

THE JOINT EXAMINATION BOARD

PAPER P3

Preparation of Specifications for United Kingdom and Overseas Patents

Thursday, 1st November 2007

10.00 a.m. – 2.00 p.m.

*Please read the following instructions carefully. **Time Allowed - FOUR HOURS***

1. The whole question is to be attempted.
2. Marks to be awarded are given on page 4.
3. Please note the following:
 - a. enter the Paper Number (P3) and your Examination number in the appropriate boxes at the top of each sheet of paper;
 - b. the scripts are photocopied for marking purposes. Please write with a **dark inked pen** on one side of the paper only and within the printed margins, and do not use highlighters in your answer;
 - c. do not state your name anywhere in the answers;
 - d. write clearly, as examiners cannot award marks to scripts that cannot be read.
4. Under the Examination Regulations **you may be disqualified from the examination and have other disciplinary measures taken against you if:**
 - a. you are found with unauthorised printed matter or other unauthorised material in the examination room;
 - b. your mobile phone is found to be switched on;
 - c. you copy the work of another candidate, use an electronic aid, or communicate with another candidate or with anyone outside the examination;
 - d. you continue to write after being told to stop writing by the invigilator(s). **NO WRITING OF ANY KIND IS PERMITTED AFTER THE TIME ALLOTTED TO THIS PAPER HAS EXPIRED.**
5. **At the end of the examination collect your answer sheets together in order and put them in the WHITE envelope provided.** Do not staple or join answer sheets together in any way. Any answer script taken out of the examination room will not be marked.
6. This paper consists of six pages, including this page and comprises three pages of the question, one sheet of client's drawings, and one further sheet of drawings for use in your answer.

You arrive in the office and listen to your answerphone. You have a message from your client, Mr Buzz, who called you from hospital earlier today. His message was as follows:

“You remember we spoke about my new smoker recently, well there have been some developments. I thought the idea was so good that I arranged an open day today at my bee hives to demonstrate it. I seem to remember you saying that I shouldn’t tell anyone about the idea before the patent was filed but it was only some people from the local beekeeping association and a journalist from the HoneyBee Post who will be publishing his on-line article on Friday.

Anyway, to cut a long story short, I had a slight accident with one of the hives. As a result, I was rushed to hospital in anaphylactic shock and it’s a bit painful to talk at the moment. However, the smoker worked a treat. I sent you details of the invention last Friday. Can you please just get on and file the patent application for me as I’m not going to be able to come into your office or take visitors for a while and I would like to approach a manufacturer as soon as I get out of hospital; it would be helpful if I could tell them that a patent application had already been filed.”

You look through your post and find a letter from Mr Buzz, together with sheets detailing his smoker, which read as follows:

“It’s always a bit tricky opening and examining bee hives, the bees never seem to get used to it and they can sometimes sting quite ferociously. Some people administer carbon dioxide to the hive, which causes the bees to pass out.

Another popular technique is to try to make the area around the hive smoky. The bees smell the smoke and gorge on honey. This seems to distract them whilst you examine the hive and it is thought that, like humans, they don’t really fancy a fight with a full belly and so the amount of stinging is drastically reduced. The smoke can be made in lots of different ways.

A technique which I and many other beekeepers have used for some years is to get a tight bundle of damp straw and use a blow torch to get it lighted. The straw then burns and generates plenty of smoke. You can waft this around and try to blow it into the hive, although you have to watch out for burning embers and, if you get too close, you can burn through your protective veil.

My smoker makes this process much easier. As you can see from the drawings, the straw or other suitable material, is enclosed within the cylindrical smoker firebox and smoulders inside. The smoker is made of copper and is around 30 cm high.

The hinged lid on top of the firebox forms a chimney which narrows towards the top. This enables the smoke to be concentrated into a narrow plume which can be directed into the hive. The offset chimney facilitates ease of use since the smoker can be held generally upright, whilst the smoke plume exits at an angle. Holding the smoker upright is desirable since otherwise the material in the firebox gets disturbed which reduces the efficiency of the smoker and can cause it to go out.

As the straw burns, most of the ash falls through the grate at the bottom of the firebox. In this way, the firebox is similar to a garden incinerator of the "dustbin" type, or a conventional woodburning stove; only in the incinerator the grate is open to the air below; the whole thing being raised off the ground on legs. There are additional holes in the sides of the incinerator or at the bottom of the woodburning stove to encourage plenty of airflow. The plentiful airflow reduces smoking to a minimum. The known "dustbin" incinerator has a removable lid with a central, vertical chimney whilst woodburning stoves are provided with a chimney in a variety of orientations to suit the room in which they are fitted.

Surrounding the outside of the smoker firebox is a cage or shield (not shown in the sectional view, Fig. 2). The cage can simply be a 'U'-shaped sheet of metal, although this tends to get quite hot and so I use a strong, typically stainless steel, wire mesh which secures e.g. to the bracket holding the bellows. Even when the firebox gets really hot, the cage is generally cool enough not to cause a severe burn if touched, particularly when wearing gloves.

One valve of the bellows attached to the firebox allows air to be sucked in, whilst the other enables the air to be blown out through an air exit hole. The bellows are fitted with a return spring. They can be depressed to cause air to be expelled and then will automatically reinflate ready for subsequent use. There is no particular reason why a mechanical or electrical fan couldn't be used in preference to the bellows.

The amount of ambient air which can enter the firebox is restricted by the air inlet tube, which is the only inlet for the air. This ensures the generation of smoke in a controlled manner by causing the straw to smoulder rather than burn, due to the relatively low amount of oxygen available. The smoker can produce small amounts of smoke from the air provided through the air inlet tube. More smoke can be produced by squeezing the bellows a few times to increase temporarily the amount of oxygen and the flow of air in the firebox. This drives accumulated smoke out of the chimney and also increases smouldering combustion, without producing flame.

A cone can be fitted to the air exit hole of the bellows. This concentrates and speeds the air emitted. In turn, the air column travels further into the firebox and the column of air draws in additional surrounding air which increases the volume of air delivered. The air exit hole and the air inlet tube need to be aligned to enable air to pass from the bellows into the firebox. A reasonably long air inlet tube oriented horizontally helps to reduce the amount of convected air drawn into the firebox between puffs which helps to control the smouldering. But provided that the firebox inlet hole is not too large, satisfactory results can be obtained even without any tube.

If the air inlet tube is located right at the bottom of the firebox, then the airflow can become clogged by ash. If the air inlet tube is located above the grate, then the burning ash is disturbed. Somewhere between these two seems to give the best results.

The lid can also be pushed or screwed on but this can make filling the firebox difficult, particularly when the lid is hot and, once removed, the lid is easily lost. If the lid is pushed on, it is held in place by a friction fit and a loop of

springy wire can be used to help the lid be removed without burning your fingers. Also, the smoker can be made of steel or another suitable metal.

As you can see, using this arrangement, smoke can readily be produced in a safe and controllable manner.”

Prepare a full patent specification for filing at the UK Patent Office which will form the basis for the widest practicable protection for your client. Include **no more than ten dependent claims** in your answer.

Marks will be awarded as follows:

Introduction, review of prior art and statement of invention – 10%

Specific description – 20%

Main claim(s) – 40%

Other claims – 25%

Abstract – 5%

Fig. 1

Perspective view

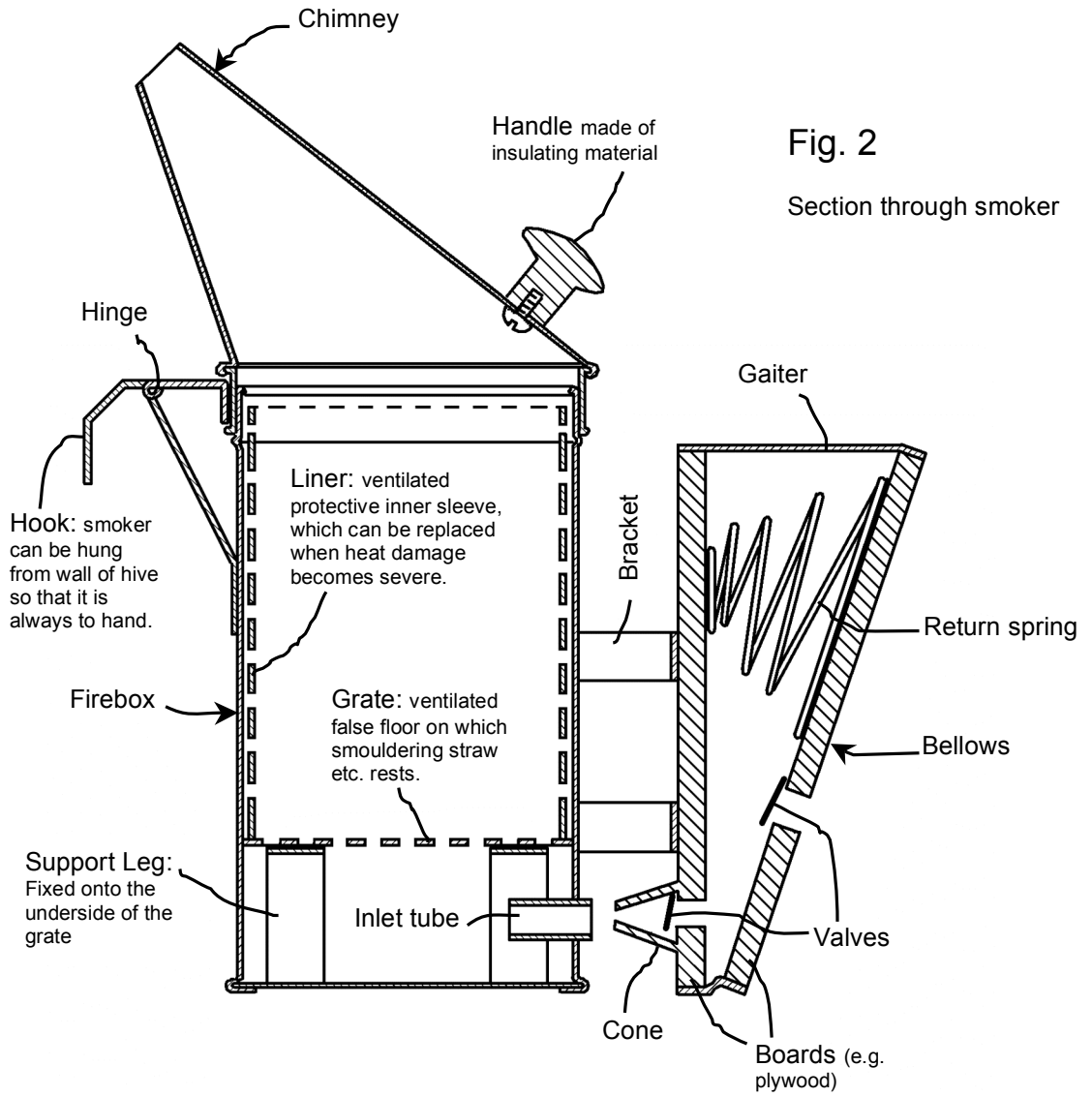
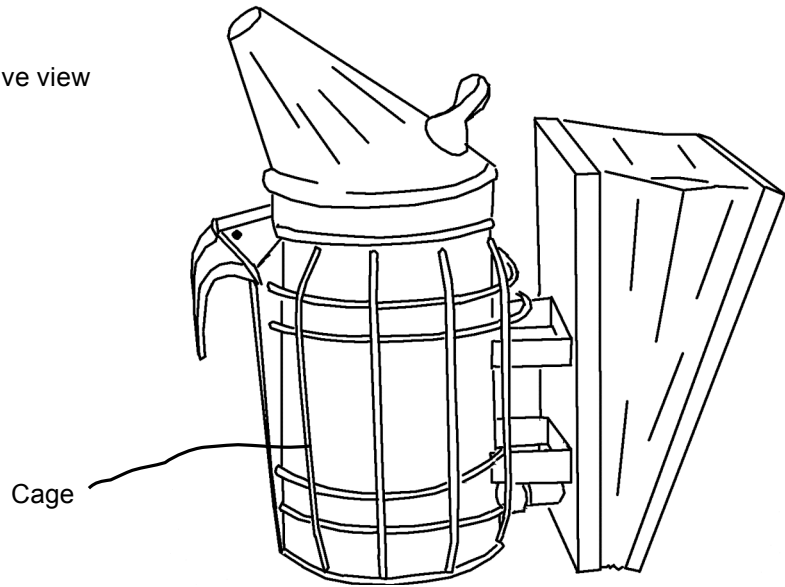


Fig. 2

Section through smoker

Fig. 1

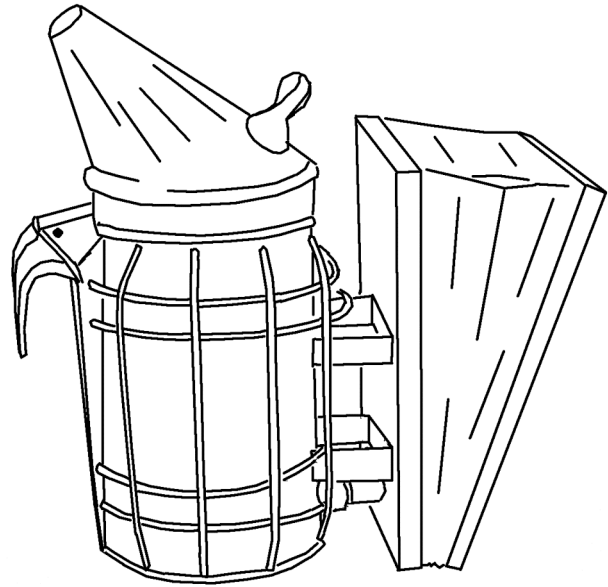


Fig. 2

