



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 151 800 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

07.11.2001 Bulletin 2001/45

(51) Int Cl.7: **B05B 1/00, A62C 31/05**

(21) Application number: **00126770.7**

(22) Date of filing: **06.12.2000**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**

Designated Extension States:

AL LT LV MK RO SI

(30) Priority: **05.05.2000 IT MI000989**

(71) Applicant: **VESTA SRL**

20010 Pogliano Milanese, (Milano) (IT)

(72) Inventor: **Bianchi, Giancarlo**

20020 Barbaiana di Lainate, (Milano) (IT)

(74) Representative: **Petruzzello, Aldo et al**

Racheli & C. S p A

Viale San Michele del Carso, 4

20144 Milano (IT)

(54) Silenced nozzle for discharge of extinguishing gas

(57) A silenced nozzle (1) for discharge of extinguishing gas comprises a base body (2) and a cover (3) that contain a filter assembly (4) to attenuate noise during discharge of extinguishing gas, a hole (7) being formed in the cover (3) for entry of the extinguishing gas, a plurality of extinguishing gas outlet holes (9, 21) being provided both in the base body and in the cover, the nozzle (1) having a hole (8) for propagation of the gas with a larger diameter with respect to the diameter of the gas inlet hole (7).

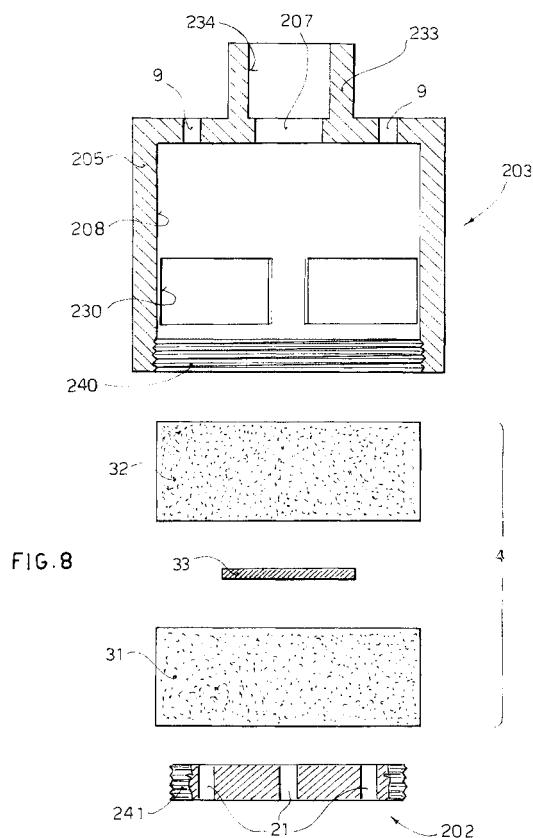


FIG. 8

EP 1 151 800 A2

Description

[0001] The present invention refers to a silenced nozzle for the discharge of extinguishing gases, particularly suitable for application to fire fighting systems that work with a gaseous-type extinguishing fluid.

[0002] In accordance with current fire regulations, premises at risk for fire must be provided with suitable fire extinguishing systems. Fire extinguishing systems that use a gaseous fluid as the extinguishing fluid are known to the art. By means of dispensing nozzles this gaseous fluid is delivered at high pressure onto the flames to inhibit them.

[0003] The dispensing nozzles of fire extinguishing systems according to the prior art have a serious drawback. These known dispensing nozzles are extremely noisy when a discharge of high-pressure extinguishing gas passes through them.

[0004] During a discharge of gas through the nozzles of the prior art, maximum noise levels around 130-140 dB and mean levels greater than 100 dB are reached.

[0005] The maximum recommended threshold for noise measured in a working environment is 90 dB. In some working environments at risk for fire, such as factories that work with inflammable produces, a discharge of gas from the nozzles of the fire extinguishing system may occur erroneously; as a result all the operators are obliged to abandon the workplace because of the unbearable noise produced by said nozzles.

[0006] The noise that occurs during discharge of gas from the dispensing nozzle is due to various factors, such as the times of discharge of the extinguishing gas, fluctuation of the air during discharge and phenomena of overpressure caused by discharge of gas in the area protected by the fire extinguishing system.

[0007] In accordance with current regulations, the time of discharge into the area protected by the fire extinguishing system must be kept within 10 seconds for chemical gases and within 60 seconds for inert gases. In order to ensure these discharge times, nozzles according to the prior art have a particular shape.

[0008] Figure 5 shows a nozzle according to the prior art which is indicated as a whole with reference numeral 100. The nozzle 100 is formed by a single body, of metallic material, substantially cylindrical in shape. The nozzle 100 has an upper part 101 that continues with a tapering intermediate part 103 that ends in a lower cylindrical part 104 having a smaller diameter than the upper part 101.

[0009] In the upper part 101 a circular hole 102 is provided, disposed axially, for entry of the extinguishing gas. The diameter of the hole 102 is about 30 mm.

[0010] The axial hole 102 then narrows in the intermediate part 103 and takes on a diameter of about 24 mm in the lower part 104. Radial gas outlet holes 105 are formed in the tapering intermediate part 103 and in the lower cylindrical part 104. The holes 105 have diameters that can range from 2 to 15 mm, preferably being

5 mm, and can be positioned on the lateral surface of the nozzle along an arc of a circumference that ranges from 90° to 360°. As shown in Figure 5, the nozzle 100 has fifteen outlet holes 105 for the extinguishing gas.

[0011] On entering the hole 102 the extinguishing gas encounters an entry area of 706 mm². When the gas propagates into the intermediate part 103 and into the lower part 104, it encounters a smaller area with respect to the entry area. The narrowing in section of air encountered by the gas as it propagates into the nozzle 100 causes a pressure increase in the gas and consequently a high noise level during discharge of the gas through the holes 105.

[0012] Furthermore, because of the narrowing in its lower part 104, said known configuration of the nozzle 100 offers a reduced surface for formation of the gas outlet holes 105. This causes a further increase in the pressure of the gas and a decrease in the efficiency of the nozzle.

[0013] The object of the invention is to eliminate the drawbacks of the prior art, providing a nozzle for discharge of extinguishing gases that produces low noise and in particular is able to maintain the noise level below 90 dB during discharge.

[0014] Another object of the present invention is to provide a nozzle for discharge of extinguishing gases that is extremely safe and easy to make.

[0015] These objects are achieved in accordance with the invention with the characteristics listed in appended independent claims 1 and 12.

[0016] Advantageous embodiments of the invention are apparent from the dependent claims.

[0017] The nozzle for discharge of extinguishing gases according to the invention has a metallic body formed by a base and a cover which enclose at least one sintered filter. Said sintered filter has a high filtration field to be able to appreciably attenuate the air fluctuation caused by discharge of the extinguishing gas and thus considerably decrease the noisiness of the nozzle.

[0018] The nozzle according to the invention further provides inside it a gas propagation area that is greater than the gas inlet area, to attenuate the pressure of the gas during discharge.

[0019] The particular structure of the nozzle according to the invention further provides the possibility of having a surface available for formation of the outlet holes for the extinguishing gas that is substantially greater than in nozzles of the prior art. Furthermore, the gas outlet holes can be disposed both on the lower surface and on the upper surface of the nozzle according to the invention.

[0020] Furthermore, part of the lateral surface of the sintered filter, contained between the base and the cover of the nozzle, is left uncovered so as to create a further outlet for the extinguishing gases.

[0021] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to purely exemplary and therefore non-limiting

embodiments thereof, illustrated in the appended drawings, in which:

Figure 1 is a front overall view of a nozzle according to a first embodiment of the invention;

Figure 2 is a top view of the nozzle of Figure 1;

Figure 3 is a bottom view of the nozzle of Figure 1;

Figure 4 is an exploded axial sectional view of the nozzle of Figure 1;

Figure 5 is a perspective view of a nozzle according to the prior art;

Figure 6 is an overall front view of a nozzle according to a second embodiment of the invention;

Figure 7 is a top plan view of the nozzle of Figure 6;

Figure 8 is an exploded axial sectional view of the nozzle of Figure 6.

[0022] A silenced nozzle for discharge of extinguishing gases according to the invention, denoted as a whole by reference numeral 1, is described with the aid of Figures 1-4.

[0023] The nozzle 1 consists essentially of three elements: a base body 2, a cover 3 and an assembly of sintered filters 4 comprised between the base body 2 and the cover 3.

[0024] The base body 2 and the cover 3 can equally well be made from materials such as aluminium, brass or stainless steel.

[0025] The cover 3 consists of a cylindrical tang 5 with a diameter of about 83 mm terminating in a circular flange 6 with a diameter of about 100 mm. An axial hole 7 is formed in the upper surface of the cylindrical tang 5 for entry of the extinguishing gas.

[0026] The hole 7 has a diameter of about 30 mm which is a standard size for attachment to extinguishing gas dispensers.

[0027] An axial hole 8 for propagation of the gas, having a slightly smaller diameter than the outer diameter of the cylindrical tang 5, is formed in the lower surface of the flange 6. In this manner the hole 8 can continue inside the cylindrical tang 5 and be in communication with the hole 7 which occupies only an upper part of the tang 5. The diameter of the hole 8 is in any case substantially greater than the diameter of the hole 7 for entry of the extinguishing gas.

[0028] Holes 9 are formed in the upper surface of the tang 5 for outlet of the gas. The holes 9 are disposed circumferentially around the gas inlet hole 7 and communicate with the hole 8 for propagation of the gas. For example, as shown in Figure 2, eight holes 9 can be disposed on a circumference and spaced at 45° to one

another. The diameter of each hole can preferably be about 5 mm.

[0029] Four through holes 10 are formed in the peripheral part of the flange 6 to receive respective tightening bolts 11. The holes 10 are preferably spaced at 90°.

[0030] The base body 2 consists of a cylindrical plate with a diameter of about 100 mm, substantially equal to the diameter of the flange 6 of the cover 3.

[0031] A circular seat 20 having a diameter substantially equal to the diameter of the hole 8 of the cover 3 is formed in the upper surface of the base body 2.

[0032] A plurality of holes 21 (in the example shown seventeen holes with a diameter of about 5 mm) for outlet of the extinguishing gas, communicating with the circular seat 20, are formed in the lower surface of the base body 2.

[0033] Four through holes 22 in positions corresponding to the through holes 10 formed in the flange 6 of the cover 3 are formed in the peripheral part of the base body 2.

[0034] The filter assembly 4 provides two sintered filters 31 and 32, made with zinc-coated metal wires suitably pressed in special moulds so as to obtain disk-shaped filter bodies, with a diameter equal to or slightly smaller than the diameter of the hole 8 of the cover 3. The filters 31 and 32 are subjected to diffusion heat treatment, so as to be able to achieve a high mechanical resistance which guarantees a long life even when used at high pressures and high temperatures (about 500 °C). The filters 31 and 32 furthermore have a very high filtering field (10-50 microns) in this case to ensure that the noisiness due to the fluctuation of air caused by discharge of extinguishing gas can be considerably attenuated.

[0035] A metal baffle is provided between the two filters 31 and 32 to deflect the flow of extinguishing gas.

[0036] The filter assembly 4, comprising the sintered filters 31 and 32 with the baffle 33 interposed, is housed inside the hole 8 of the cover and the bottom end of the filter 31 is housed in the seat 20 of the base body. Thus the bolts 11 engage in the respective holes 10 and 22 and are tightened by means of nuts 25 which are screwed to the end of the shank of each bolt 11 which protrudes downward from the base body 2.

[0037] The height of the filter assembly 4 is designed so that there is a height of at least 20 mm between the lower surface 6 of the flange and upper surface of the base body 2, thus the lateral surface of the filter assembly 4 remains uncovered for a about 20 mm. The height of the base body 2 and of the cover 3 is designed so that the total height of the assembled nozzle is about 100 mm.

[0038] Once assembled, the nozzle 1 can be mounted on an extinguishing gas dispenser of a fire extinguishing system. The extinguishing gas leaving the dispenser enters the nozzle 1 through the inlet hole 7, propagates into the hole 8 passing through the filter assembly 4 and

exits upward through the outlet holes 9 in the upper surface of the nozzle 1, downward through the outlet holes 21 in the bottom surface of the nozzle and sideward from the lateral surface of the filter assembly 4 which remains uncovered.

[0039] Contrary to what occurs in nozzles of the prior art, in the nozzle 1 according to the invention the gas enters the inlet hole 7 which has a sectional area of about 706 mm and is propagated into the hole 8 which has a substantially larger sectional area. This attenuates the pressure of the gas and thus the noise during discharge of gas.

[0040] Furthermore, the particular structure of the nozzle 1 according to the invention provides a larger surface for the formation of gas outlet holes, compared with prior art nozzles. In fact, in the nozzle according to the invention there can be seventeen holes in the lower surface and eight holes in the upper surface, for a total of twenty-five holes. Furthermore, the gas has a further outlet area represented by the lateral surface of the filter assembly 4 which remains uncovered.

[0041] With the aid of Figures 6-8 a second embodiment of a nozzle 200 according to the invention is described, in which like or corresponding parts with respect to those described in the first embodiment are indicated by the same references.

[0042] The nozzle 200 comprises a base body 202, a cover 203 and a filter assembly 4 substantially identical to that described in the first embodiment.

[0043] The cover 203 comprises a hollow cylindrical body 205 inside which is situated a seat or chamber 208 to contain the filter assembly 4. The cylindrical body has rectangular slots 230 communicating with the inner chamber 208. Four slots 230 are preferably provided so as to form four columns 231 (three visible in Figure 6) that connect the upper part of the cylindrical body 205 to the lower part thereof. The cylindrical body 205 can be produced by fusion connecting an upper cylinder to a lower cylinder by means of the columns 231.

[0044] A glass-shaped mouth 233 that has seat 234 open toward the outside to receive the gas dispensing line is provided on the upper surface of the cylindrical body 205. The seat 234 has an aperture 207 communicating with the chamber 208.

[0045] A plurality of axial holes 9 communicating with the chamber 208 is formed in the upper surface of the cylindrical body 205, on the outside with respect to the mouth 233. As in the first embodiment the holes 9 can be eight in number.

[0046] In the lower part the cylindrical body 205 has an inner thread 240 destined to engage with a respective outer thread 241 provided in the base body 202. The base body 202 is a cylindrical plate that has a plurality of axial holes 21, for example seventeen as in the first embodiment.

[0047] For assembling the nozzle 200, it is sufficient to insert the filter assembly 4 in the chamber 208 of the cover 203 and screw the base body 202 into the bottom

end of the cover 203.

[0048] The gas dispensing line is housed in the seat 234 of the mouth 233, therefore the gas delivered, through the aperture 207 expands in the chamber 208 and the fluctuation of the air is attenuated by the filters 4. Thus, as in the first embodiment, the extinguishing gas is discharged upward from the holes 9, sideward from the slots 230 and downward from the holes 21.

[0049] Various modifications and changes of detail within the reach of a person skilled in the art can be made to the present embodiments of the invention whilst still remaining within the scope of the invention expressed by the appended claims.

Claims

1. A silenced nozzle (1; 200) for discharge of extinguishing gases comprising a body (2, 3; 202, 203) in which a hole (7; 207) for entry of extinguishing gas and a plurality of holes (9, 21) for discharge of extinguishing gas are formed, **characterized in that** a filter assembly (4) able to attenuate the noise caused during discharge of the extinguishing gas is provided inside said body.
2. A nozzle (1; 200) according to claim 1, **characterized in that** said body of the nozzle comprises a base body (2; 202) and a cover (3; 303) assembled with one another so as to enclose within them said filter assembly (4).
3. A nozzle (1) according to claim 2, **characterized in that** said cover (3) comprises a cylindrical tang (5) terminating in a circular flange (6) with a greater diameter, to receive securing means (11) for assembly to said basic body (2).
4. A nozzle (1; 200) according to claim 2 or 3, **characterized in that** said cover (3; 203) has an inlet hole (7; 207) for the extinguishing gas, communicating with a hole (8; 208) for propagation of the extinguishing gas, having a greater diameter than the inlet hole, in order to have an attenuation of the pressure of the extinguishing gas during discharge.
5. A nozzle (1; 200) according to claim 4, **characterized in that** in the upper surface of said cover (3; 203) in a peripheral area with respect to said inlet hole (7; 207) for the extinguishing gas, a plurality of outlet holes (9) for the extinguishing gas are provided, communicating with said hole (8; 208) for propagation of the extinguishing gas.
6. A nozzle (1; 200) according to claim 4 or 5, **characterized in that** said filter assembly (4) is housed in said hole (8; 208) for propagation of the extinguishing gas.

7. A nozzle (1) according to any one of claims 2 to 6, **characterized in that** said base body (2) has a seat (20) to receive said filter assembly (4), communicating with a plurality of outlet holes (21) for the extinguishing gas. 5

8. A nozzle (1) according to any one of claims 2 to 7, **characterized in that** between the lower surface of said cover (6) and the upper surface of said base body (2) a certain space is left so as to leave uncovered at least part of the lateral surface of the filter assembly (4) to allow outflow of the extinguishing gas from the lateral surface of the filter assembly (4). 10
15

9. A nozzle (200) according to claims 2 to 7, **characterized in that** said cover (203) is made in a single piece and has side slots (230) communicating with the inside and open toward the outside to allow outflow of the extinguishing gas from the lateral surface of the filter assembly (4). 20

10. A nozzle (1; 200) according to any one of the preceding claims, **characterized in that** said filter assembly (4) comprises at least one sintered filter (31, 32) made by means of zinc-coated metal wires, suitably pressed to have a high filtration field. 25

11. A nozzle (1; 200) according to claim 10, **characterized in that** said at least one filter (31, 32) is subjected to a heat diffusion treatment able to give it a greater resistance at high pressures and temperatures. 30

12. A nozzle (1; 200) according to any one of the preceding claims, **characterized in that** said filter assembly (4) comprises two filters (31, 32) and a baffle (33) interposed between them. 35

13. A silenced nozzle (1; 200) for discharge of extinguishing gases comprising a body (2, 3; 202; 203) in which a hole (7; 207) is formed for entry of the extinguishing gas communicating with a hole (8; 208) for propagation of the extinguishing gas, the hole (8; 208) communicating with a plurality of outlet holes (9, 21) for extinguishing gas, **characterized in that** said hole (8; 208) for propagation of the extinguishing gas has a greater diameter with respect to the diameter of the inlet hole (7; 207) for the extinguishing gas, in order to attenuate the pressure of the gas during discharge. 40
45
50

55

FIG. 1

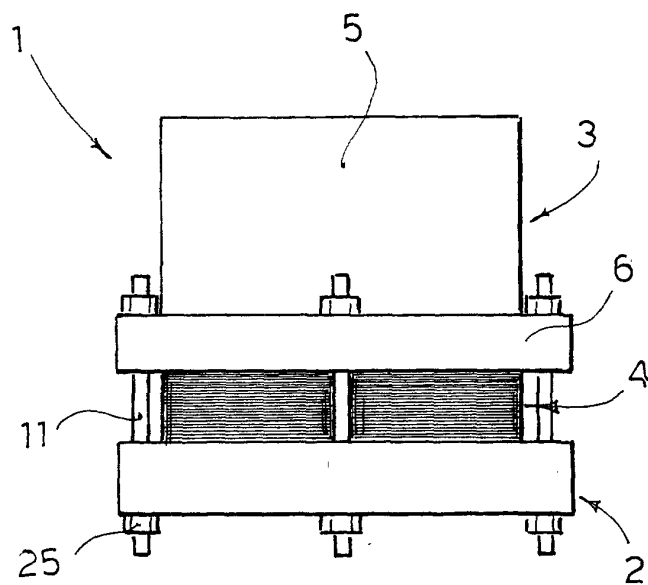


FIG. 2

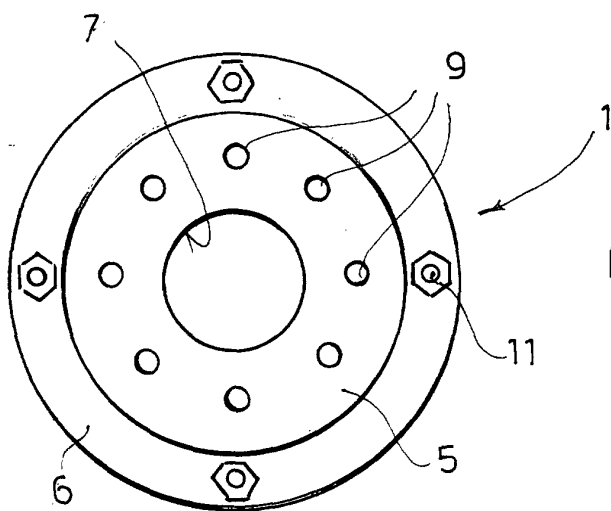
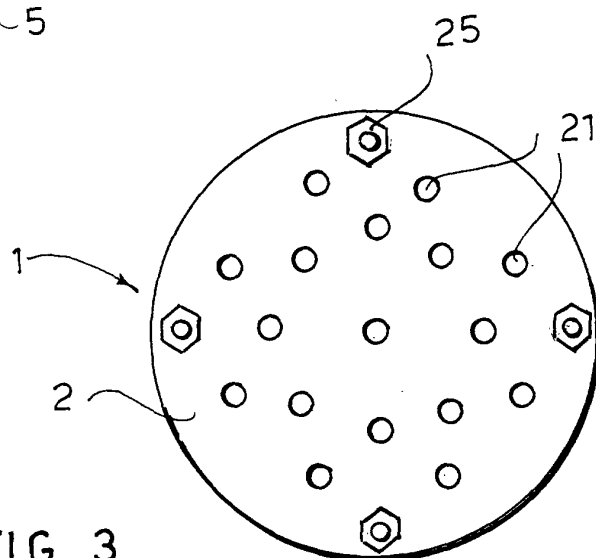


FIG. 3



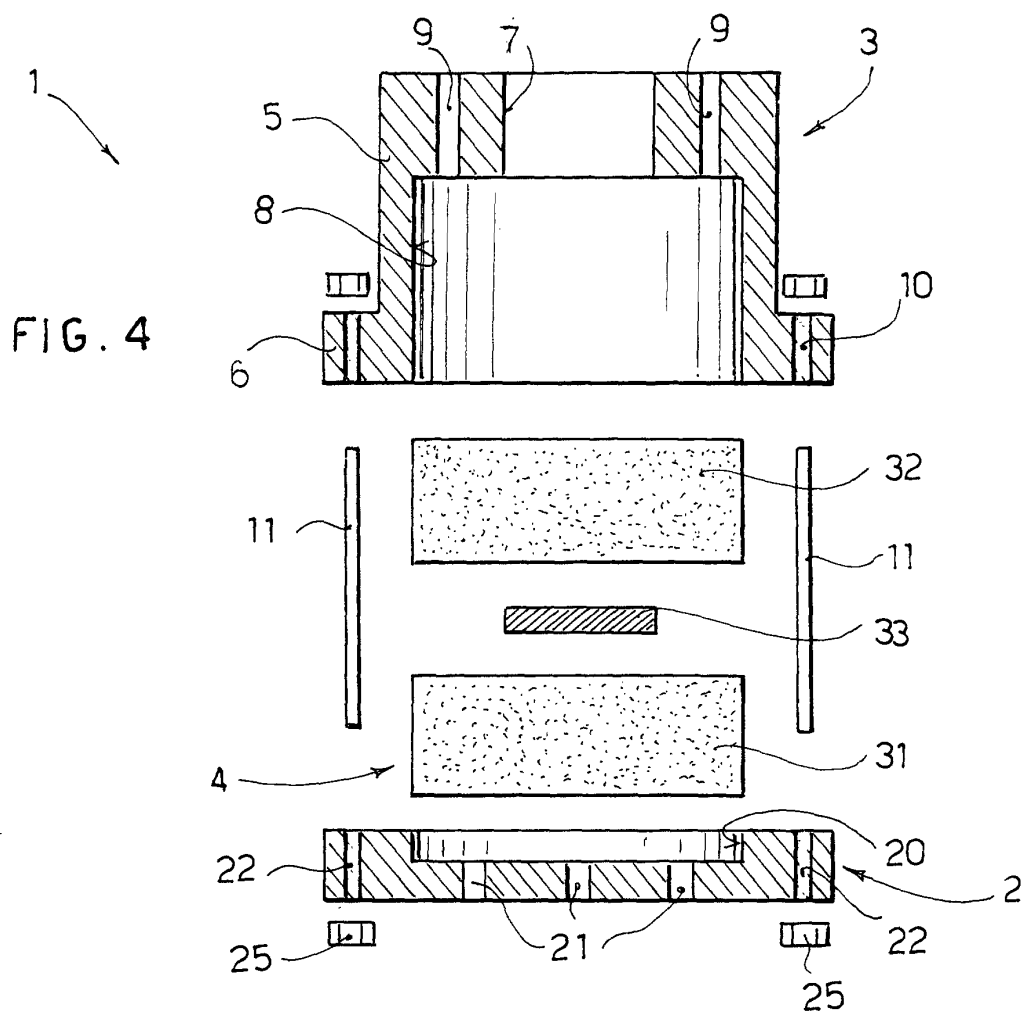
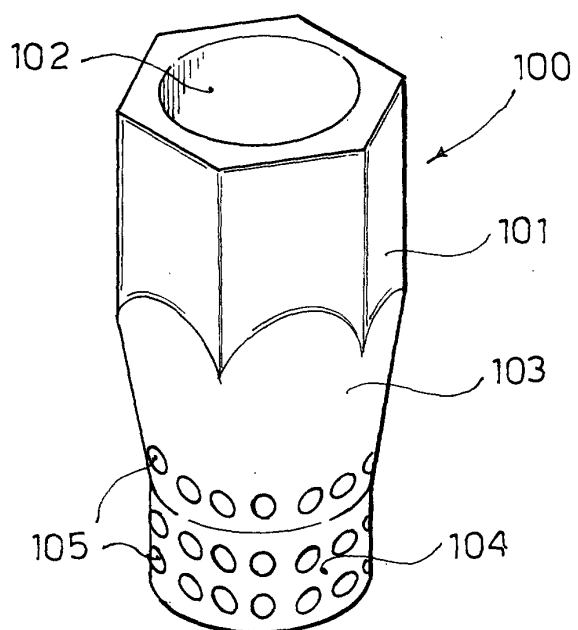


FIG. 5
PRIOR ART



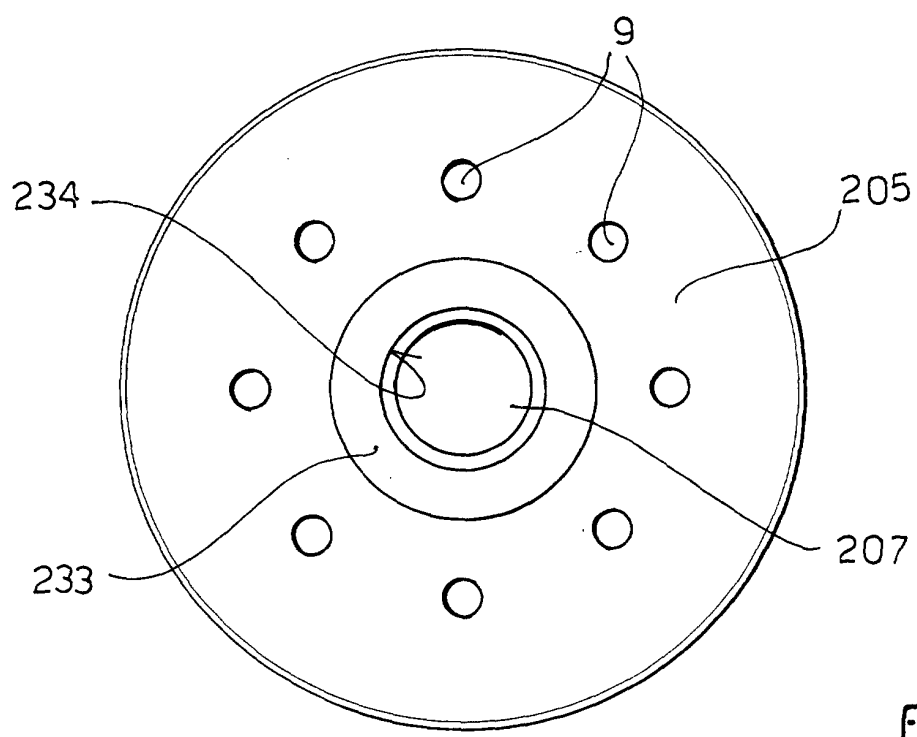
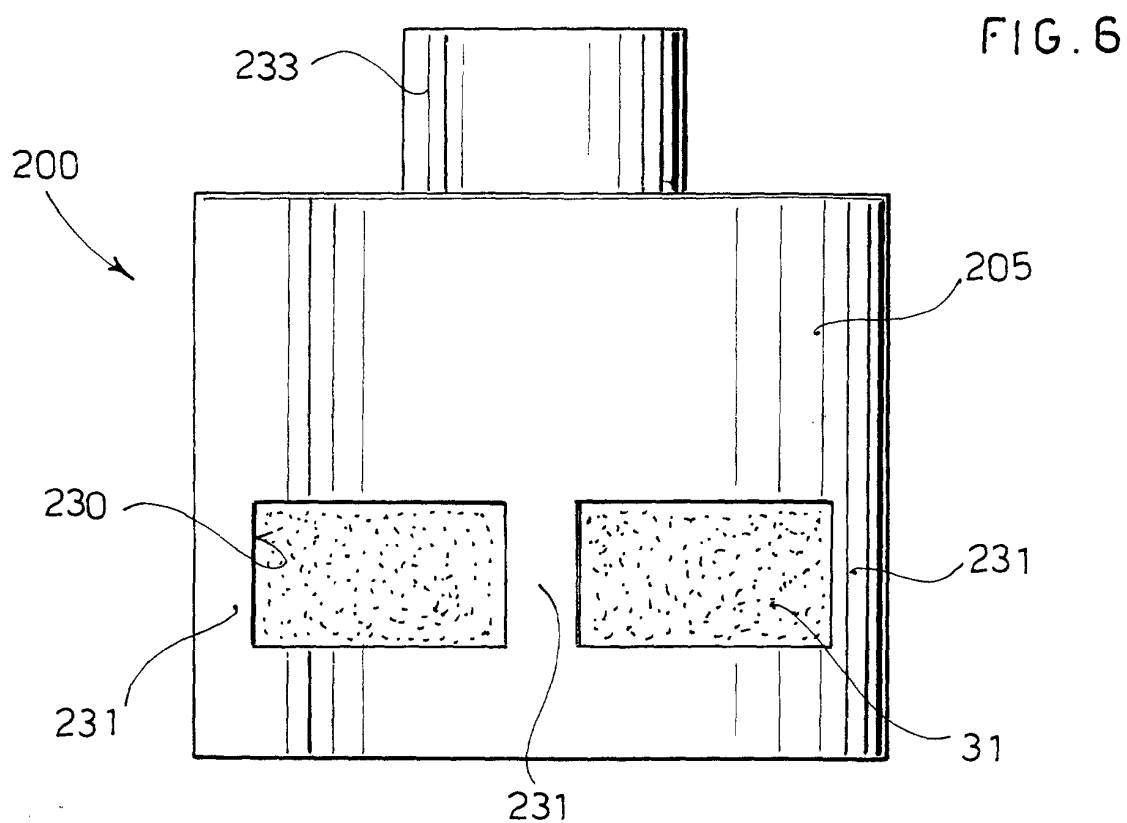


FIG. 7

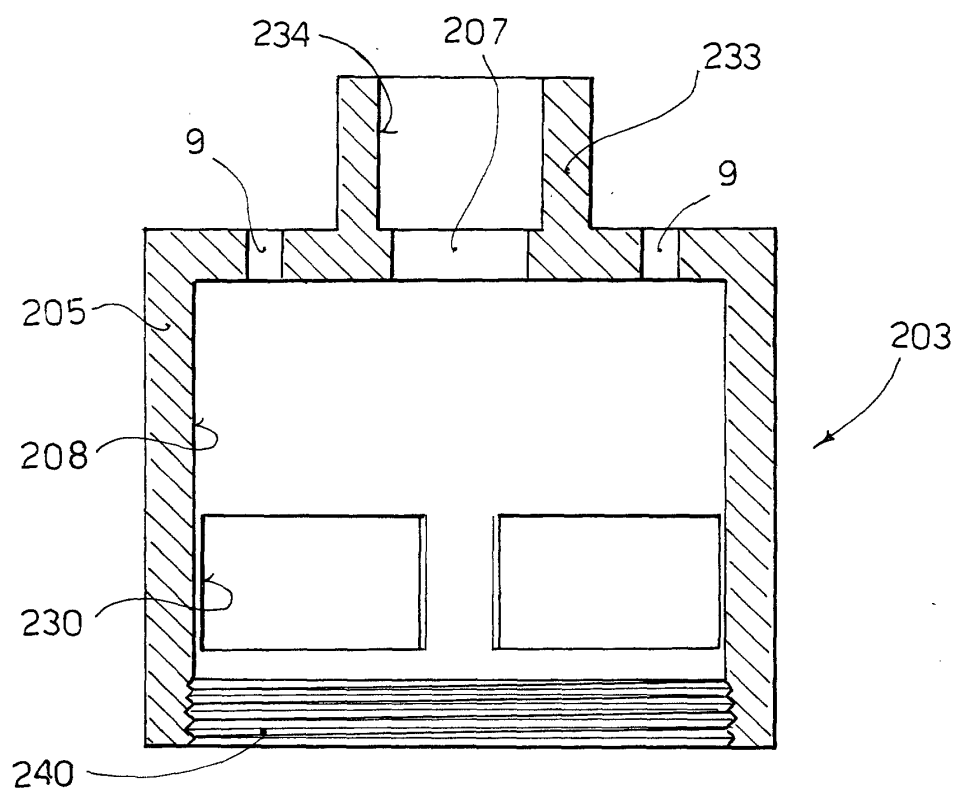


FIG. 8

