

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**

**6 October 2008, Monday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100



INTELLECTUAL PROPERTY  
OFFICE OF SINGAPORE

**INSTRUCTIONS TO CANDIDATES**

1. This Paper consists of 9 pages, including this cover page.
2. Write your answers in English. Answers in any other language will not be marked. Answers in illegible handwriting will not be taken into consideration.
3. Two copies of the question paper are provided, one is for your reading and the other is for your use (optional) when answering the question(s) in the Answer Booklet(s).
4. Only your answers and/or drawings to the question(s) written or glued in the Answer Booklet(s) provided by the Examination Secretariat will be considered. You are to write on one side of each sheet in the Answer Booklet(s).
5. Information provided in the question(s) may be obtained from actual situations or modified therefrom for the purpose of this examination. You should accept the facts given in the paper. Assume also that the prior art given is exhaustive.
6. The document provided in this question is:

Document A – Client's write-up of his invention (4 pages of description and 4 page of drawings).

End

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**  
**6 October 2008, Monday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

---

**Document A – Client’s write-up of his invention (1/8)**

Your client, a manufacturer and retailer of laminated products, writes to you as follows:-

5 “Good morning, patent agent. I am in a joyous mood today because we have come up with a  
new system for producing laminated products that I would like you to patent for me. My new  
system 100 is shown in Figures A and B, and includes a loading station 102 where transfer  
paper 104 is fed to a movement means and in this case, a conveyor system 106. The conveyor  
10 system 106 is driven by an assembly of rollers 108 (powered by a motor 110) which carries the  
transfer paper 104 to a first dispensing station 112, a second dispensing station 114 and then to  
a drying station 116. The first dispensing station 112 coats a layer of liquid adhesive 118 onto  
the transfer paper 104 as the transfer paper 104 is carried down the conveyor system 106. As  
the adhesive layer 118 and the transfer paper 104 passes under the second dispensing station  
15 114, a curtain of paint flows down and forms a layer of liquid paint 120 onto the adhesive layer  
118 and thereafter, the drying station 116 directs pressurized air to bond the paint and adhesive  
layers 118,120. A collection unit 122 subsequently collects the laminated product 400 as a roll.

As you know, I have been in the laminated product business for years and 5 years ago, we  
invented iron-on paint and our business has gone from strength to strength, probably due to  
20 your advice to obtain a Singapore design registration for my iron-on paint. As you would recall,  
the Singapore design registration is D/2003/123/A (See Figure E), and the laminated iron-on  
paint includes a layer of transfer paper 10, adhesive layer 20, paint layer 30 and a protective  
layer 40. To make this laminated iron-on paint, we import paint in sheet form from a supplier in  
China and at our factory, we then apply a layer of liquid adhesive to the sheet of paint, followed  
25 by a peel-away layer or transfer paper. A protective layer then goes on top of the paint layer to  
complete the laminated iron-on paint. As you are aware, to use the product, the transfer paper is  
peeled away slowly to expose the adhesive layer and the paint layer is then transferred to a  
surface (such as a wall). A domestic iron or similar heat source such as a hair dryer is then used  
to soften the adhesive layer so that the paint layer adheres to the wall. The protective layer is  
30 removed last to expose the layer of paint that looks and feels as if the wall was painted using  
normal paint, but without the hassle. The product was quite successful but that’s when we  
started receiving complaints that the product is not reliable. After transferring the paint layer  
onto the wall, there were complaints that the paint layer peels away from the adhesive layer.

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**  
**6 October 2008, Monday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

---

**Document A – Client’s write-up of his invention (2/8)**

We consulted our supplier in China and the solution we thought of was to, after forming the layers for the laminated product, subject the layers to a pressure roller to create a permanent  
5 bond between the paint layer and the adhesive layer. The effect is shown in Figure C which shows that the paint layer is partially impregnated with the adhesive layer due to the pressure. We have been selling this improvement for about two years but the process for producing the laminated product is very inefficient and cumbersome. To achieve even distribution of pressure and consistent bonding between the paint and adhesive layers, the thickness of the layers must  
10 be controlled but this is easier said than done. With changes in thickness of 0.5mm or more in the paint or adhesive layer, which is common, we realised the pressure applied by the roller must be adjusted and varied based on the variations in the thickness. This is definitely not easy to achieve and resulted in very poor productivity and manufacturing output. I am glad to say that our new system 100 shown in Figures A and B for producing the laminated product 400 is able  
15 to address our problems.

The transfer paper 104 is in roll form and this is attached to a roller 124 of the loading station 102. The roller 124 loads the transfer paper 104 onto the conveyor system 106 and the conveyor belt 126 carries the transfer paper 104 in the direction X. Of course, it is preferred to  
20 lay the transfer paper 104 as flat as possible and there is a pressure roller 128 (powered by a pressure roller motor 130) just downstream of the loading station 102 to spread the paper flat. The first dispensing station 112 includes a slot die 132 – i.e. a slot within a die for containing an adhesive 134 – with an opening 136 positioned above the conveyor belt 126. An inlet 132a supplies a continuous flow of adhesive to the slot die. A slot die 132 is preferred because the  
25 adhesive material is viscous. The amount of adhesive discharged depends on the size of the opening 136 and the conveyor speed and this can be easily calculated based on known techniques. Generally, the adhesive layer 118 should have a thickness of 50µm to 100µm, but this is nothing clever. The adhesive 134 may be gravity-fed but to have a more controlled discharge of the adhesive, it is preferred to apply pressure.

30 The second dispensing station 114 makes use of a curtain coating process. The dispensing station 114 includes a reservoir 138 for holding the paint 140 and there is an inlet 138a arranged to supply liquid paint to the reservoir. A dispensing channel 142 is located at the base

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**  
**6 October 2008, Monday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

---

**Document A – Client's write-up of his invention (3/8)**

of the reservoir which transverses the width of the conveyor belt 126. The dispensing channel 142 allows a continuous curtain of paint 144 to fall down onto the conveyor system. The height  
5 of the dispensing channel 142 above the conveyor system is calculated to minimize spatter. As the transfer paper 104 and adhesive layer 118 pass underneath, the layer of paint 120 is formed on the adhesive layer 118.

10 In the embodiment of Figure A, the belt speed and the width of the dispensing channel 142 is set to achieve coating speeds of 60 to 130 m/min, although other coating speeds may be used depending on the type of paint and adhesive.

The layer of adhesive 118 is coated with the paint 120 as the adhesive layer 118 passes through the curtain 144, and this enables the paint layer 120 to be partially impregnated with the  
15 adhesive while the paint is in liquid form.

The layers of paint, adhesive and transfer paper 120,118,104 are then allowed to pass under the drying station 116. The drying station has a dryer 146 which directs streams of pressured air 148 under ambient temperature through an air nozzle 150 to evaporate the solvent from the  
20 paint layer and thus bond the paint and adhesive layers. This is useful to quickly set the paint but for products with long lead times, the dryer 146 is not necessary and we can save energy simply by letting the paint and adhesive layers dry naturally to form the permanent bond.

Finally, the collection unit 122 collects the laminated product 400 in the form of a roll with the  
25 help of a collection roller 152 (powered by motor 152a). A protective sheet can also be laid on top of the paint layer after the paint is dried just like our earlier product and this is simply a matter of installing another roller at the collection unit to lay the protective sheet on top of the paint layer before rolling up the product 400.

30 As an alternative, instead of the curtain coating process, roll coating can also be used to form the layer of liquid paint as shown in Figure D. In roll coating, a feed roll 200 and an applicator roll 300 turn in opposite directions and cooperate to direct a controlled flow of liquid paint 140 between the rolls and this forms a layer of liquid paint 120 onto the adhesive layer 118. For the

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**  
**6 October 2008, Monday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

---

**Document A – Client’s write-up of his invention (4/8)**

laminated product 400 to work, it should be mentioned that it is necessary for the adhesive layer  
to at least partially impregnate the liquid paint layer when the layers are in contact to achieve a  
5 permanent bond when dried.

We wish to secure the widest possible patent protection for this new idea all over the world.”

\*\*\*\*\*

10

You did a search of your records and found D/2003/123/A and a copy of the representations is  
shown in Figure E. Of course, you did wonder why you did not advise the client to file a patent  
application for the idea.

15

You are uncertain as to the meaning of the terms “bond” and “impregnate” and a Web search  
reveals the following definitions:

a) bond – something that binds, adheres, fastens or holds together.

20

b) impregnate – to infuse particles of one substance into the mass of another substance.

\*\*\*\*\*

25

Please prepare a Singapore patent application, without abstract, suitable for first filing at the  
Singapore Patent Office.

Assume that the prior art referred to in the write-up is comprehensive.

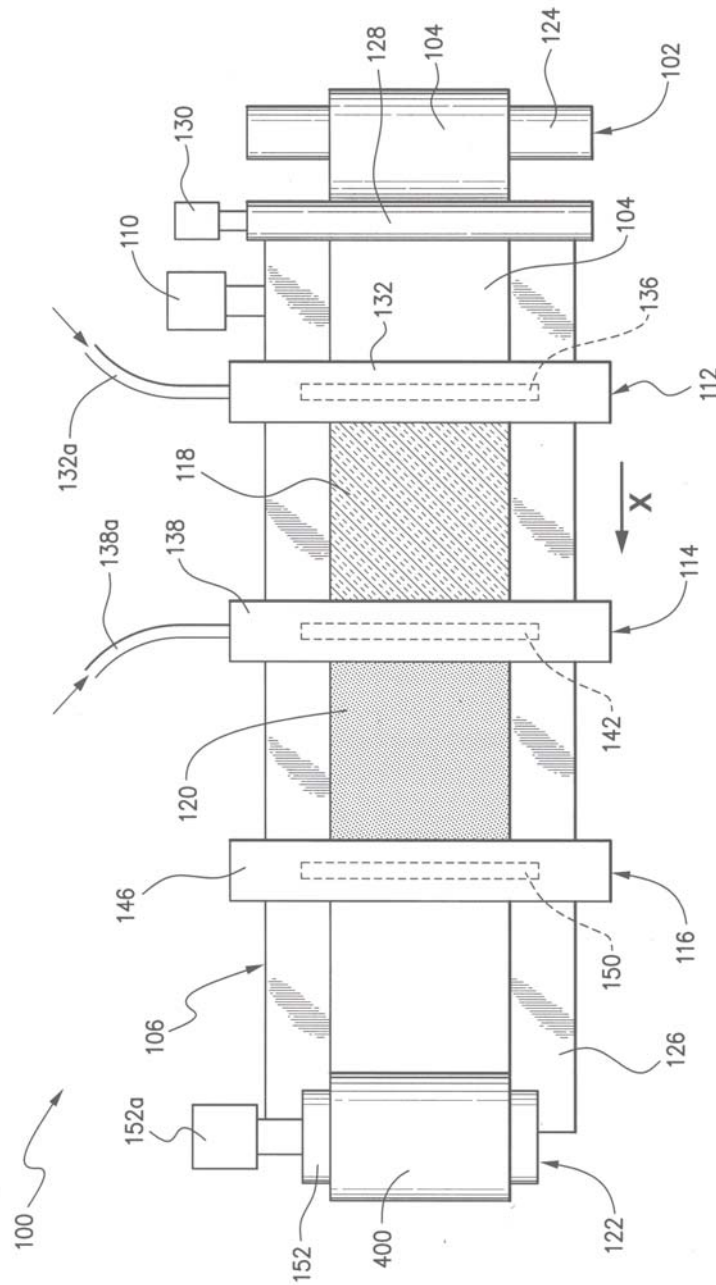
30

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**  
**6 October 2008, Monday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

**Document A – Client’s write-up of his invention (5/8)**



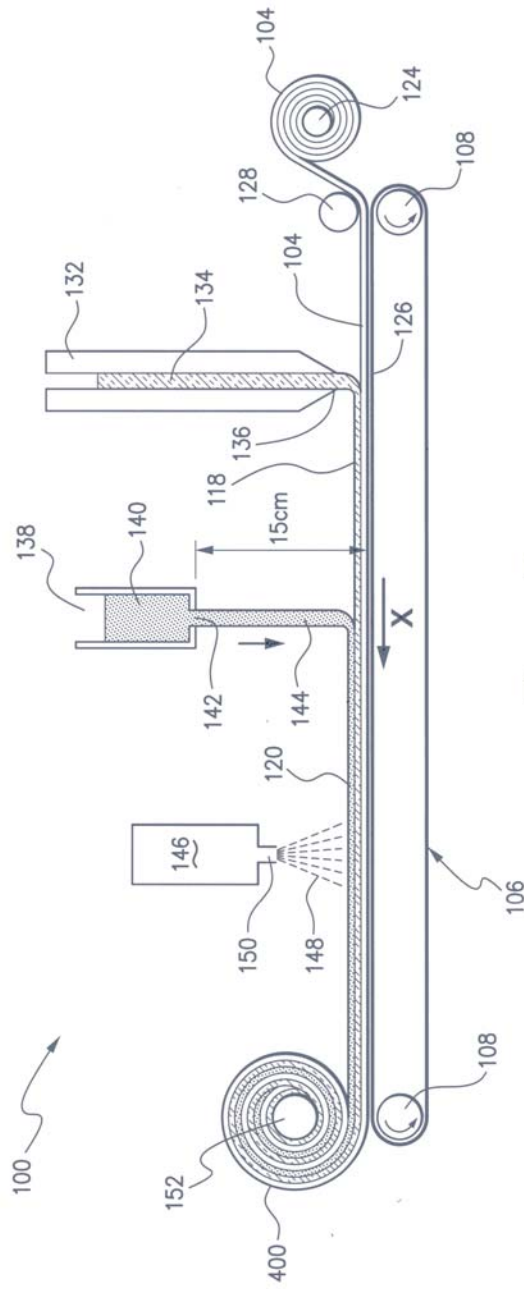
**Figure A**

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**  
**6 October 2008, Monday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

**Document A – Client's write-up of his invention (6/8)**



**Figure B**

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**

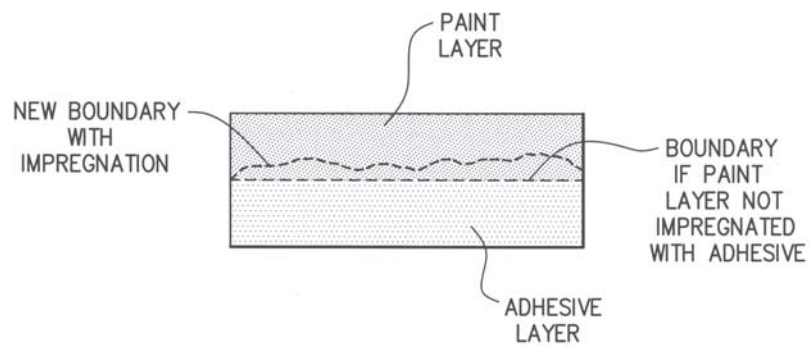
6 October 2008, Monday

1330 – 1730 hrs

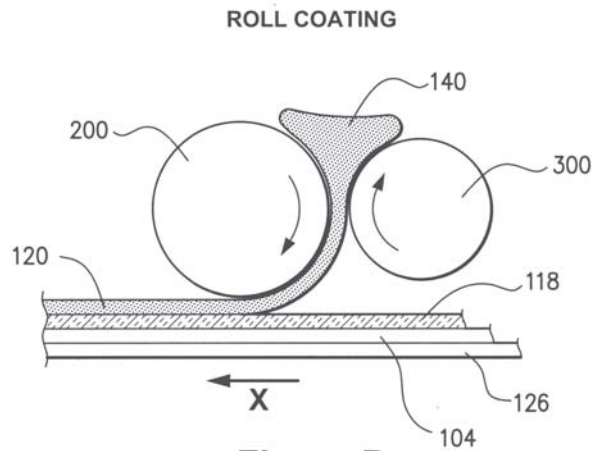
Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

**Document A – Client's write-up of his invention (7/8)**



**Figure C**



**Figure D**

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**

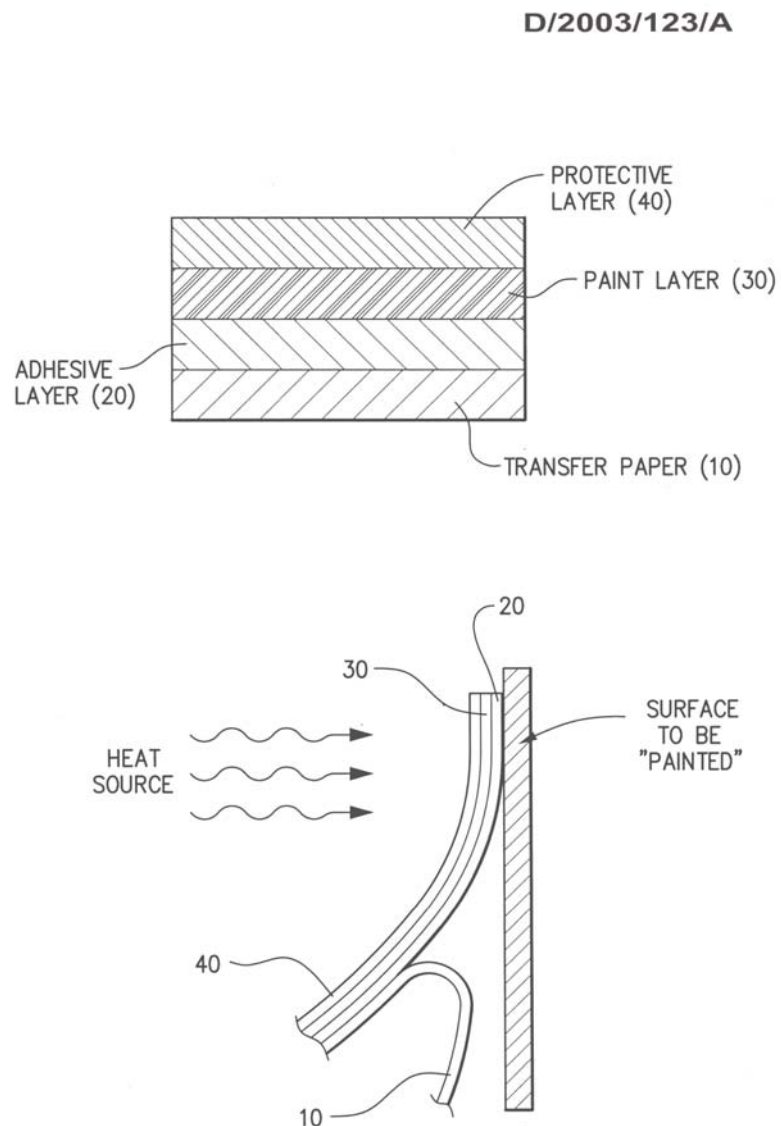
6 October 2008, Monday

1330 – 1730 hrs

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100

**Document A – Client's write-up of his invention (8/8)**



**Figure E**