covering position. Cover panel **22** includes an upper surface **24** and opposing lower surface **23** that meet at a peripheral rim **25** and may form a surrounding edge wall **25A** sized and shaped such that the retainer **21** can sit on and/or form a releasable sealing grip on or about the lip **12C**.

[0018] The container **11** may be filled with liquid **19** such that a supra-liquid space **14B** forms between the surface of the liquid **19** and the cover panel lower surface **23** of the retainer **21** when in a covering position such that a bag **15** retained in an elevated position by the retainer **21** may be separated from the liquid **19** and, for example, the steeping process stopped thereby.

[0019] Preferably, the retainer **21** includes an open or openable drinking aperture **91** that may be positioned generally adjacent to the surrounding edge wall **25A** through which the liquid may be drawn either directly by the consumer or indirectly—such as through a straw.

[0020] The elevational retainer **21** includes a bag retention structure **31** that, depending upon the embodiment, is openable and may be partially opened or more fully opened depending upon the pressure applied on the retention structure or is open such that a bag retention aperture **51** is provided by which a bag **15** may be releasably secured to the retainer **21** in a variety of positions.

[0021] One of the many types of bags **15** that may be used with the apparatus **21** includes a single sheet of porous material gathered to form a bag having a side wall **16** proportioned to accommodate tea, coffee, or other contents (not shown) therein even after the contents have been immersed and are swollen thereby. The illustrated bag includes a string **17** that is fastened to an upper portion **16A** of the side wall **16** of the beverage bag **15**. The string **17** may include a tag **20** attached at or adjacent to the free end of the string **17**. Tag **20** conventionally is planar in shape and sized so that it can be pulled between a user’s thumb and forefinger.

[0022] Certain preferred embodiments of the retainer **21** include a retention structure **31** having a string/tag securing bag retention aperture **51** through which a string **17** and/or tag **20** attached to a bag **15** may be inserted such that the bag is in a secured position relative to the retainer **21**, thereby permitting, for example, a consumer to move the bag **15** within the liquid **19** by use of the string **17** and/or tag **20** with less likelihood that the entire string **17** and tag **20** will fall into the liquid **19** after the consumer has released the string **17** and/or tag **20**. Among these embodiments are those in which the string **17** and/or tag **20** may be releasably gripped by edges **45** of the aperture **51** such that the bag is releasably secured to the retainer **21** in a position chosen by the consumer.

[0023] The illustrated embodiments of the retainers **21** include a nose/face accommodation area **24A** between the drinking aperture **91** and the retention areas **26** that further permits a consumer

to drink from the aperture **91** with generally less likelihood that the consumer will encounter a moist bag **15** retained within and exposed outward from the retainer **21**. Additional details of the preferred embodiments will now be discussed.

[0024] FIGS. 1A and 1B illustrate a preferred embodiment of the retainer **21A** including an openable bag retention structure **31A** that permits: a bag **15** to be adjustably placed in a secured position relative to the depth of the liquid **19** in a container **11** so that the bag can be fully immersed and the steeping process can begin; the consumer to sample the container contents through a drinking aperture **91** with the retainer **21A** still in place and without an interruption in the steeping process in order to determine if the beverage has been prepared according to his or her liking; and, if the preparation is completed, the bag **15** to be raised to an elevated position thereby stopping the steeping process.

[0025] The bag retention structure **31A** includes a retention area **26** that rises above the other generally horizontal portions of the upper surface **24** of the cover panel **22** in a position spaced by the accommodation area **24A** away from and generally opposite to the drinking aperture **91**. The retention structure **31A** of the FIGS. 1A and 1B embodiment includes side walls **26A**, **26B** of a reduced vertical height relative to the full profile illustrated in FIGS. 2A and 2B such that the retention structure **31A** is of a generally reduced profile and includes an inner retainer surface **28** of a size and shape to form a bag retention space **28A** in which some or all of a bag **15** that was used to prepare the beverage may be confined within the supra-liquid space **14B**. The raised retention area **26** of the FIGS. 1A and 1B embodiment includes also an upper retainer surface **27** having a patterned area **41** of weakenings such as scorings formed in or perforations or incisions cut through the flexible material sheet from which the retainer **21** may be made such that the structure **31A** is openable. The patterned area **41** of this embodiment can be opened partially by the application of pressure at the openable patterned area **41**—so as to provide a bag retention aperture **51**.

[0026] The opening of the patterned area **41** of this embodiment, in part or entirely, exposes opposing generally pliable, yet resilient edges **45**—that, depending upon the degree to which the patterned area is opened, can grip, for example, the string **17** or tag **20**—such that the bag **15** is in a secured position relative to the retainer **21A**—or the upper side wall portion **16A** of the bag

15—such that the bag **15** is in an elevated position relative to the retainer **21A** and liquid **19**. The opposing gripping edges **45** may include opposing tips **47** that are pointed or textured such that, upon the more complete opening of the patterned area **41**, one or all of the tips **47** can catch the bag side wall **16** or other part of the bag **15** and further facilitate the retention of the bag in an elevated position at or above the surface of liquid **19**.

[0027] FIG. 1A shows the retention structure **31A** after the retention area **26** has been opened to a sufficient degree to permit the tag **20** and string **17** of the bag **15** to be threaded through the aperture **51** and gripped between and by the resultant opposing resilient edges **45** of the patterned area **41**—thereby releasably securing the bag **15** to the retainer **21A** in a secured position—and then to a greater degree by pulling up on the bag **15** by the tag **20** and/or string **17** until the upper side wall portion **16A** of the bag **15** is between the opposing gripping edges **45** and one or all of the tips **47** catch the bag side wall **16** or other part of the bag **15** to permit the retention of the bag in an elevated position at or above the surface of liquid **19**.

[0028] FIG. 1B illustrates the patterned area **41** as opened—such as by the placement of upward pressure onto the inner retainer surface **28** under the openable patterned area **41** by the drawing of the bag **15** upward by the pulling on the string **17** and/or tag **20**—to form a bag retention aperture **51** that is of a size and shape to accommodate an upper side wall portion **16A** of the bag **15** and such that the opposing pliable resilient edges **45** of the patterned area **41** grip the side wall **16** of the bag **15** snugly and the tips **47** of the patterned area **41** catch on the side wall **16** of the bag **15** or other portion of the bag **15**.

[0029] The edges **45** and tips **47** of the opened retention structure **31A** shown in FIGS. 1A and 1B thereby form a one-way catch that retains the bag **15** in an elevated retained position at or above the surface of the liquid **19**. As in the other embodiments, the storage of the bag **15** in this elevated position within the retainer **21A** eliminates the need for the separate storage of the wet beverage bag **15**.

[0030] FIGS. 2A and 2B show another preferred embodiment of the retainer **21C** including an open bag retention structure **31C** having a full profile that permits a bag **15** to be adjustably placed in a generally secured position for the controlled preparation of a beverage and when the beverage preparation has been completed to draw the bag **15** up into an elevated position. The

retention structure **31C** of this embodiment including surrounding side walls **26A**, **26B**. Surrounding wall **26A** rises in a curve adjacent to peripheral rim **25** and generally opposite to the drinking aperture. Wall **26B** meets surrounding wall **26A** and is linearly aligned to generally face the drinking aperture **91**. Horizontally connecting the side walls **26A**, **26B** is a generally flat upper retainer surface **27** that includes a retention area **26** that collectively define the full profile and provide a bag retention space **28A** of sufficient size and shape to accommodate generally without squeezing confinement a bag **15** even after the bag is swollen after immersion.

[0031] The open bag retention structure **31C** of the FIGS. 2A, 2B embodiment includes a shaped bag retention aperture **51** that is positioned generally centrally within the raised area **26** and spaced away by the accommodation area **24A** from and generally opposite to the drinking aperture **91**. Bag retention aperture **51** is sized and shaped such that the string **17** and tag **20** of a bag **15** can be easily and quickly threaded therethrough generally without folding of the tag **20** and so that the string **17** and tag **20** are loosely retained above or adjacent to the surface **24** of the retainer **21C** and the bag **15** is loosely held in a secured position to the apparatus **21C** and the container **11** on which the apparatus **21C** is fitted. The tag **20** and string **17** as exposed above the surface **24** of the retainer **21C** to permit the consumer to easily manipulate the bag **15**—such as to raise and lower the bag **15** while it is immersed in order to speed up the beverage preparation process and to raise the bag **15** into an elevated position.

[0032] Because the open bag retention structure **31C** of FIGS. 2A, 2B does not include edges **45** or opposing tips **47** like the openable bag retention structure of FIGS. 1A-1B, it may be faster and easier to use (e.g. because the string **17** and tag **20** can be quickly passed therethrough without catching), it may be easier for a user to manipulate the bag **15** (e.g. to repeatedly raise and lower bag **15** within the liquid to speed the brewing process), and/or it may be less likely to ultimately tear the side wall **16** when bag **15** is raised and secured in the elevated position. However, the embodiment of FIGS. 1A-1B may be easier and cheaper to manufacture because of the need to form fewer apertures through the material from which retainer **21** is made, and further presents a lower risk of tag **20** inadvertently falling back through and into the liquid. The embodiment of FIGS. 1A-1B may therefore be preferred in some embodiments.

[0033] The illustrated aperture **51** is of a size and shape also to permit the generally upper side wall portion **16A** of the bag **15**, whose contents are swollen by the immersion process, to be drawn up and through the aperture **51**—by pulling upward on the string **17** such that the opposing resilient gripping edges **45** of the aperture **51** grip the bag **15** at or near the side wall portion **16A** and thereby retain the bag **15** in an elevated position. While the open retention aperture **51** may be of a variety of shapes, the retaining aperture **51** of the FIGS. 2A and 2B embodiment is rounded in shape. An aperture **51** having a rounded shape is advantageous in that a bag **15** pulled through such an aperture does not encounter any sharpened edges or tips that may puncture, tear or otherwise damage what may be a fragile surrounding wall **16A** of the bag. An aperture **51** having the illustrated oval shape is further advantageous in that an upper portion **16A** of an appropriately sized bag **15** may be pulled through the aperture **51** and a gap **48** may form between the bag **15** and the side wall of the aperture **51**. Such a gap **48** can function as a vent to permit the pressure within and outside the container **11** to equalize so that the gases that form within the container **11** can be exchanged with those outside the container and vice versa even with upper portion **16A** of the bag **15** retained in an elevated position within the aperture **51**. Such a vent as is provided by gap **48** allows liquid to be withdrawn from the container **11** freely and such that vacuum-like conditions do not easily form within the container.

[0034] FIG. 2B provides a cross sectional view of the embodiment illustrated in FIG. 2A further showing the retention of the beverage bag **15** by the opposing resilient edges **45** of the bag retention aperture **51** such that the bottom side wall portion **16B** of the bag **15** is above the surface of the liquid **19** and generally within the bag retention space **28A** of the supra-liquid space **14B** and contacting the inner retainer surface **28**. The bag retention space **28A** of this full profile embodiment can accommodate many different sized and shaped bags **15** generally without confinement. The bag retention aperture **51** of the open retention structure **31C** of the FIG. 2B embodiment differs from the bag retention aperture **51** of the openable retention structure **31A** of the FIG. 1B embodiment in that if a consumer determines that they have prematurely withdrawn bag **15** from the liquid, the bag **15** can be pushed gently to displace it from the bag retention aperture **51** and move the bag **15** back into the beverage **19**, for example to allow the brewing process to continue for a longer period of time.

[0035] FIGS. 3A through 3C show another embodiment of the retainer **21D** having a generally flattened upper surface **24** and an openable retention structure **31D** with an even retention structure profile (i.e. which has no sidewalls **26A** or **26B** defining a retention area **26** as described for the embodiments of FIGS. 1A, 1B, 2A and 2B). The bag retention structure **31D** of this embodiment includes a patterned area **41** of weakenings formed in or perforations or incisions cut through the flexible cover panel **22**—such as the illustrated zigzag pattern—that can be opened partially or completely to provide a bag retention aperture **51** by the application of respectively increasing amounts of pressure at the patterned area **41**. By application of a relatively reduced amount of pressure at the patterned area **41**, the area may be partially opened. The partial opening of the patterned area **41** of this embodiment as shown in FIG. 3A exposes, in part or entirely, opposing resilient edges **45**—that, can grip, for example, the string **17** at any point along its length or the tag **20**, thereby permitting the bag **15** to be placed at a variety of secured positions relative to the retainer **21D**.

[0036] By application of greater pressure at the openable patterned area **41**, such as by drawing the bag upward against the lower retention surface **28** below the patterned area **41** after the steeping process has been completed by pulling upward on the string and/or tag, the bag **15** is compressed against the retention surface **28**—causing the patterned area **41** to be opened even more. The bag **15** can then be drawn in between the opposing resilient edges **45** such that the bag upper side wall portion **16A** of the bag **15** is gripped and the bag **15** is retained in a position that is elevated relative to the liquid surface. The opposing gripping edges **45** may include opposing tips **47** that are pointed or textured such that, upon the more complete opening of the patterned area **41**, one or all of the tips **47** can catch a portion on the upper portion **16A** of the bag **15** or other portion of the bag **15** thereby forming a one-way catch that retains the bag **15** in an elevated position at or above the surface of the liquid **19**.

[0037] The retainer **21D** of this invention may include additional means to further restrict the movement of a bag such as to prevent a retained or elevated bag from blocking the drinking aperture **91**. FIGS. 3A through 3C embodiment includes a depressed area **81** in the upper surface **24** of the cover panel **22** that extends vertically perpendicular and downward relative to the lower surface **23** thereby forming a depressed wall section **93** that provides a bag blocking element sized and shaped such that, when a bag **15** is secured by, or a portion **16A** of the bag **15** is pulled

through, the bag retention aperture **51**, the bottom portion **16B** of the bag **15** is prevented from blocking the drinking aperture **91** even when the container **11** is rotated for drinking.

[0038] FIG. 3B shows an overhead view of the embodiment illustrated in FIG. 3A. More specifically, FIG. 3B shows the patterned area **41** opened after a relatively greater amount of pressure has been applied at the patterned area **41** such that the upper portion **16A** of a beverage bag **15** is drawn through and retained in an elevated position by the gripping of the side wall **16A** of the bag **15** by the opposing resilient edges **45** and the tips **47** of the patterned area **41**.

[0039] FIG. 3C shows a cross sectional view of the embodiment illustrated in FIGS. 3A and 3B and in particular the beverage bag **15** drawn in part through and thereby retained in an elevated position within the supra-liquid space **14B** by the patterned area **41** and the depressed wall section **93** extending vertically perpendicular to the other portions of the lower surface **23** of the cover panel **22**. In certain embodiments, a depressed wall section **93** advantageously may be formed from the same sheet of material used to form the cover panel **22**. Such a depressed wall section **93** may be formed from a first generally vertical wall **93A**, a second generally vertical wall **93B**, and a first generally horizontal wall **93C**.

[0040] The following will further describe the use of certain embodiments of the retainer **21**. In those embodiments having an openable retention structure **31**, a person, such as one in the food service industry or the ultimate consumer, may apply pressure to the patterned area **41** to open the patterned area **41** to provide at least a bag retention aperture **51** such that string **17** and tag **20** may be threaded through the aperture **51**. This places the bag in a secured position relative to the retainer with a portion of the string and tag above the upper surface **24** of the retainer **21** and the remaining portion of the string **17** and the bag **15** below the lower cover surface **23**. In those embodiments having an open retention structure **31**, the string **17** and tag **20** is threaded through the retaining aperture **51** to place the bag in a secured position. The person then places the retainer **21** with bag **15** releasably secured thereto onto the lip **12C** of the container **11** already holding the liquid **19** from which the beverage will be prepared such that the surrounding edge **25A** of the retainer **21** is seated on the lip **12C** of the container **11** and the bag **15** comes to be fully immersed in the liquid **19**.

[0041] At any time after the initial immersion of the bag **15** within the liquid **19**, the consumer may advantageously sample the liquid in order to determine if the beverage preparation has been completed without removing the bag **15** from the liquid or the retainer from its position on the container. When the consumer has determined that the beverage is of the desired strength and/or flavor, the person can easily move the bag **15** from the beverage and to an elevated position at or above the level of the liquid **19** by pulling upward on the tag **20** and/or string **17** such that at least an upper portion **16A** of the bag **16** is gripped between the opposing edges **45** of the retaining aperture **51** and thereby held in place.

[0042] The beverage consumer can then drink through the aperture **91** of the retainer **21** even with the bag in this elevated position. The person does not need to come into direct contact with the wet bag **15** at any time in order to prepare a beverage with this apparatus and method. When the consumer is finished, the container **11** with retainer **21** and bag **15** retained in place can be disposed simultaneously.

[0043] While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not of limitation.

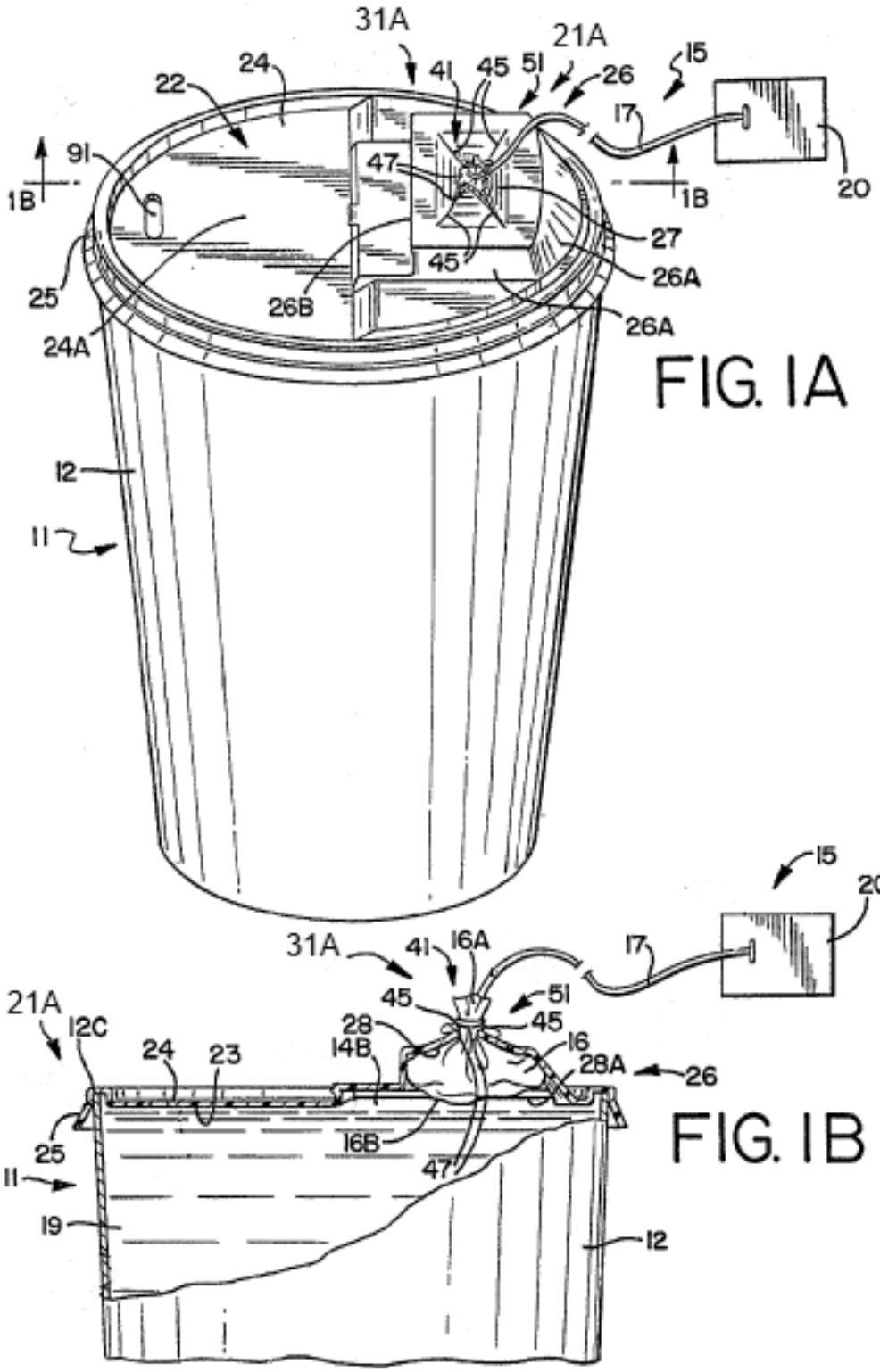

31A
21A
24
22
41
45
51
26
15
17
20
91
1B
47
27
45
26A
25
26B
26A
24A
12
11
15
20
31A
41
16A
17
45
51
21A
12C
24
23
28
14B
45
16
28A
26
25
16B
47
11
19
12

FIG. 1A

FIG. 1B

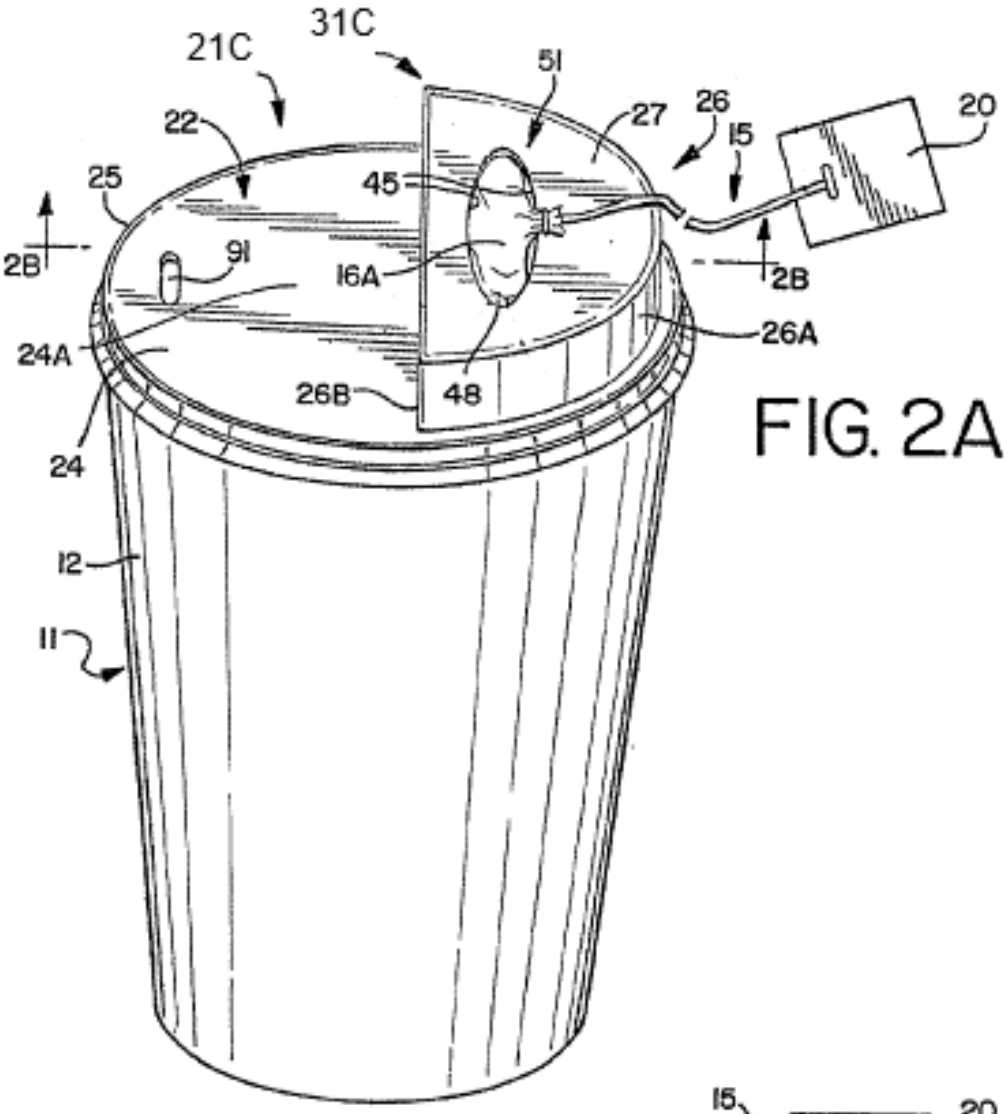

31C
21C
51
22
27
26
15
20
25
45
2B
91
16A
2B
24A
26A
26B
48
24
12
11

FIG. 2A

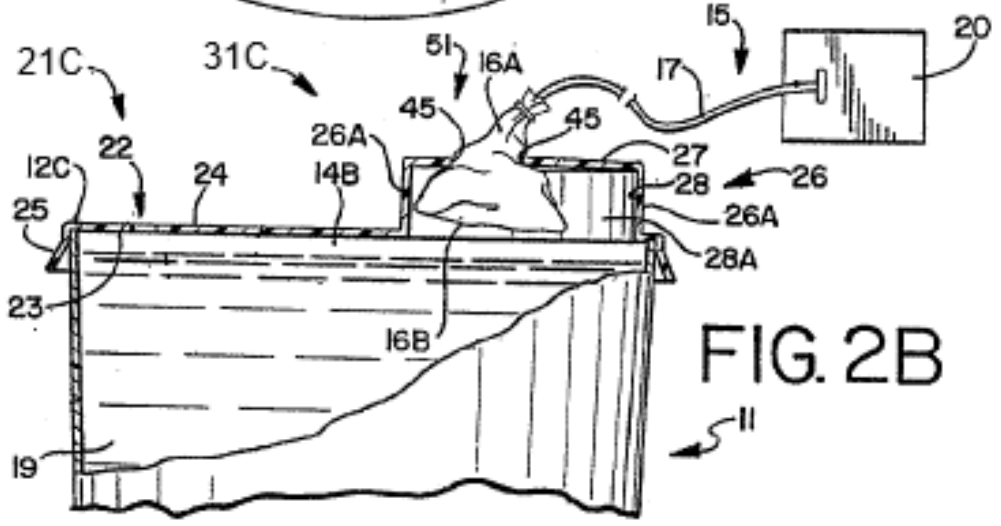

15
20
21C
31C
51
16A
17
45
45
26A
27
22
12C
24
14B
28
26
25
26A
28A
23
16B
19
11

FIG. 2B

FIG. 3A

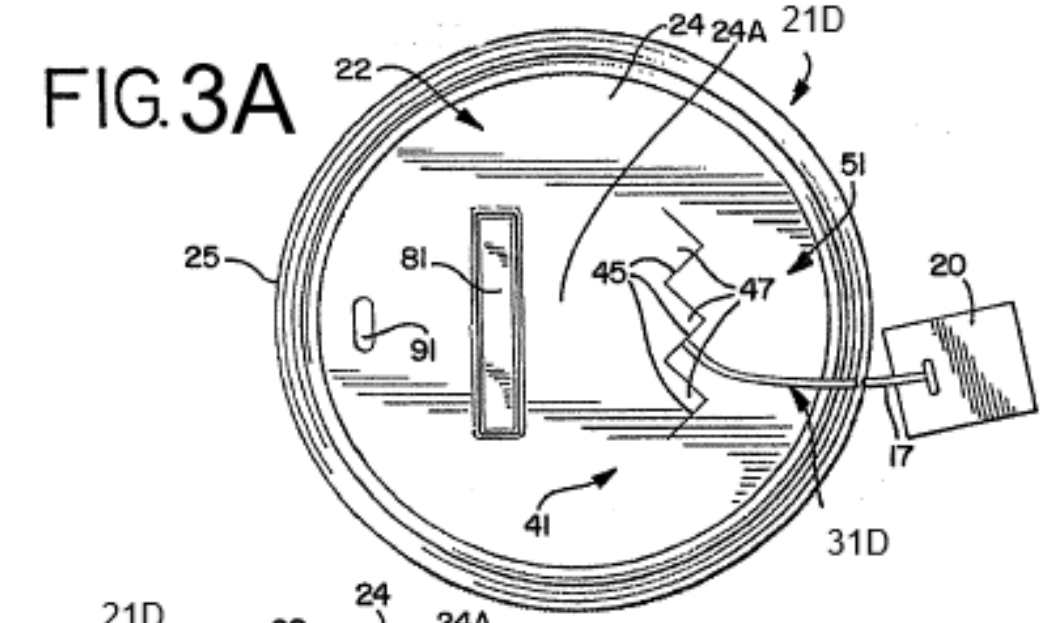


FIG. 3B

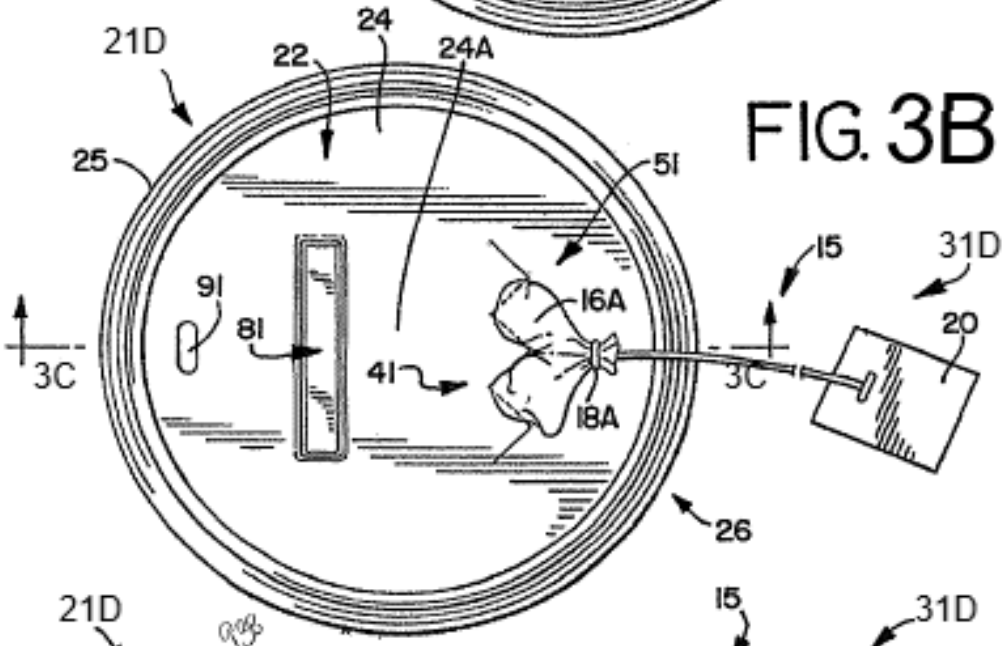
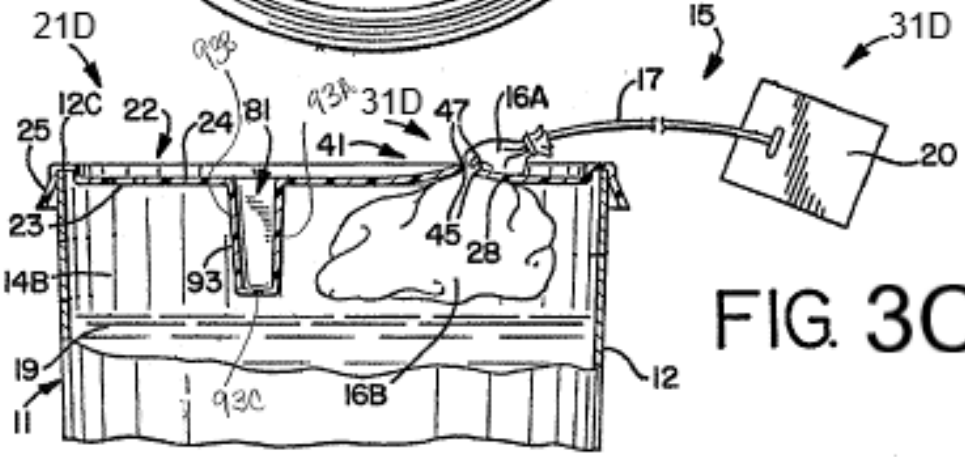


FIG. 3C



Claims

1. A lid for preparing a brewed beverage from a beverage bag containing a dried beverage preparation, the lid comprising:

a cover panel having a rim for providing sealing engagement with a beverage container;

a drinking aperture formed through the cover panel; and

a support structure for retaining the beverage bag after the beverage has been brewed.

2. A lid as defined in claim 1, wherein the support structure is an open support structure.

3. A lid as defined in claim 1, wherein the support structure is an openable support structure.

4. A lid as defined in claim 3, wherein the support structure comprises a one-way catch.

5. A lid as defined in either one of claims 2 or 3, comprising a vent.

6. Apparatus for preparing a brewed beverage from a beverage bag containing a dried beverage preparation, the apparatus:

a lid configured for sealing engagement with a beverage container;

a drink through aperture formed in the lid;

a bag retention structure formed in the lid; and

a bag blocking element interposing the drink through aperture and the bag retention structure.

7. A lid as defined in claim 6, wherein the bag blocking element comprises a depressed wall section.

8. A lid as defined in claim 7, wherein the depressed wall section comprises first and second generally vertical walls connected by a generally horizontal wall.

THE TEA BREWING BUBBLE LID

FIG. A is an overhead view of the Tea Brewing Bubble Lid.

FIG. B is a cross sectional view of Tea Brewing Bubble Lid taken along line B—B of FIG. A, showing the tea bag in a brewing configuration.

FIG. C is a cross sectional partial view of the Tea Brewing Bubble Lid showing the tea bag in a secured post-brewing configuration.

The Tea Brewing Bubble Lid **A** has a rounded generally continuous surrounding side wall **B** that rises, in part, adjacent to a rim **C** that is engageable with a cup **U** to a top **T** of the lid. The surrounding side wall **B** is sized and shaped in proportion to a tea bag **E** to have a raised portion **G** that defines a space **F** that accommodates the tea bag **E** in a post-brewing configuration above the level of liquid **L** after a user has finished steeping their tea to a desired level, as shown in FIG. C. The raised portion **G** is positioned across from an opening **D** through which a user can consume the brewed beverage.

A depressed portion **H** of the Tea Brewing Bubble Lid interposes the opening **D** and the raised portion **G**, and helps to secure the used tea bag **E** in the post-brewing configuration, so that a user's enjoyment of the brewed beverage is not disrupted by the used tea bag **E** blocking the opening **D**.

To ensure that the beverage is dispensed evenly from the lid **A** without splashing, a vent **V** is provided in raised portion **G**.

To facilitate the use and securement of tea bag **E**, lid **A** has a pair of generally perpendicularly oriented and intersecting score lines **I** and **J** formed through the raised portion **G**. In use, a user can force the tag **K** and/or string **M** of the tea bag **E** through the material of lid **A** at the intersection of score lines **I** and **J**. The lid **A** can then be secured on rim **C** of the cup in a conventional manner, with the tea bag **E** sitting within the liquid **L** within the cup, as shown in FIG. B.

To secure the tea bag **E** in place in the post-brewing configuration above the level of liquid **L** once a user has determined that the tea has steeped for the desired period of time, the user can

pull on tag **K** and/or string **M** of the tea bag to pull tea bag **E** upwardly and out of liquid **L**. By continuing to pull once the upper portion **N** of the tea bag **E** is grasped between the edges of lid **A** at the intersection of score lines **I** and **J**, the upper portion **N** of the tea bag **E** will be grasped gently by these edges and thereby be secured above the level of liquid **L**. Further, depressed portion **H** will help to block the tea bag **E** from moving towards opening **D** when a user tilts the cup to consume the beverage.

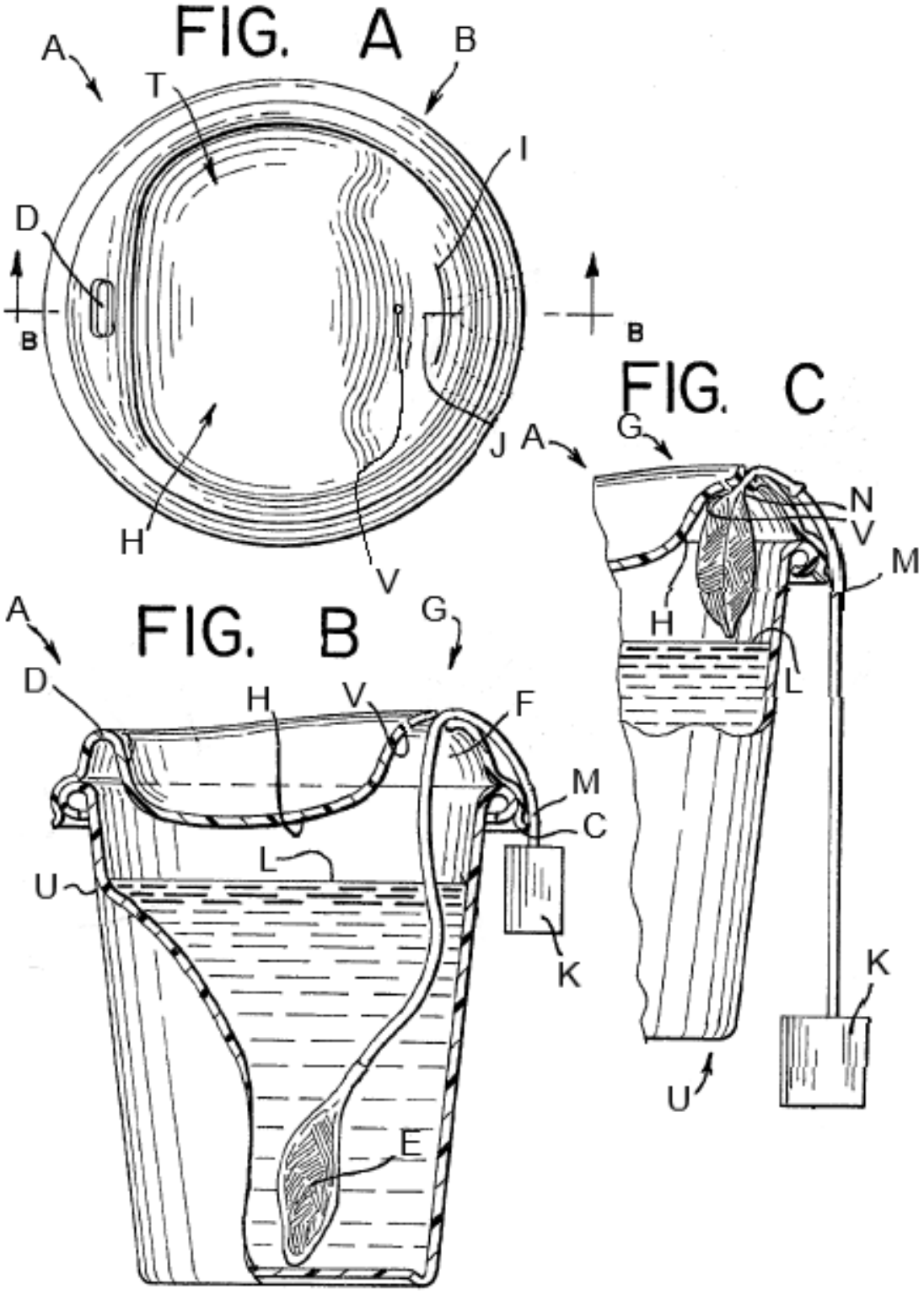


FIG. A
A
B
T
I
D
B
B
H
V
J
FIG. C
A
G
N
V
M
H
L
K
U
FIG. B
A
G
D
H
V
F
M
C
L
U
K
E

Duplicate Patent Claims

Claims

1. A lid for preparing a brewed beverage from a beverage bag containing a dried beverage preparation, the lid comprising:

a cover panel having a rim for providing sealing engagement with a beverage container;

a drinking aperture formed through the cover panel; and

a support structure for retaining the beverage bag after the beverage has been brewed.

2. A lid as defined in claim 1, wherein the support structure is an open support structure.

3. A lid as defined in claim 1, wherein the support structure is an openable support structure.

4. A lid as defined in claim 3, wherein the support structure comprises a one-way catch.

5. A lid as defined in either one of claims 2 or 3, comprising a vent.

6. Apparatus for preparing a brewed beverage from a beverage bag containing a dried beverage preparation, the apparatus:

a lid configured for sealing engagement with a beverage container;

a drink through aperture formed in the lid;

a bag retention structure formed in the lid; and

a bag blocking element interposing the drink through aperture and the bag retention structure.

7. A lid as defined in claim 6, wherein the bag blocking element comprises a depressed wall section.

8. A lid as defined in claim 7, wherein the depressed wall section comprises first and second generally vertical walls connected by a generally horizontal wall.

END OF PAPER D

Tips for Scoring Well on Paper D

- Do not merely quote passages of the specification, claim language, or legislation: state the relevant language but then explain in your own words (and in wording other than the claim language) how that language is connected to the conclusion or statutory provision.
- Make sure you expressly state your full answer and supporting reasoning – marks are only awarded for what is explicit in your answer. The markers cannot award marks for anything that is merely implicit in your answer.
- When considering the allegedly infringing device, map to the letter that identifies the corresponding element.
- When analyzing infringement, specifically list out every claim element in your analysis (e.g. state whether or not all features of a parent claim are present). For multiply dependent claims, state this and your conclusion as to infringement for all possible dependencies.
- No marks are awarded for relying on the specification to establish inventor's intent, unless you state why recourse to the specification is permissible to elucidate the claim language (e.g. if there is an ambiguity).
- For claim construction, you must specifically state if your comments pertain to the inventor's intent or material effect branch of the essentiality analysis. No marks are awarded for commentary for which its relevance to claim construction is not provided.
- Keep your answers concise. Time is limited and your answer does not need to be long if you address the salient points only.
- Do not provide alternative answers (i.e. do not throw everything at the wall in hope something will stick). If you provide contradictory answers, you will receive zero marks even though one of your alternative answers may be correct: the contradiction indicates you do not in fact know the correct answer.
- If you are asked to state a conclusion, you must expressly state a conclusion: saying that a claim "might" be infringed is not a scorable answer if you are asked to state whether the claim is infringed—it is either infringed or not infringed (in the context of the exam).

MARKING GUIDE

2021 PAPER D

Question A1A

Element	Mapping	Function
(i) support structure (claim 1);	bag retention structure 31 [**0.5 marks**]	Can grasp and secure tea bag in an elevated position [**0.5 marks**] above or substantially above the surface of a brewing liquid [**0.5 marks**]
(ii) bag blocking element (claim 6);	Depressed area 81 (or depressed wall section 93) [**0.5 marks**]	To prevent the tea bag from moving to a position where it would block the drinking aperture [**1 mark**]]

Question A1B Claim Construction

(i) "an openable [support structure]" [**7.5 marks**]

- Patentee will argue that it is an essential feature that the support structure be initially in a fixed position [**0.5 marks**] that can then be opened (e.g. by breaking perforations or weakened areas) [**0.5 marks**]
- Supported by inventor's intent as inferred from the language of the claims, claim differentiation [**0.5 marks**]
    - Language of claim 2 says the support structure is "open" [**0.5 marks**] while language of claim 3 says the support structure is "openable" [**0.5 marks**]
    - Suggests a difference in meaning between "open" and "openable" is intended [**1.0 marks**]
- Material effect [**0.5 marks**]
    - Person skilled in the art would recognize that the purpose of openable support structure is to enhance manufacturability [**0.5 marks**] and to limit the risk of the tag falling back into the beverage container during use [**0.5 marks**]
    - Any structure that the tag and string of the beverage bag is passed through by breaking apart the material forming the opening would provide this function [**1.0 marks**]
- This construction supports a finding of infringement because this essential feature is present in the Bubble Lid [**0.5 marks**] – the score lines I and J [**0.5 marks**] are initially secured in place and are broken open by a user to provide the support structure [**0.5 marks**]

(ii) “an open [support structure]” [**7.5 marks**]

- The infringer will argue that it is essential that an open support structure must be provided without a need to break or separate any easily frangible portion of the lid [**1.0 marks**]
- This interpretation is supported by the inventor’s intent as inferred from the language of the claims/claim differentiation [**0.5 marks**]
    - Language of claim 2 says the support structure is “open” [**0.5 marks**] while language of claim 3 says the support structure is “openable” [**0.5 marks**]
    - Suggests a difference in meaning between “open” and “openable” is intended [**1 mark**]
- Material effect [**0.5 marks**]
    - The purpose of the open support structure is to allow a user to easily push a string and tag of a beverage bag through the support structure without breaking or separating any attached elements [**1 mark**] **OR** the open support structure allows the string to be pulled more easily to raise and lower the beverage bag [**1 mark**]
    - The need to push the string and tag through attached elements e.g. to break an easily frangible portion makes it materially more difficult for a user to pass the string and tag of the beverage bag through the support structure [**1 mark**]
- This interpretation supports a finding of no infringement because this essential feature is not present in the Bubble Lid [**0.5 marks**] – the user must force the tag and string of the bag through the score lines I and J by force [**1 mark**]

(iii) “a vent” [**7.5 marks**]

- The patentee will argue that a vent aperture positioned anywhere in the lid is the essential feature [**0.5 marks**], specifically it is not essential that the vent be provided by the bag retention structure [**0.5 marks**]
- Supported by inventor’s intent as inferred from the language of the claims, claim differentiation [**0.5 marks**]
    - Claim 5 depends from both claim 2, which recites an “open support structure” [**0.5 marks**] and claim 3 which recites an “openable support structure” [**0.5 marks**]
    - While the only example embodiment of a vent taught in the patent is provided in an open support structure, the dependency of claim 5 suggests inventor understood that openable support structures could also have vents [**1 mark**]
- Material effect [**0.5 marks**]
    - A person skilled in the art would understand that a vent aperture provided at any location would allow venting to occur [**1 mark**]
    - Thus even though the vent hole is not provided as part of the bag retention structure, it will still perform the function of allowing venting [**1 mark**]

- This construction supports a finding of infringement because this essential feature is present [**0.5 marks**] – a vent is provided on the Bubble Lid as V [**1 mark**, must cite V for full marks]

(iv) "a bag blocking element" [**7.5 marks**]

- Infringer will argue that it is an essential feature that the bag blocking element is a separate element that depends downwardly from the main body of the lid [**1 mark**]
- Inventor's intent based on the language of the claims [**0.5 marks**]
    - The bag retention structure and the bag blocking element are recited as two separate elements [**0.5 marks**], suggesting that the downwardly extending element that provides the bag blocking element should be separate from the portion of the lid that provides the bag retention structure [**0.5 marks**]
    - There is no indication in the language of any of the claims that these two elements could be provided by the same structure [**1 mark**]
- Supported by material effect [**0.5 marks**]
    - Although the person skilled in the art would recognize that alternative structures that are not necessarily a separate element could perform the function of preventing the bag from occluding the drinking aperture [**1 mark**]
    - on balance the inventor's intent prevails and this is a self-inflicted wound because of the language used in the claims [**1 mark**]
- This construction supports a finding of no infringement because this essential feature is absent [**0.5 marks**], because the surface of the Bubble Lid is contiguous with no separate downwardly depending element between the bag retention structure and the drinking aperture[**1 mark**]

(v) "a depressed wall section" [**7.5 marks**]

- The patentee will contend that all that is required to provide a depressed wall section is a downwardly depending wall extending from the bag blocking element [**0.5 marks**], i.e. the specific shape and configuration of the depressed wall section is not essential [**0.5 marks**]
- Supported by inventor's intent as inferred from the language of the claims, claim differentiation [**0.5 marks**]
    - Claim 8 recites an "first and second generally vertical walls", [**0.5 marks**] while claim 7 recites the "depressed wall section" [**0.5 marks**]
    - This suggests that the language of claim 7 is intended to be broader than the specific downwardly depending wall of the illustrated embodiment [**1 mark**]
- Material effect [**0.5 marks**]
    - The purpose of the depressed wall section is to prevent the bag from swinging back towards the drinking aperture [**1 mark**]

    - The person skilled in the art would understand that any structure that extends downwardly between the raised bag and the drinking aperture would perform this function[**1 mark**]
- This interpretation supports a finding of infringement because this essential feature is present in the Bubble Lid [**0.5 marks**] the curving arc of the lid extends downwardly between the tea bag and the drinking aperture to prevent the used tea bag from swinging towards the drinking aperture [**1 mark**]

Question A2 Analysis of Claim Infringement [13.5 marks]

Claim 1 [3.0 marks]

A lid for preparing a brewed beverage from a beverage bag containing a dried beverage preparation	Present: lid A [**0.5 marks**]
a cover panel	Present: top T [**0.5 marks**]
having a rim for providing sealing engagement with a beverage container	Present: rim C [**0.5 marks**]
a drinking aperture formed through the cover panel	Present: opening D [**0.5 marks**]
a support structure for retaining the beverage bag after the beverage has been brewed	Present: score lines I and J [**0.5 marks**]
Conclusion	Infringed [**0.5 marks**]

Claim 2 [2 marks]

A lid as defined in claim 1	Present: all elements of claim 1 are present [**0.5 marks**]
wherein the support structure is an open support structure	Not Present [**0.5 marks**] As construed an open support structure means that no force is required to pass the tea bag string and tag through the support structure **[0.5 marks]**
Conclusion	Not infringed [**0.5 marks**]

Claim 3 [2 marks]

A lid as defined in claim 1	Present: all elements of claim 1 are present [**0.5 marks**]
wherein the support structure is an openable support structure	Present [**0.5 marks**]: score lines I and J must be broken open to create the support structure [**0.5 marks**]
Conclusion	Infringed [**0.5 marks**]

Claim 5 [2.5 marks]

A lid as defined in either one of claims 2	Not present: not all elements of claim 2 are present [**0.5 marks**]
or 3	Present: all elements of claim 3 are present [**0.5 marks**]
Comprising a vent	Present: vent V [**0.5 marks**]
Conclusion when dependent on claim 2	Infringed as all elements present [**0.5 marks**]
Conclusion when dependent on claim 3	Not infringed as not all elements present [**0.5 marks**]

Claim 6 [4 marks]

Apparatus for preparing a brewed beverage from a beverage bag containing a dried beverage preparation	Present: lid A [**0.5 marks**]
a lid configured for sealing engagement with a beverage container	Present: rim C **[0.5 marks]** is configured for sealing engagement with cup U [**0.5 marks**]
a drink through aperture formed in the lid	Present: opening D [**0.5 marks**]
a bag retention structure formed in the lid	Present: score lines I and J [**0.5 marks**]
a bag blocking element interposing the drink through aperture and the bag retention structure	Not present: As construed in A1(a)(iv), this element is not present [**0.5 marks**] because there is no separate structure that depends downwardly from the portion of the lid that provides the bag retention structure **[0.5 marks]**
Conclusion	Not infringed as not all elements are present [**0.5 marks**]

Question A3

A3A Who is or is not liable for direct infringement? (**5 marks**)

- Section 42 of the Patent Act grants the exclusive right to make, use and sell the invention in Canada (**0.5 marks**)
- Mega Manufacturing is liable **(0.5 marks)** for selling the Bubble Lid in Canada **(0.5 marks)**. Since title to the goods passes within Canada, the sale of goods is considered to have taken place in Canada **(0.5 marks)**. [This is a necessary implication of the holding in *Domco Industries Ltd v Mannington Mills Inc.* (1988), 29

C.P.R. (3d) 481 (FCTD) or other suitable explanation; no citation to case law authority required for full marks].

- Able Imports is liable **(0.5 marks)** for selling the Bubble Lid in Canada **(0.5 marks)**
- The coffee shops **(0.5 marks)** are liable for using (and/or selling) the Bubble Lid in Canada **(0.5 marks)**
- The end consumer **(0.5 marks)** is liable for using the Bubble Lid in Canada **(0.5 marks)**

A3B Period of liability? (**5 marks**)

- Period of liability starts 6 years prior to date action commenced, i.e. December 1, 2015 **(0.5 marks)**. Section 55.01 Patent Act **(0.5 marks)**.
- Liable for reasonable compensation (**0.5 marks**) for sales occurring after the limitation date but prior to grant, i.e. until December 1, 2020 **(0.5 marks)** sub-section 55(2) of the *Patent Act* (**0.5 marks**). This covers approximately 60 months or 60,000 lids **(0.5 marks)**.
- Liable for damages (**0.5 marks**) for units sold after December 1, 2020 (**0.5 marks**) since patent had granted sub-section 55(1) of the *Patent Act* (**0.5 marks**). This covers 12 months or 12,000 lids **(0.5 marks)** (with liability accruing as long as sales continue).

A3C. Challenge to Validity **[5.0 marks]**

- Able Imports could challenge the validity of the '189 Patent by requesting re-examination of the patent **(0.5 marks)**, section 48.1(1) of the *Patent Act* **(0.5 marks)**. Able Imports would need to file a copy of the product catalogue **(0.5 marks)** as a printed publication to support is request for re-examination **(0.5 marks)**.
- Able Imports could challenge the validity of the '189 Patent in a court proceeding by commencing an impeachment action (**0.5 marks** – award also if mentioned as a counterclaim in an infringement proceeding brought by GoodCups), section 60(1) of the *Patent Act* **(0.5 marks)**. In the case of an impeachment action evidence filed could include the product catalogue and additional evidence of the prior public use of the Tea Brewing Bubble Lid **(0.5 marks)**, since evidence in an impeachment action is not limited to printed publications **(0.5 marks)**.
- In both cases, the prior publication or sale of the Tea Brewing Bubble Lid in China would have made the subject matter available to the public **(0.5 marks)** and would be anticipatory in view of section 28.2 of the *Patent Act* **(0.5 marks)** [or accept reference to the Gillette defence]

A4A. Interlocutory Injunction **[3 marks]**

- Test for interlocutory injunction requires the existence of a serious issue to be tried, possibility of irreparable harm, and the balance of convenience **(0.5 marks)**, *RJR-Macdonald Inc v Canada (Attorney General)*, [1994] 1 SCR 311, *R. v. CBC* 2018 SCC 5 or other suitable authority **(0.5 marks)**. Generally since patent rights are economic rights, it is difficult to establish irreparable harm **(0.5 marks)**, since damages will compensate the economic loss **(0.5 marks)**. Where the plaintiff is not itself practicing the technology, the argument that its losses can be compensated by monetary damages is strengthened **(1.0 marks)**.

A4B. Standing to Sue **[2 marks]**

- Regardless of whether the agreement between GoodCups and Mega Mean Corporation is exclusive or non-exclusive **(0.5 marks)**, a licensee has standing to sue for infringement **(0.5 marks)**, *Signalisation de Montréal Inc v Services de Béton Universels Ltée*, 46 C.P.R. (3d) 199 (FCA) **OR** *Armstrong Cork Ltd Canada v Domco Industries Ltd*, 66 C.P.R. (2d) 46 (SCC) **(0.5 marks)** and sub-section 55(1) of the *Patent Act* **(0.5 marks)**.

B1. True or False **[6 marks]**

- True **(1.0 marks)**. A Certificate of Supplementary Protection can extend the term of protection **(0.5 marks)**, section 106 of the *Patent Act* or other provision relating to CSP grant **(0.5 marks)**.
- True **(1.0 marks)**. The Commissioner can authorise use of a patented invention by government **(0.5 marks)**, section 19 of the *Patent Act* **(0.5 marks) OR** The Commissioner can authorized use of a patented invention for international humanitarian purposes to address public health problems **(0.5 marks)**, section 21.01 of the *Patent Act* **(0.5 marks)** [only award full marks if the citation and the rationale match, e.g. only award 0.5 marks for citing both sections 19 and 21.01 of the *Patent Act* with no accompanying explanation].
- False **(1.0 marks)**. In the case of a patented process, the burden of proof shifts to the defendant **(0.5 marks)**, section 55.1 of the Patent Act **(0.5 marks)**.

B2. Repair and replacement parts **[4.5 marks]**

- B2A. Company B is not liable for infringement **(0.5 marks)**. Merely offering to repair a patented article does not amount to infringement **(0.5 marks)**. *Rucker Co. v. Gavel's Vulcanizing Ltd.* (1986), 7 C.P.R. (3d), 6 C.I.P.R. 137 (F.C.T.D.) **(0.5 marks)**.
- B2B. Company C is not liable for infringement **(0.5 marks)**, since the sale of non-infringing parts for use in an infringing machine does not, in itself, amount to infringement **(0.5 marks)**, *Beloit Canada Ltd. v. Valmet Oy* (1995), 61 C.P.R. (3d) **(0.5 marks)**.

- B2C. Yes, the answer would change **(0.5 marks)**, since providing instructions to assemble the patented article using the unpatented hot plates could result in liability for inducing infringement **(0.5 marks)**, *MacLennan et al. v. Produits Gilbert Inc.*, 2008 FCA 35 **(0.5 marks)**.

B3. Damages vs. lost profits. **[3 marks]**

- Damages are intended to compensate the patentee for the loss they suffered by the infringement (e.g., lost sales or royalties) **(1.0 marks)**.
- An account of profits is intended to avoid the unjust enrichment of the infringer (recovers the profit they earned through infringement) **(1.0 marks)**.
- Any reasonable answer can suffice for why you might choose one option over the other; **(1.0 marks)** for why an award of damages would be sought **OR** **(1.0 marks)** for why an accounting of profits would be sought. E.g.
    - You may choose an account of profits when damages can be difficult to quantify.
    - An account of profits may be chosen to cover extra-territorial sales of a product manufactured in Canada.
    - An account of profits may be elected by a non-practising entity which would not have sustained any loss of sales.
    - Damages may be chosen if the patentee can clearly show that their sales were adversely impacted by the infringer.
    - Damages may be preferred where the sales volume of the infringer was low.
    - Damages may be elected where the patentee may have 'unclean hands' that affects entitlement to the equitable remedy of account of profits.

B4. Temporary use of patented article. **[3 marks]**

- No, George is not liable for patent infringement **(0.5 marks)**, his vehicle is a land vehicle entering Canada temporarily **(0.5 marks)** and the invention is used exclusively for his vehicle **(0.5 marks)**, section 23 of the *Patent Act* **(0.5 marks)**. George cannot sell his vehicle in Canada **(0.5 marks)**, as then the vehicle would no longer be temporarily in Canada **(0.5 marks)**.

B5. Prior use. **[4.5 marks]**

- B5A. Yes, Company A can continue to use the Superbike **(0.5 marks)**, because it manufactured the Superbike [i.e. committed the infringing act] prior to the claim date [i.e. December 1, 2010] of the '382 Patent **(0.5 marks)**, section 56(1) of the *Patent Act* **(0.5 marks)**.
- B5B. Yes, Company C can continue using the Superbike **(0.5 marks)**, because it acquired the business of Company A, and a transferee of a business or a part of a

business may acquire the prior user rights of the transferor **(0.5 marks)**, section 56(2) of the *Patent Act* **(0.5 marks)**.

- B5C. Yes, Company D can re-sell the Superbike **(0.5 marks)**, because it purchased the Superbike from Company A, and the prior user rights of the vendor follow the sold apparatus **(0.5 marks)**, section 56(3) of the *Patent Act* **(0.5 marks)**.

B6. Third party intervening rights. **[5 marks]**

- Yes, Company F can continue using the patented method **(0.5 marks)**, section 55.11(3) of the *Patent Act* **(0.5 marks)**. Since Company F in good faith committed an act that would be an infringement of the '288 patent **(0.5 marks)**, it is not thereafter an infringement for Company F to do that act **(0.5 marks)**.
- Yes, company G can continue using the patented method **(0.5 marks)**, section 55.11(4) of the Patent Act **(0.5 marks)**. Since the act was made in the course of Company F's chemical synthesis business **(0.5 marks)** and Company F's chemical synthesis business was transferred to Company G **(0.5 marks)**, Company G can continue to use the patented method **(0.5 marks)**. Company F can no longer use the patented method **(0.5 marks)**.