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(71) Applicant: **PVG International B.V.**
5342 CW Oss (NL)

(72) Inventors:
- **Elemans, Johannes Cornelis Maria**
  6642 AJ Beuningen (NL)
- **Wagemakers, Franciscus Adrianus Maria**
  5672 HP Nuenen (NL)

(74) Representative: **Prins, Adrianus Willem et al**
Vereenigde,
Nieuwe Parklaan 97
2587 BN Den Haag (NL)

(54) Assembly of a heater and a fuel container placeable on the heater

(57) An assembly of a heater and a fuel holder placeable on the heater, the fuel holder (10) being provided with a metering part (14) with a fuel outflow opening, the metering part (14) being provided with a closing means (12) which can be brought into a first or second position, respectively, for closing off or not closing off, respectively, the outflow opening (11), the metering part (14) being further provided with spring means (13) arranged for applying a spring force to the closing means (12), such that under the influence of that spring force, the closing means (12) is brought into the first position, the heater being provided with a fuel filling opening (2) provided with means (3) for bringing the closing means (12) of the fuel holder (10) into the second position, against the spring force of said spring means (13), when the fuel holder (10) is placed by the metering part (14) in a filling position in the filling opening (2) of the heater (1), wherein the fuel holder metering part (14) is an integral part of a wall (15) of the fuel holder (10).

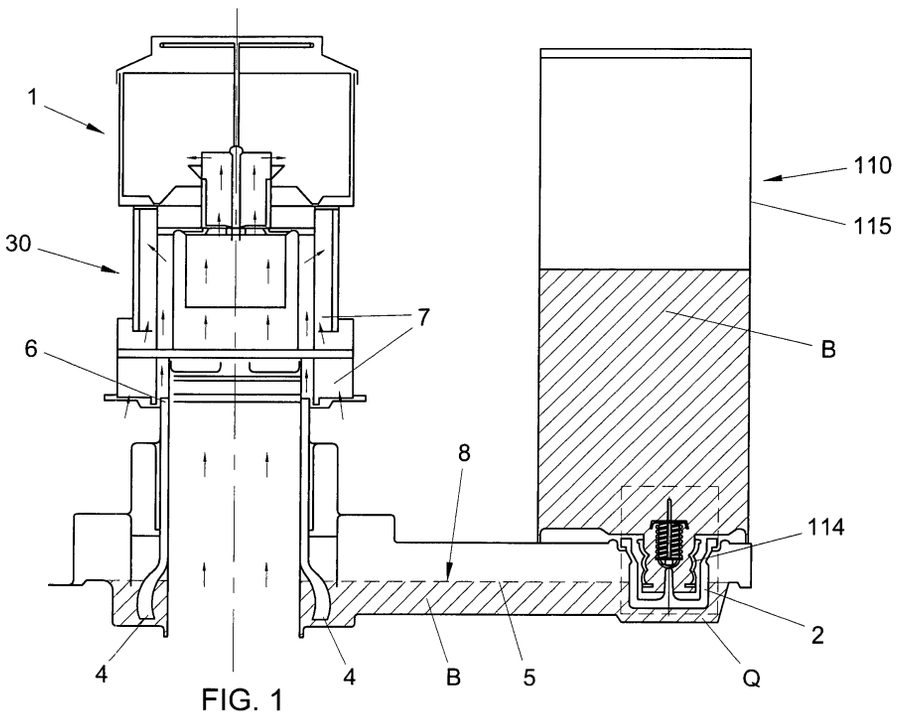

FIG. 1

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Description

[0001] The invention relates to an assembly of a heater and a fuel holder placeable on the heater, the fuel holder being provided with a metering part with a fuel outflow opening, the metering part being provided with a closing means which can be brought in a first or a second position, respectively, for closing off or not closing off, respectively, the outflow opening, the metering part being further provided with spring means arranged for applying a spring force to the closing means, such that under the influence of this spring force the closing means is brought into the first position, the heater being provided with a fuel filling opening provided with means for bringing the closing means of the fuel holder in the second position, against the spring force of the spring means, when the fuel holder with the metering part is placed in a filling position in the filling opening of the heater.

[0002] Such an assembly is known from practice. When the fuel holder is not used in combination with the heater, for instance during storage and/or transport, the outflow opening of the holder is closed off by the closing means. The closing means has then been brought into the first position by the spring means.

[0003] In order to provide the heater with fuel, the metering part of the fuel holder is coupled by way of the outflow opening to the filling opening of the heater. In this filling position, the fuel holder is, as a rule, in an upside-down position, at least with the metering part and the outflow opening turned downwards.

[0004] The filling opening of the heater is arranged for bringing the closing means of the fuel holder into the second position when the holder has been placed on the heater in the filling position so that fuel present in the holder can flow into the heater. To this end, the heater is provided at the filling opening with an upwardly projecting pin which pushes the closing means of the holder to the second position against the spring force of the spring means. After the fuel holder is positioned on the heater, the pin applies an upwardly directed normal force to the closing means, which normal force is a reaction force of the gravitational force applied by the mass of the fuel holder to the pin.

[0005] The fuel outflow opening of the metering part of the fuel holder is relatively small, as during burning of the heater, as a rule, a relatively small fuel flow flows to the heater via the opening. Furthermore, the small size of the fuel outflow opening is desired to prevent fuel from being spilled during placement of the fuel holder onto the heater or taking the fuel holder from the heater. Moreover, as a result, refilling the fuel holder by a user is considerably hampered or even made impossible.

[0006] An advantage of the known assembly is that at any location, the heater can be provided with fuel by the fuel holder. Furthermore, the heater and the fuel holder detachable therefrom can be transported and stored safely and separate from each other, while the outflow opening of the fuel holder is safely closed off by the closing means. Furthermore, coupling the fuel holder to the heater proceeds in a relatively simple manner by simply placing the holder onto the heater in the desired filling position. The holder can then be retained in position, by means of, for instance, retaining means such as clamping and/or strapping means or the like, connected to the heater, and/or wall parts of the heater extending along the holder.

[0007] In the known assembly, the fuel holder comprises a relatively large metal fuel can, while the metering part comprises a detachable metal cap. The outflow opening and the spring means of the fuel holder are provided in this cap. When the fuel holder is empty, the cap can be taken from the fuel holder so that relatively large fuel holder filling opening is cleared. Then, the holder can be refilled via the holder filling opening. This has the advantage that each time the same fuel holder can be used in combination with the heater.

[0008] A drawback of the known assembly is that refilling the fuel can is relatively cumbersome and requires great accuracy. Fuel may then be spilled. When fuel is spilled, for instance clothes of bystanders may be ruined. An important drawback of the known assembly is that the fuel can is relatively large and heavy, which will complicate transport, handling and storage of this fuel holder. By contrast, small fuel cans have the drawback that they have a limited content.

[0009] The present invention contemplates solving problems of the known assembly while maintaining its advantages. In particular, the invention contemplates an assembly of a heater and a fuel holder, while the assembly can be used in a relatively safe manner.

[0010] According to the invention, the assembly is characterized to this end in that the fuel holder metering part is undetachably connected to a wall of the fuel holder.

[0011] In this manner, the fuel holder is suitable to be used once, which is relatively safe compared with reuse of the holder. The metering part cannot easily be removed from the fuel holder, at least not without damaging the holder and rendering it unfit for use, in that the metering part is undetachably connected to the holder, for instance in that it forms an integral part of the wall of the holder. Accordingly, after use, when fuel stored in the holder has been used up by the heater, the fuel holder is to be replaced by a new, filled fuel holder to provide the heater with fresh fuel. By each time using a new fuel holder, the cumbersome step of refilling the fuel holder need not be carried out. Each used-up, empty fuel holder can, for instance, be recycled.

[0012] Preferably, some or all parts of the fuel holder are manufactured from plastic. As a result, the holder can be of relatively light and yet sufficiently strong design. Manufacturing the holder entirely from plastic, the spring means included, is particularly advantageous because, as a result, the holder is more easily recyclable than a holder composed from various materials. Further,

a plastic holder can be manufactured in large quantities relatively inexpensively, which is advantageous when the holder is used as a disposable container. By designing each holder to be relatively light, the holder can contain more mass in fuel before reaching a particular total weight relative to a comparatively heavy holder, which is advantageous from the point of view of transport.

[0013] An advantageous plastic to be used in the holder is the relatively inexpensive high density polyethylene (HDPE). This plastic has a low density, so that weight can be economized on. Further, HDPE is somewhat translucent, so that the fuel level in the holder can be observed from the outside when the holder wall is manufactured from HDPE. Furthermore, HDPE in itself is relatively fuel impermeable, which is requisite for the durability and safety of the fuel holder.

[0014] The invention further provides a fuel holder characterized by the subject matter of claim 17. This holder is very safe in use as the fuel holder metering part is undetachably connected to a wall of the fuel holder. Undesired refilling of the holder is thus prevented. For that reason, the holder is particularly suitable for single use, which offers the above-mentioned advantages.

[0015] Further elaborations of the invention are described in the subclaims. Presently, the invention will be clarified with reference to an exemplary embodiment and the drawing. In the drawing:

Fig. 1 shows a cross section of an assembly of a heater and a fuel holder according to the state of the art;
Fig. 2 shows detail Q of the cross section represented in Fig. 1;
Fig. 3 shows, represented in a partly cut-away manner, a side view of a metering part with a closing means of a fuel holder according to the invention;
Fig. 4 shows a top plan view of the side view represented in Fig. 3;
Fig. 5 shows, represented partly in cross section, a side view of the closing means of the metering part represented in Fig. 3;
Fig. 6 shows a top plan view of the side view represented in Fig. 5;
Fig. 7 shows, represented in a partly cut-away manner, a side view of the metering part represented in Fig. 3.

[0016] Fig. 1 shows an assembly of a heater 1 with a fuel holder 110 known from the state of the art. The heater 1 is provided with a burner head 30 and a wick 4 for soaking up fuel B from a lower container 5, transporting it to an evaporation surface 6 and evaporating it there for the purpose of burning the fuel. Furthermore, the heater 1 comprises an air lock 7 for feeding air to the evaporated fuel B for the purpose of burning the fuel B in the burner head 30. The air flow is indicated by arrows in Fig. 1.

[0017] The known fuel holder 110 comprises a fuel reservoir enclosed by a wall 115. As shown in Fig. 1, the holder 110 is placed, during use, by a metering part 114 on a filling opening 2 of the lower container 5 of the heater 1 for continuously refilling this lower container 5 with fuel B to a filling level represented by a dotted line 8. In the filling opening 2, a filter 9 is arranged for filtering the fuel flowing via this opening 2 to the lower container 5. By means of a threaded connection, the metering part 114 is detachably connected to the holder 110.

[0018] As shown in Fig. 2, the metering part 114 of the fuel holder is provided with a fuel outflow valve comprising an assembly of a plug 112, a metal spring 113 and a fuel outflow opening 111. With the plug 112 in a first position (not shown), the outflow opening 111 is closed off by that plug 112. In Figs. 1 and 2, a second position of the plug 112 is represented with the plug 112 not closing off the outflow opening 111. The spring 113 is arranged for applying a spring force to the plug 112 such, that under the influence of that spring force, the plug 112 can be brought from the second position to the first position. As shown in Figs. 1 and 2, the filter of the fuel filling opening 2 of the heater 1 is provided with an upwardly projecting pin 3 for bringing and retaining the plug 112 of the fuel holder 110 in the second position, against the spring force of the spring means 113 when the fuel holder is placed on the heater in the filling position shown.

[0019] With the position of the plug 112 represented in Figs. 1 and 2, fuel can flow via the outflow opening 111 from the fuel holder 110 to the lower container 5 of the heater 1, while air flows into the fuel holder 110. Naturally, the fuel flow from the holder 110 stops each time the fuel level 8 in the lower container 5 has reached the outflow opening 111 of the fuel holder 110, since, in that case, no air can flow back into the holder 110 any longer. In this manner, during use of the heater 1, the fuel in the lower container 5 is continuously kept at the desired level 8 by the holder 110.

[0020] As shown in Figs. 1 and 2, the holder 110 known from the state of the art comprises a metering part 114 which can be unscrewed, entailing the drawbacks mentioned in the introduction.

[0021] Figs. 3 - 4 show a part of a fuel holder 10 according to the invention. This fuel holder 10 is provided with a convex metering part 14 integrally connected to the fuel holder wall 15. The metering part 14 is provided with a circular outflow opening 11. In the metering part 14 a closing means 12 is arranged, which can be brought in a first or second position, respectively, for closing off or not closing off, respectively, the outflow opening 11. In Fig. 3, the first position of the closing means is represented. Via spring means 13, the closing means 12 is connected to an inside 23 of the metering part 14. The spring means 13 are arranged for applying a spring force to the closing means 12 such that under the influence of this spring force, the closing means 12 is brought into the first position.

[0022] As shown in Fig. 5, the closing means 12 com-

prises a frustoconical body 16 which, in the first position of the closing means 12, is contiguous to an inside of the outflow opening 11 for closing off that opening 11. An outer side 17 of the frustoconical body 16, which side is engaged by the pin 3 of the filling opening 2 of the heater 1 for bringing the closing means 12 to its second position, is of concave design. The concave outer side 17 of the closing means 12 comprises a segment of a spherical surface, such that the closing means 12 engages the pin 3 in a self-centering manner as the holder 10 is being placed in the filling position onto the heater 1 in the above-described manner. At right angles to an inside 19, remote from the outer side 17, of the frustoconical body 16 extends a cylindrical guiding element 20. At an outside, this guiding element 20 is provided with four guiding ribs 21 extending in longitudinal direction of this element. The spring means 13 comprise a spiral spring 13 extending around the guiding element 20. By one end, the spiral spring 13 is integrally connected to the inner side 19 of the frustoconical body 16. By means of three cross connections 24, the other end of the spiral spring 13 is connected to a fastening ring 22. This fastening ring 24 is connected to the inner wall 23 of the metering part 14, for instance by a snap and/or glue connection.

[0023] When the holder 10 represented in Fig. 3 is placed on the filling opening 2 of the heater 1, the closing body 12 is moved by the pin 3 of the heater 1 in a direction R, against the spring force of the spring 13, so that fuel can flow from the holder 10 via the outflow opening 11 to the container 5 of the heater 1.

[0024] Preferably, the spring means 13 comprise a plastic spiral spring. In addition, it is advantageous when the closing means 12 is designed substantially from plastic. The closing means can, for instance, be an integral part of the spring means. Further, the fuel holder 10 can be manufactured entirely from plastic. Preferably, the wall 15 of the fuel holder is manufactured from High Density Polyethylene (HDPE).

[0025] With the closing means 12 in the first position, the spring means 13 of the closing means 12 preferably apply a spring force to the closing means such that the fuel filling opening 2 of the heater 1 retains the closing means 12 of the fuel holder 10 in the second position, at least under the influence of the weight of the fuel holder 10, when the fuel holder 10 is in the filling position. What is achieved in this manner is that the spring means do not apply so large a spring force that the closing means is already moved back by the spring means to the closed, first position while the holder 10 still contains a certain amount of fuel. Further, the spring means 12 do need to apply a sufficiently large spring force, such that the closing means is moved completely to the first position when the fuel holder 10 is in a position of rest, moved away from the heater 1.

[0026] The heater 1 and fuel holder 10 according to the invention are relatively safe in use as the holder 10 is only suitable for single use.

[0027] It is self-evident that the invention is not limited to the exemplary embodiment described. Various modifications are possible within the framework of the invention as outlined in the following claims.

[0028] For instance, the fuel holder can be manufactured from various materials. Preferably, the holder is manufactured completely from disposable material. Further, it is advantageous when the holder 10 does not comprise metal parts, in particular for designing the holder to be relatively light.

[0029] The outflow opening 12 can have different sizes. In particular, the diameter of the outflow opening is not more than approximately 1 cm.

[0030] Further, the outflow opening 12 can be shaped in various manners, such as circular, angular, or comprise a combination of these and other shapes. The outflow opening 12 can be designed in different manners, for instance in that the opening 12 comprises a bore, is provided with a porous mass or a porous dispensing body or in that the outflow opening 11 is designed in a different manner.

[0031] Further, the holder can be placed on the heater in various orientations, for instance horizontally, vertically and/or at an inclination, depending on the position of the metering part and the outflow opening of the holder.

[0032] In addition, the holder can be placed on the heater in different positions, depending on the position of the filling opening of the heater.

[0033] Further, the spring means 13 can for instance be arranged for allowing the closing means 12 to be brought from the first to the second position when the means 3 of the fuel filling opening 2 apply a force to the closing means which is less than approximately 3 N, in particular less than approximately 2 N. In this manner, a fuel holder of relatively light design can still be opened by the means 3, such as the pin 3, for the purpose of fuel supply to the heater 1, in particular in the event that the holder 1 is only filled with fuel to a limited extent. Thus, the outflow opening of the holder is prevented from being closed off prematurely by those spring means, so that the holder can entirely empty into the heater 1.

[0034] Preferably, the mass of the holder, at least in a non-filled condition, is less than approximately 0.3 kg, in particular less than approximately 0.2 kg, so that the holder can be made with relatively little material.

Claims

1. An assembly of a heater and a fuel holder placeable on the heater, the fuel holder (10) being provided with a metering part (14) with a fuel outflow opening, the metering part (14) being provided with a closing means (12) which can be brought into a first or second position, respectively, for closing off or not closing off, respectively, the outflow opening (11), the

metering part (14) being further provided with spring means (13) arranged for applying a spring force to the closing means (12), such that under the influence of that spring force, the closing means (12) is brought into the first position, the heater (1) being provided with a fuel filling opening (2) which is provided with means (3) for bringing the closing means (12) of the fuel holder (10) into the second position, against the spring force of said spring means (13) when the fuel holder (10) is placed by the metering part (14) in a filling position in the filling opening (2) of the heater (1), **characterized in that** the fuel holder metering part (14) is undetachably connected to a wall (15) of the fuel holder (10).

2. An assembly according to claim 1, wherein said spring means (13) are substantially manufactured from plastic.

3. An assembly according to claim 2, wherein said spring means comprise a plastic spiral spring (13).

4. An assembly according to any one of the preceding claims, wherein the closing means (12) is manufactured from plastic.

5. An assembly according to at least claims 2 and 4, wherein the closing means (12) comprises an integral part of the spring means (13).

6. An assembly according to any one of the preceding claims, **characterized in that** the fuel holder (10) is manufactured entirely from plastic.

7. An assembly according to any one of the preceding claims, **characterized in that** the wall (15) of the fuel holder (10) is manufactured from High Density Polyethylene (HDPE).

8. An assembly according to any one of the preceding claims, wherein the metering part (14) is a convex part (14) of the wall (15) of the fuel holder (10).

9. An assembly according to any one of the preceding claims, wherein, with the closing means (12) in the first position, said spring means (13) apply a spring force to the closing means (12) such that the fuel filling opening (2) of the heater (1) retains the closing means (12) of the fuel holder (10) in the second position, at least under the influence of the weight of the fuel holder (10), when the fuel holder (10) is in said filling position.

10. An assembly according to any one of the preceding claims, wherein the fuel holder (10) is manufactured completely from disposable material.

11. An assembly according to any one of the preceding claims, wherein the fuel holder (10) does not comprise metal parts.

12. An assembly according to any one of the preceding claims, wherein a diameter of the outflow opening (12) is approximately 1 cm or less.

13. An assembly according to any one of the preceding claims, **characterized in that** the fuel filling opening (2) of the heater (1) is provided with a substantially upwardly projecting pin-shaped body (3) for bringing the closing means (12) of the fuel holder (10) in the second position.

14. An assembly according to any one of the preceding claims, **characterized in that** said spring means (13) are arranged for allowing the closing means (12) to be brought from the first to the second position when said means (3) of the fuel filling opening (2) apply a force to the closing means which is less than approximately 3 N.

15. An assembly according to claim 14, **characterized in that** said spring means (13) are arranged for allowing the closing means (12) to be brought from the first to the second position when said means (3) of the fuel filling opening (2) apply a force to the closing means which is less than approximately 2 N.

16. An assembly according to claim 1, wherein at least said spring means (13) are substantially manufactured from metal.

17. A fuel holder, evidently intended for an assembly according to any one of the preceding claims.

18. A fuel holder according to claim 17, **characterized in that** the holder in a non-filled condition has a mass which is less than approximately 0.3 kg.

19. A fuel holder according to claim 18, **characterized in that** said mass is less than approximately 0.2 kg.

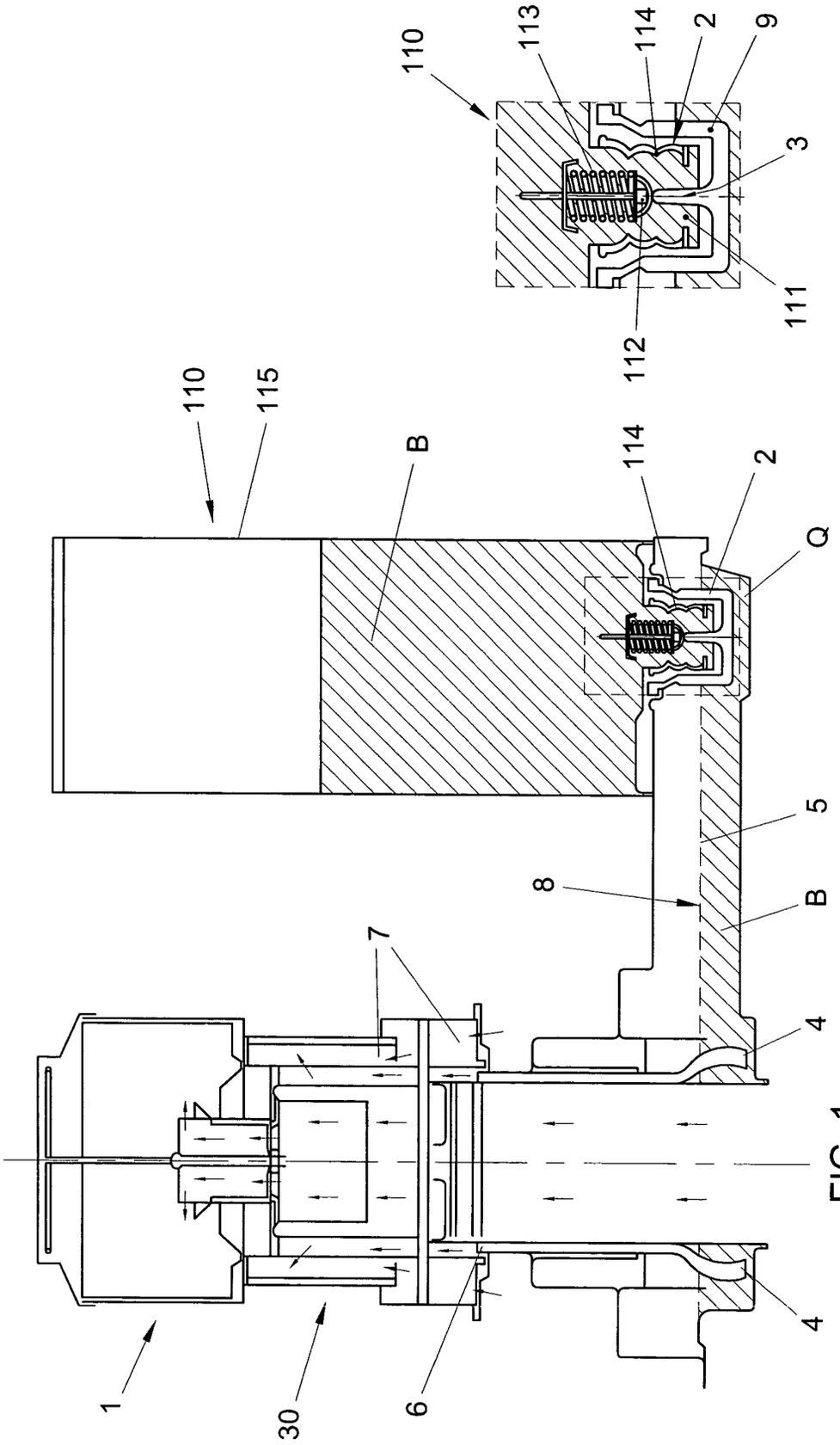

FIG. 2

FIG. 1

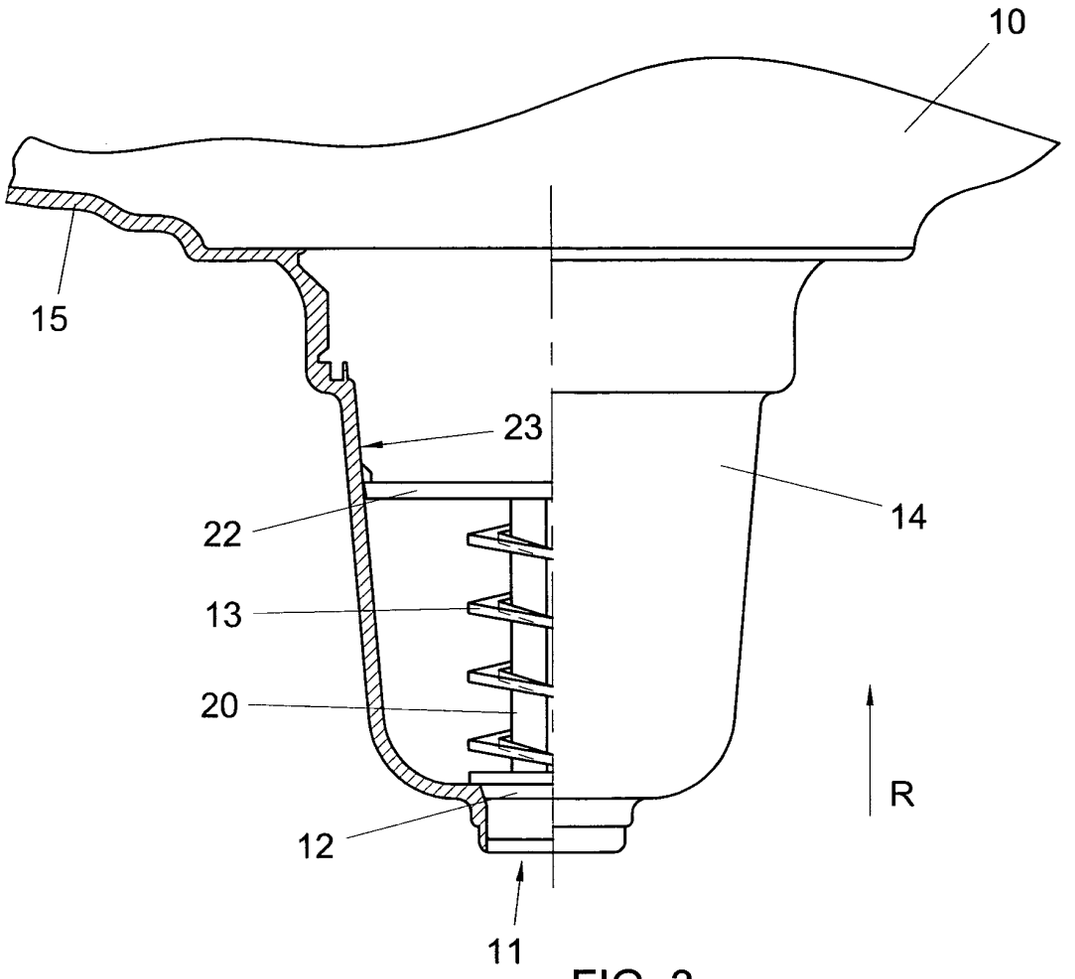

FIG. 3

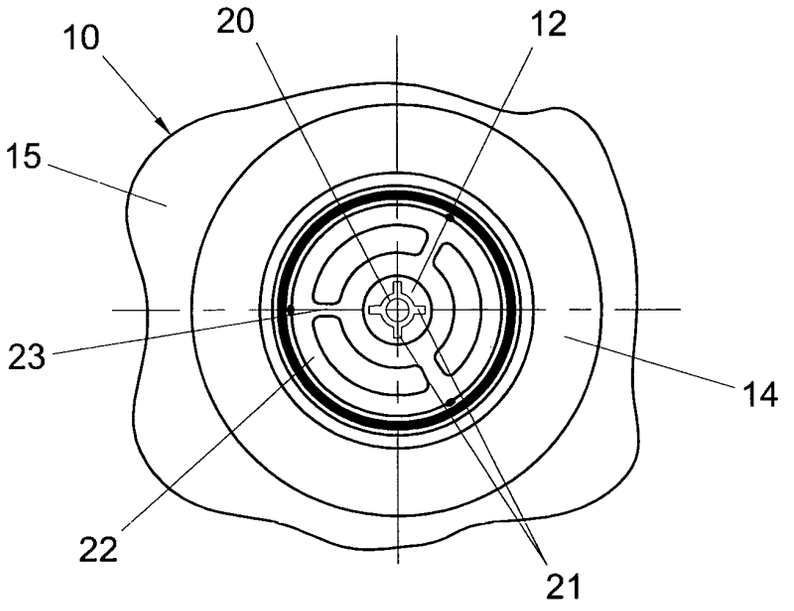

FIG. 4

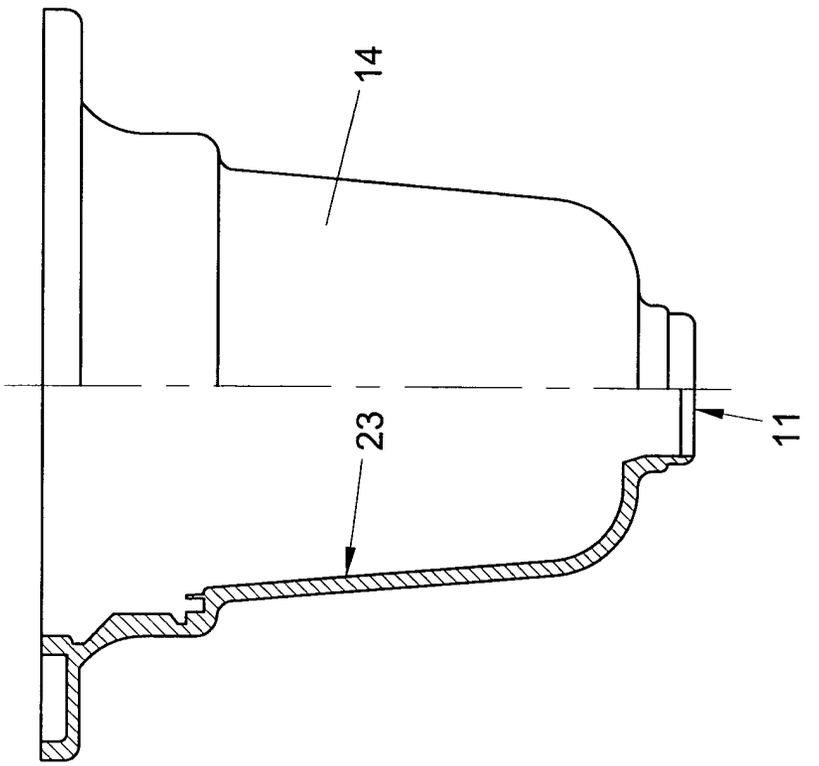

FIG. 7

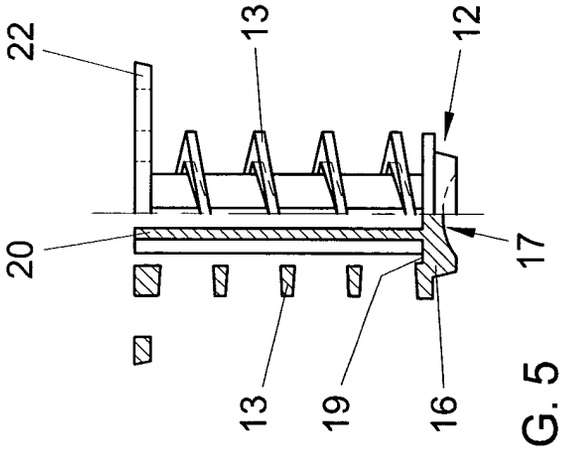

FIG. 5

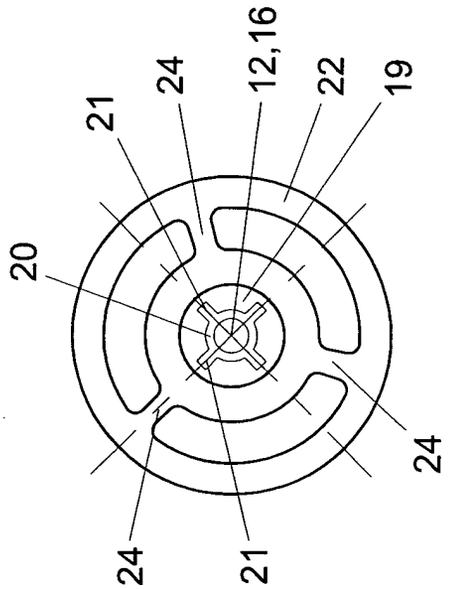

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 03 07 7531

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)
F24C
F23K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 December 2003	Vanheusden, J

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