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(54) Tamper-evident/non-refillable closure for containers

(57) A tamper-evident/non-refillable type of closure for a bottle that comprises a cylindrical tube (G) which fits around and is secured to the outer surface of the neck of the bottle (H), a valve seat (D) which forms a seal with the neck of the bottle (H), a valve (C) which makes a seal with the valve seat (D), two cylindrical spheres or marbles (E) and (F), one located in a lower cavity of the valve seat (D) and the other located above the valve (C), a pourer (B) attached to the tube (G) by ultrasonic welding and extending around the valve seat (D) and accommodating the valve (C), and an internally screw threaded tamper-evident cap (A) which is screwed onto the pourer (B).

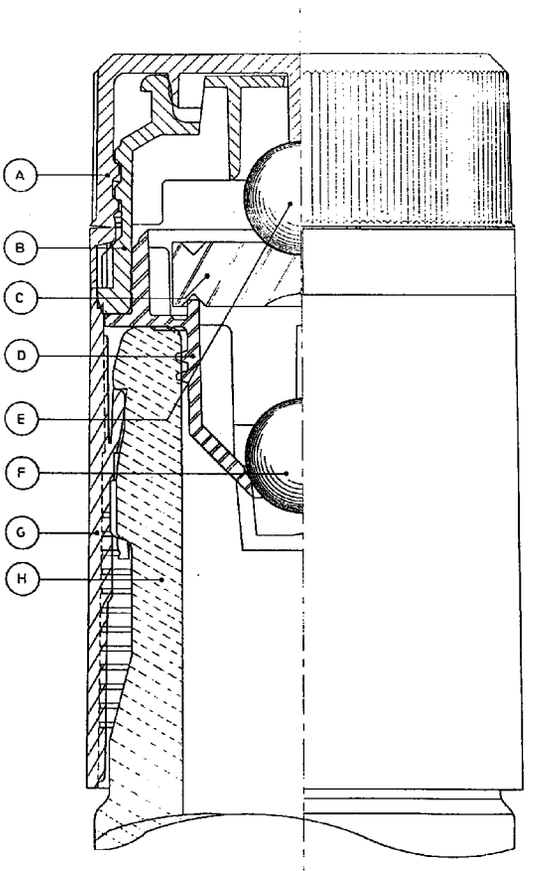

FIG. 1

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Description

The present invention relates to closures for containers such as bottles, and is concerned with such closures which are of the tamper-evident/non-refillable type. The invention is particularly applicable to closures for containers for liquids, such as all types of beverages including alcoholic beverages. However the invention is applicable for containers which require a tamper-evident and a non-refillable function to avoid adulteration of the contents.

Tamper-evident/non-refillable closures for containers are well known and are required to minimize the adulteration of alcoholic beverages by refilling the bottles when only the tamper-evident feature is used. By combining these two features the contents or the bottle are protected against tampering or adulteration of the original liquid.

It is the object of the present invention to provide a practical closure at a reasonable production cost that incorporates the tamper-evident and non-refillable features.

The present invention provides a tamper-evident/non-refillable closure for containers comprising a cylindrical tube designed to fit around and engage the outer surface of the neck of the container, a movable valve member cooperating with the valve seat and adapted to form a seal therewith, a pourer extending around the valve seat and attached to the cylindrical tube by ultrasonic welding and an internally threaded cap which can be secured to the pourer, and has a lower ring that detaches and breaks in two parts, when the cap is first unscrewed from the pourer. The various elements of the closure are preferably integral mouldings of any desired, preferably resilient plastic materials.

The tube preferably carries a plurality of projections on its inner surface which are deformed outwardly when the tube is placed over the neck of the container and which snap inwardly behind a shoulder defined by the neck of the container, so as to retain the tube in position on the neck of the container. Because the tube is moulded from plastic resin of appropriate physical and chemical characteristics, such as polycarbonate, once it is placed on the neck of the container, it will be extremely difficult if not impossible, to remove it with out its destruction.

The tube preferably has a plurality of vertical ribs on its inner surface which are adapted, in use, to engage projections on the neck of the container and thus prevent rotation of the tube with respect to the container.

The tube preferably also has a plurality of vertical ribs on its inner upper surface for the purpose of holding in place the valve seat, when the closure is assembled.

The tube can be assembled to the pourer by ultrasonic welding or using appropriate adhesive materials, so that both parts become one.

In the preferred embodiment, the valve seat has an upper circular vertical surface with a series of rings on the outer surface that, when assembled to the lower opening of the pourer, snap in place against a ridge that the pourer has, and makes a hermetic seal between these two parts and engage both parts in place.

It is preferred that the upper inside circular surface of the valve seat has a horizontal ring where the valve blocks the flow of liquid, when the cap is screwed to the pourer and exerts pressure on the vertical axis against a sphere or marble that sits on the upper surface of the valve.

The valve seat preferably has in its lower part a cavity opened at the lower end, where a sphere or marble is placed for the purpose of detaching the valve from the valve seat, when the liquid is poured from the container. It is preferred that the valve seat has in its upper inside circular surface a series of ribs for the purpose of guiding the displacement of the valve on the vertical axis of the closure.

In its preferred embodiment the pourer has an annular tube and a plurality of integral webs within it, which engage the valve member and marble and retain it in its desired position with respect to the valve seat.

The outside circular surface of the pourer has a threaded section that engages corresponding threads placed inside the circular vertical surface of the cap, to screw both parts.

The pourer preferably has in its outside lower circular surface a series of angled teeth that allows the cap to be screwed to the pourer, but engage corresponding angled teeth located on the inside lower part of the cap and prevents it from rotating when the cap is first removed from the pourer. The lower part of the cap is secured to the upper part by a series of small vertical segments or bridges that break, when the cap is first removed from the pourer. The lower part of the cap has two vertical 180 degree cuts, that allow the lower part of the cap or ring to break in two parts, when the vertical segments or bridges are broken.

The cap preferably carries a central depending stem which, when the cap is screwed onto the pourer, exerts pressure on the sphere or marble, located in the upper horizontal surface of the valve member, and at the same time pressures the valve against the circular ring of the valve seat, blocking the flow of liquid through this opening.

The cap preferably carries a depending annular flange which, when the cap is screwed onto the pourer, engages and substantially forms a seal with an upstanding annular flange on the pourer. Thus in this embodiment the closure has a two-stage seal, of which the first stage is constituted by the valve member and the valve seat, and the second is constituted by the engaging annular flanges.

The valve is preferably made so that the upper and lower surfaces are similar and contain a semicircular cavity, where the sphere or marble is held in its place and an outer circular cavity that sits on the ring of the valve seat.

The two spheres or marbles preferably can be made of glass or other appropriate rigid material.

Accordingly, the present invention provides a tamper-evident/non refillable closure for a container, comprising means for dispensing the contents from the container, a valve member located within the dispensing means for selectively opening and closing a path through the dispenser; valve actuation means to facilitate opening and closure of the valve and a closure member engagaeble with the dispensing means, the closure member having a tamper-evident portion integrally formed therewith.

The invention also embraces a container, such as a bottle carrying such a tamper-evident/non-refillable closure.

Further features and details of the invention will be apparent from the following description of one specific embodiment which is given with reference to the accompanying drawings, in which:

Figure 1	is a scrap side elevation, partly in section, of the neck of the bottle or container on which a closure in accordance with the invention is assembled;
Figure 2	shows a partly sectioned side view of the cap of the closure;
Figure 2a	shows a plan view of the cap of Figure 2;
Figure 3	shows a partly sectioned side view of the pourer;
Figure 3a	shows a plan view of the pourer of Figure 3;
Figure 4	shows a partly sectioned side view of the valve seat;
Figure 4a	shows a plan view of the valve seat of Figure 4;
Figure 5	shows a partly sectioned side view of the valve member;
Figure 5a	shows a plan view of the valve member of Figure 5;
Figure 6 & 7	shows side views of the spheres or marbles;
Figure 8	shows a partly sectioned side view of the cylindrical tube;
Figure 8a	shows a plan view of the cylindrical tube of Figure 8;
Figure 9	shows a partly sectioned side view of the bottle neck;
Figure 9a	shows a transverse sectional view of the bottle neck of Figure 9; and
Figure 9b	shows a scrap view showing a detail from the sectional view of Figure 9.

Referring to Figure 1, the closure comprises an integrally threaded cap A which is screwed onto the pourer B. Within the pourer is a sphere or marble E and a valve C with a valve seat D. In the lower part of the valve seat D a sphere or marble F is contained. Attached to the pourer is a cylindrical tube G which extends around the neck H of the bottle or container.

Figure 2 illustrates the screw cap A which comprises an upper disc with a depending peripheral circular wall 1 with helicoidal threads 2 on the inside surface which, in use, engage external threads 21 on the pourer B. When the cap A is screwed onto the pourer B, a stem 10 depending from the underside of the upper disc 8 passes through a circular opening 16 defined by the upper surface 15 of the pourer B and exerts a vertical pressure on the sphere or marble E which at the same time transmits the vertical pressure to the valve C. On the underside of valve C there are two inclined surfaces 49 and 50 that are pressed against an annular horizontal surface 36 on the valve seat D, and normally form a seal therewith to prevent the flow of liquid through a circular opening defined in the valve seat D by the vertical circular surface 35.

Within the cap A is a depending annular flange or tube 9 which is integral and coaxial with the cap A and has the purpose of making a second seal when the cap A is in the closed position by contacting the vertical surface 17 of the pourer B. The lower end of flange 9 is bevelled to facilities its introduction into pourer B.

The external cylindrical surface 1 of the screw cap A can be formed with a series of vertical ribs 11 that allow cap A to be gripped securely when removing it from pourer B.

In the lower part of peripheral circular wall 1 a ring 5 is formed that is separated from the upper circular wall 1 by a horizontal cut 3 made to such a depth that allows the small vertical segments or bridges 4 to unite ring 5 to the upper circular surface 1.

Ring 5 has on the inside vertical wall a series of angled teeth 6 at such an angle that allow the screw cap A to be screwed to pourer B, but prevent ring 5 from rotating in the opposite direction by a series of corresponding angled teeth 23 located on the outside lower surface of vertical wall 22 of pourer B. By not permitting ring 5 of cap A to rotate on the unscrewing direction, the small segments or bridges 4 break and separate ring 5 from the upper vertical surface 1 of cap A.

Two vertical cuts 7 at 180 degrees are made on ring 5 for the purpose of separating ring 5 in two parts, when the vertical segments or bridges 4 are broken.

Within pourer B and integrally depending from surface 15 is annular flange or tube 19 which limits the displacement of sphere or marble E on a vertical axis, relative to pourer B.

Within pourer B there is a plurality of radial spaced vertical segments 29 which centers valve C by engaging and guiding its external cylindrical surface 48, and thus limiting its displacement on a vertical axis relative to pourer B. Horizontal surface 30 of vertical segments 29 limit the entrance of circular vertical cylinder 32 of valve seat D.

Vertical wall 22 of pourer B has on its lower part a horizontal surface 24 from which angled teeth 23 protrude upwards.

Lower part of pourer B has an inclined vertical surface 25 that guides the pourer into ring 54 located on the upper cylindrical surface 65 of tube G, so that pourer B and tube G can be welded by ultrasonics or attached to

horizontal surface 26 of pourer B with horizontal upper surface 55 located in the inside wall 65 of tube G.

Inside vertical wall 27 of pourer B has a circular projecting ring 28 to engage rings 33 located on the outside vertical cylindrical wall 32 of valve seat D, to prevent pourer B to separate from valve seat D, when they are assembled.

The upper part of pourer B has a horizontal circular surface 12 that has a radius 13 towards circular cavity 14, so that the liquid does not run on the outside of pourer B, but returns to the inside of pourer B, when the liquid stops flowing from the container H.

The liquid flows from the inside of pourer B through spaces 47 left between radial spaced segments 29 and horizontal circular surface 18.

External cylindrical wall 32 of valve seat D has a plurality of peripheral rings 33 on its outer surface which, when the closure is assembled makes a tight, hermetic seal with the internal cylindrical surface 27 of pourer B, and also secures valve seat D when assembled to pourer B, by means of ring 28 located on the inside vertical surface 27 of pourer B.

The upper part of cylindrical wall 32 is angled 31, to facilitate assembly of valve seat D to pourer B.

From the inside of vertical surface 32 a number of vertical segments 34 are located for the purpose of limiting the displacement of valve C by coming in contact with circular vertical surface 48 of valve C.

The upper part of horizontal circular surface 37 limits the placement of valve seat D when it is assembled to pourer B by coming in contact with circular horizontal surface 26. The lower part of horizontal circular surface 37 has a number of rings 38 which, when the closure is placed on the container neck H, makes a tight, hermetic seal with horizontal circular surface 69 of container neck H.

Vertical circular surface 39 has on its outside wall a number of rings 40 that when the closure is applied to the container neck H makes a tight, hermetic seal with vertical circular surface 68.

Vertical circular surface 39 has on its inside wall a number of vertical segments 41 for the purpose of guiding the displacement of sphere or marble F on a vertical axis, relative to valve seat D.

The lower part of valve seat D has an inclined vertical surface 42 that forms a seal 43 with the sphere or marble F, and forms circular cavity 46 through which the liquid flows from the inside of container H.

To facilitate moulding valve seat D, horizontal ribs 45 and vertical ribs 44 are located on the lower part.

To center the placement of sphere or marble E, a semicircular cavity 51 is located on the horizontal surface of valve C. Valve C is designed so that it can be placed correctly on either side on to valve seat D.

The purpose of sphere or marble E is to exert vertical pressure on valve C and maintain valve C on circular surface 36 of valve seat D, blocking the entrance of liquid, when the container or bottle H is placed upright.

The purpose of sphere or marble F is to detach valve C from valve seal D when liquid is poured from container or bottle H.

The upper inside circular wall 65 of tube G has a number of vertical segments 57 ending in horizontal surface 56, that prevent valve seat D from sliding downwards, when the closure is assembled by limiting displacement of circular surface 37.

On the upper inside circular surface 65 of tube G, a series of angled segments 59 project inwards, so that when the closure is applied to the container or bottle neck H, horizontal surface 58 of angled segments 59 engage under shoulder or ring 72 of the container or bottle neck H, not allowing tube G to be removed. To facilitate placement of the closure to the container or bottle neck H, angled segments 59 have a lower inclined surface 60 that slips onto inclined circular outer surface 71 of the container or bottle neck H.

To prevent tube G from rotating with respect to the container or bottle neck H, vertical circular surface 65 of tube G, has a series of vertical ribs 61 and 62 that engage corresponding vertical ribs 73 on the container or bottle neck H. The lower end of vertical ribs 61 and 62 form angles 63 and 64 to facilitate positioning of the closure on the container or bottle neck H. For the same purpose a series of longer and less prominent ribs 66 are located in the lower inside vertical surface 65.

The lower part of tube G ends as radius 67 to form a continuous surface with the lower part 74 of container or bottle neck H.

The seven parts that make up the tamper-evident/non-refillable closure are assembled as follows:

First sphere or marble F is placed inside valve sat D, followed by valve C, sphere or marble E and pourer B, forming the non-refillable mechanism. Next the non-refillable mechanism is attached or ultrasonic welded to tube G. Once the non-refillable mechanism and tube G are assembled, the tamper-evident cap A is screwed onto pourer B.

The closure is applied to the container or bottle neck H by applying vertical pressure on the top of the closure, forcing the angled segments 59 of tube G to engage under shoulder or ring 72 of the container or bottle neck H, as shown in Figure 1.

Claims

1. A tamper-evident/non refillable closure for a container, comprising means for dispensing the contents from the container, a valve member located within the dispensing means for selectively opening and closing a path through the dispenser; valve actuation means to facilitate opening and closure of the valve and a closure member engagaeble with the dispensing means, the closure member having a tamper-evident portion integrally formed therewith.

2. A tamper-evident/non-refillable closure for a container according to claim 1, wherein the tamper-evi-

dent portion comprises a ring attached to the lower portion of the closure member by a plurality of severable segment which are adapted to break on first removal of the closure member from engagement with the dispensing means.

3. A tamper-evident/non-refillable closure for a container according to claim 2, wherein the ring is formed in two sections which are adapted to separate when the closure member is first removed from engagement with the dispensing means.

4. A tamper-evident/non-refillable closure for a container according to claim 2 or 3, wherein the ring is provided with a plurality of teeth which engage corresponding teeth on the dispensing means to prevent the ring from rotating with the closure means upon removal of the closure means from engagement with the dispensing means.

5. A tamper-evident/non-refillable closure for a container according to any one of the preceding claims wherein the closure member has a concentric cylindrical surface which makes a hermetic seal with a corresponding surface on the dispensing means.

6. A tamper-evident/non-refillable closure for a container according to any one of the preceding claims wherein the valve actuation means comprises a sphere mounted in a depression in the surface of the valve.

7. A tamper-evident/non-refillable closure for a container according to claim 6 wherein a sphere is mounted in a depression on the upper surface of the valve and a further sphere is mounted in a depression in the lower surface of the valve.

8. A tamper-evident/non-refillable closure for a container according to claim 6, wherein the closure member is provided with a stem which engages in an opening in the dispensing means and encourages the upper valve actuation means into engagement with the valve to obtain a hermetic seal between the valve and a valve seat within the dispensing means.

9. A tamper-evident/non-refillable closure for a container according to any one of the preceding claims comprising a collar extending downwards from the dispensing means said collar being adapted to encircle the neck of a container to which the closure is fitted.

10. A tamper-evident/non-refillable closure for a container according to claim 9, wherein the collar is provided with ribs to engage under a rim located on the container neck.

11. A container having a neck carrying a closure as claimed in any one of the preceding claims.

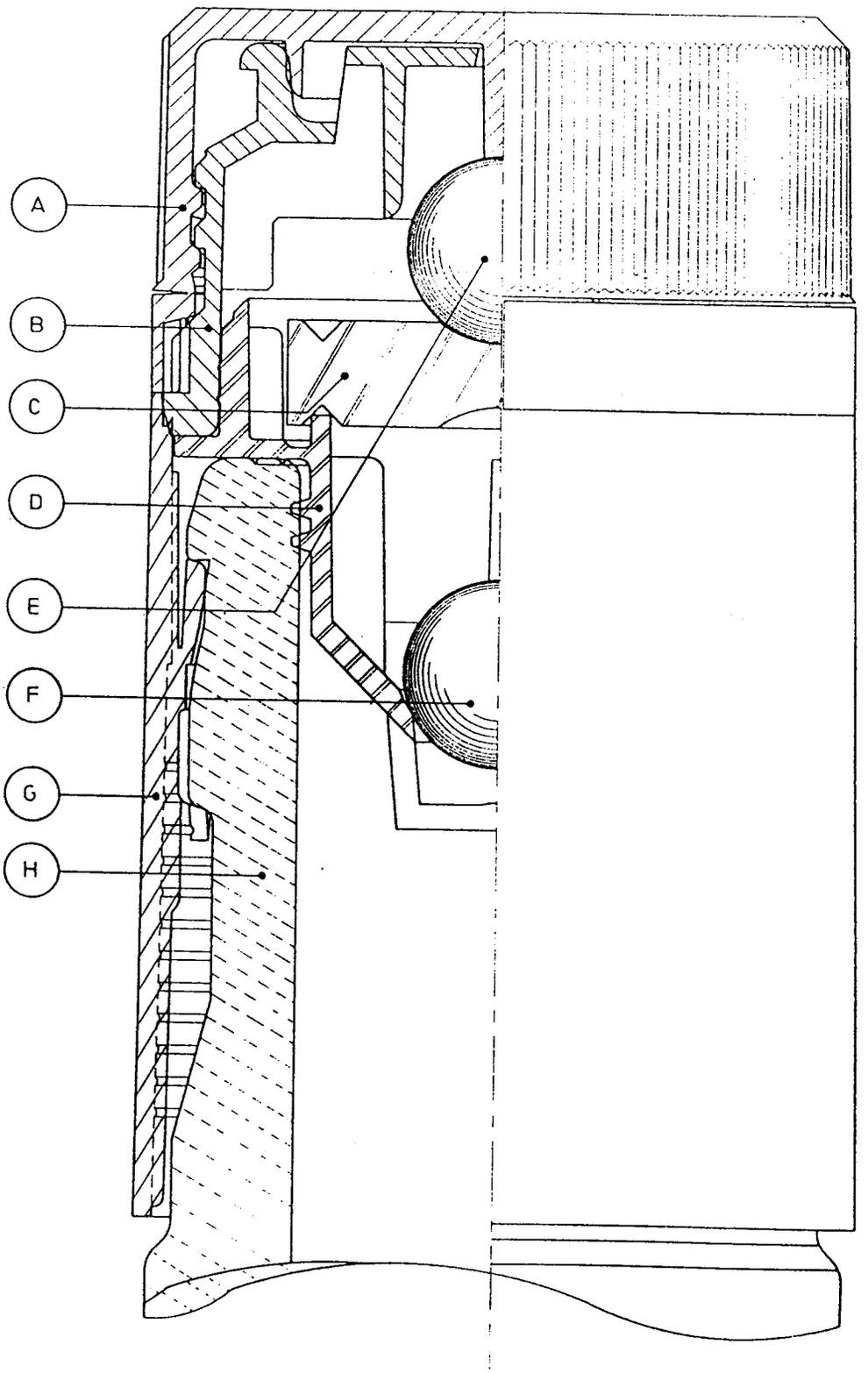

FIG. 1

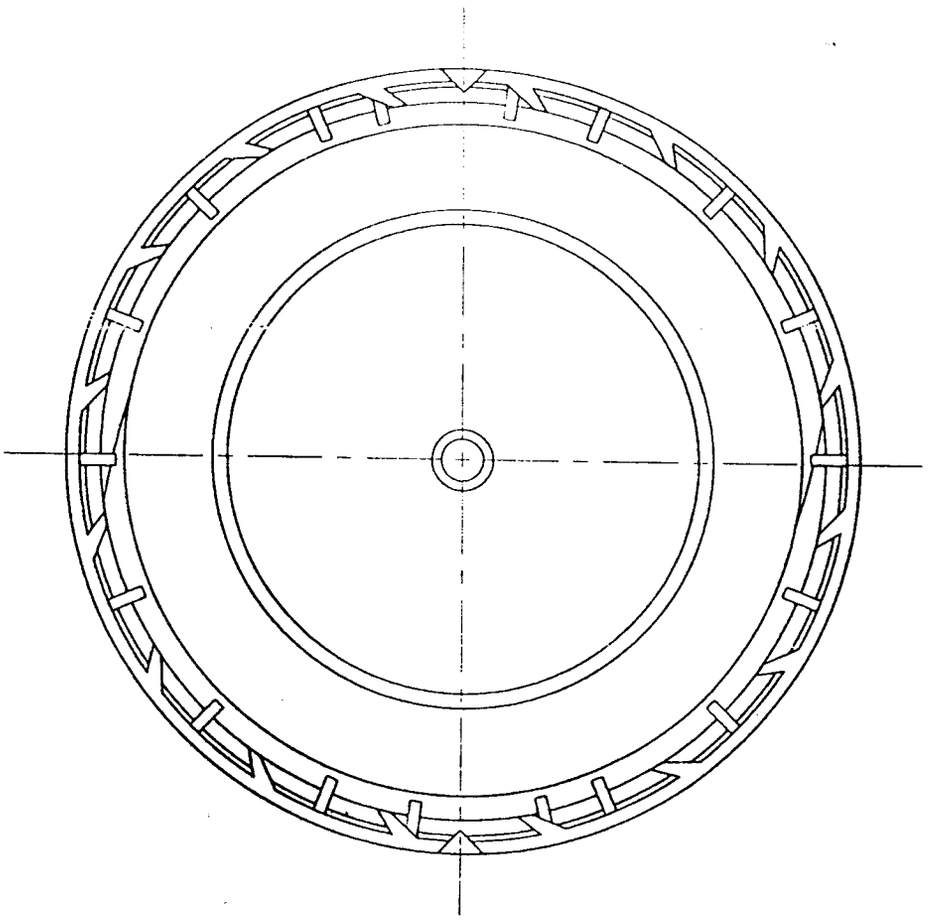

FIG. 2A

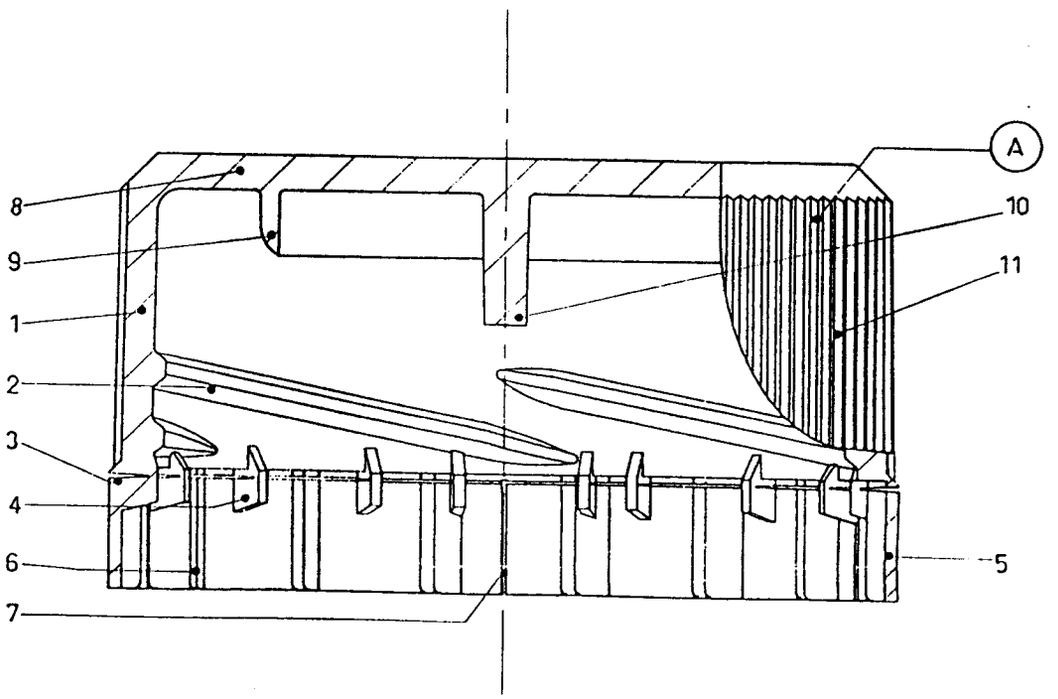

FIG. 2

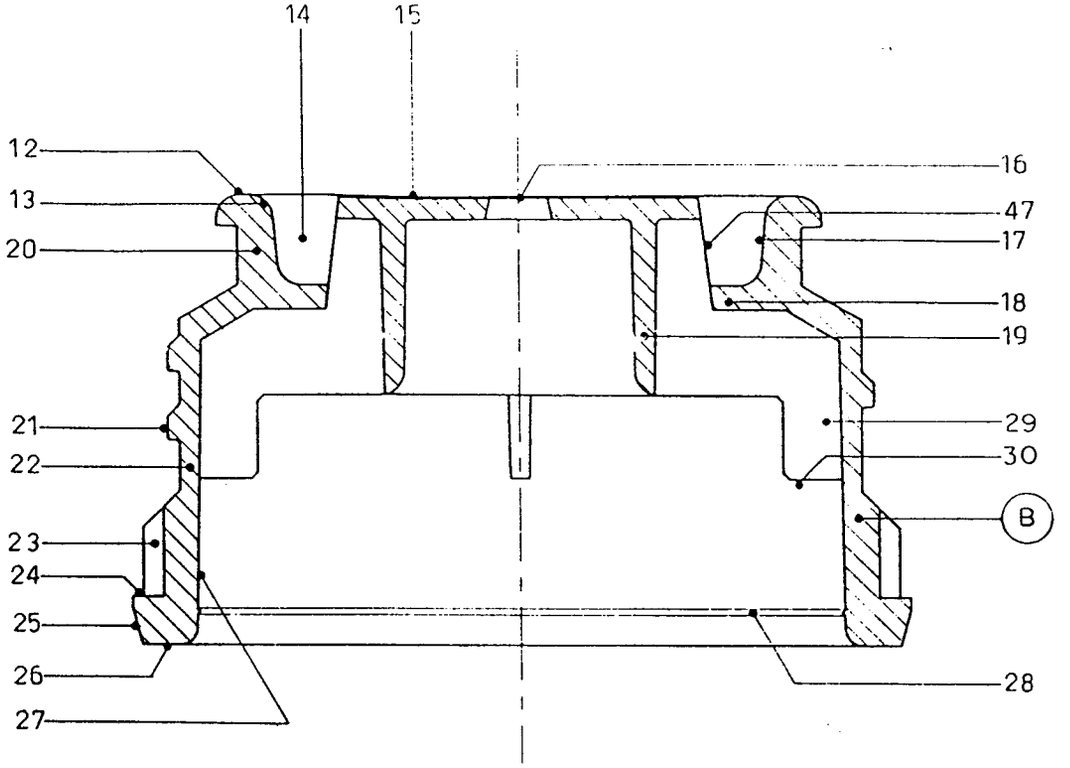

FIG. 3

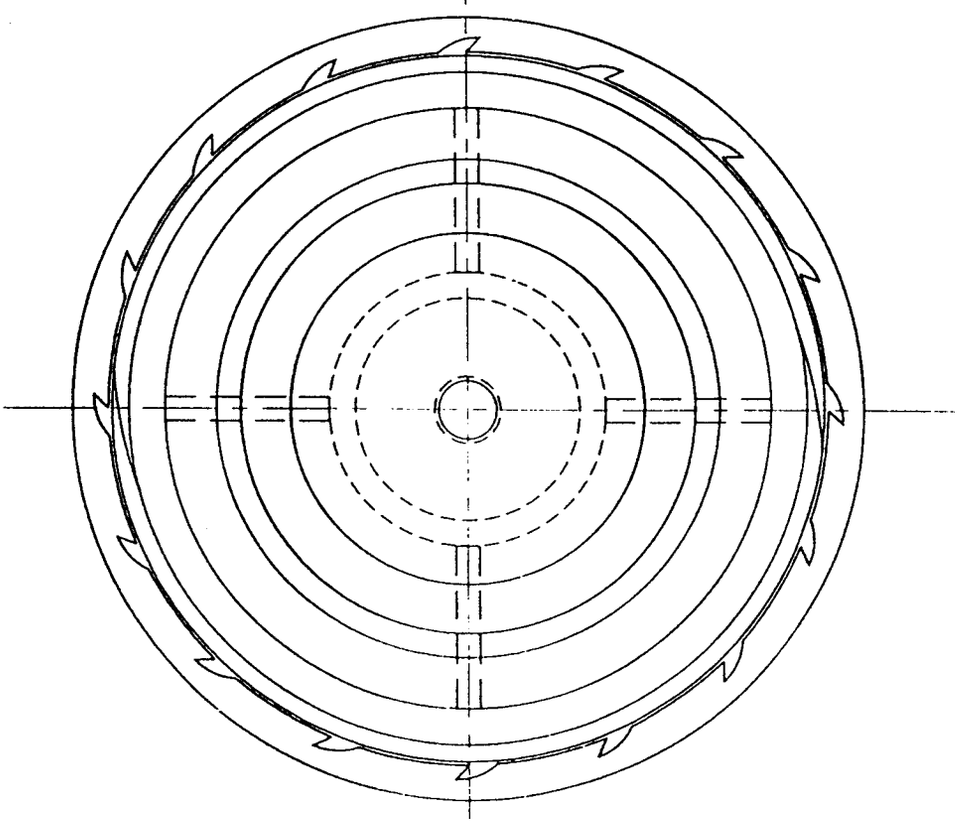

FIG. 4

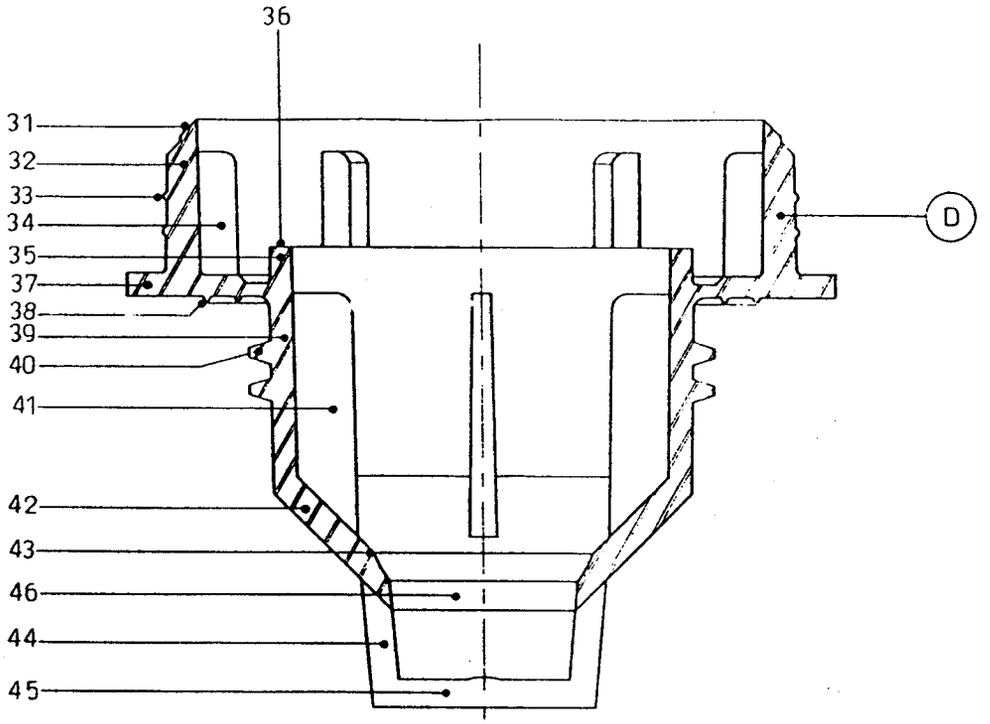

FIG. 4

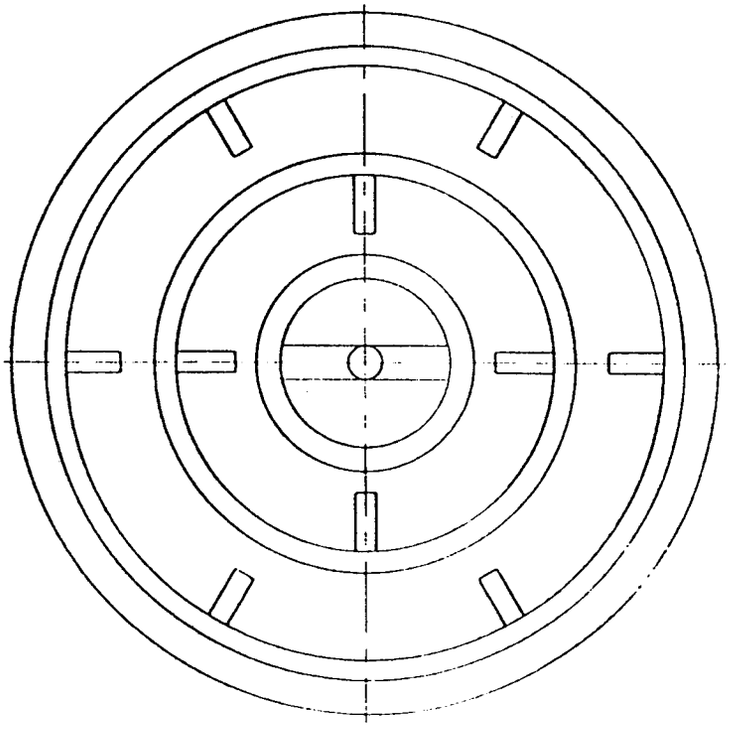

FIG. 4A

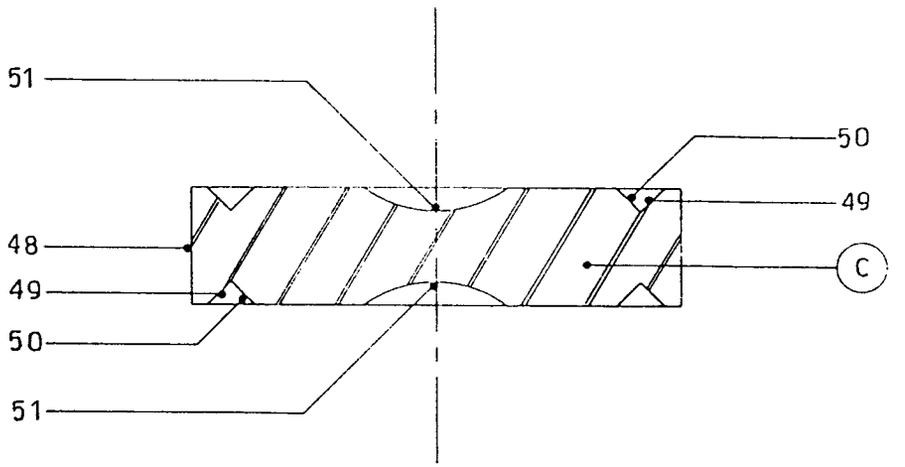

FIG. 5

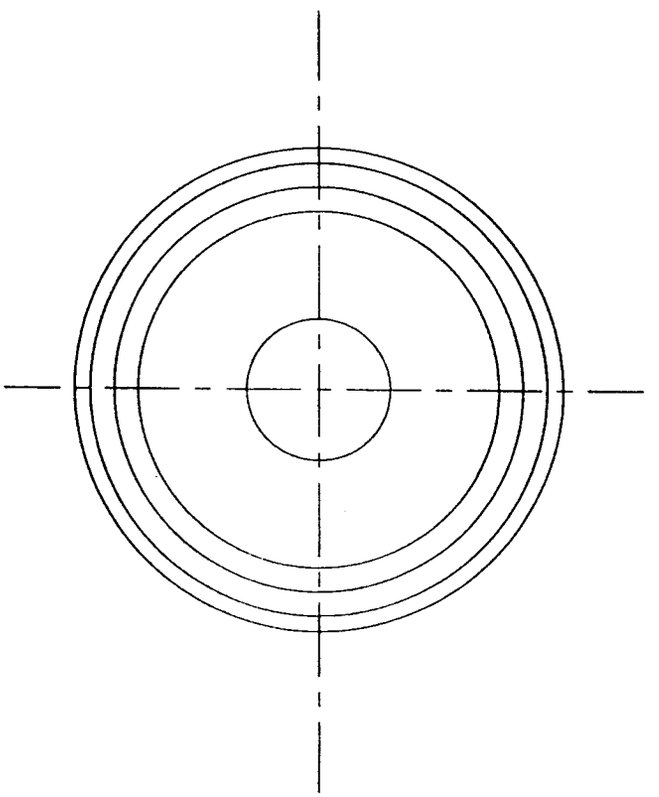

FIG. 5A

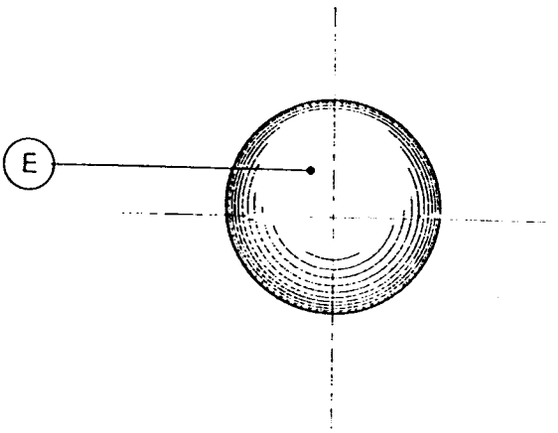

FIGURA 6

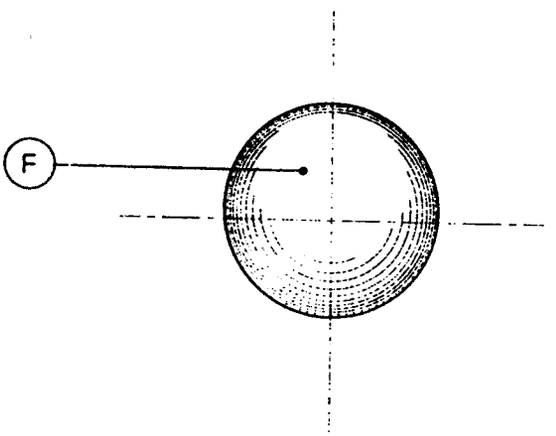

FIG. 7

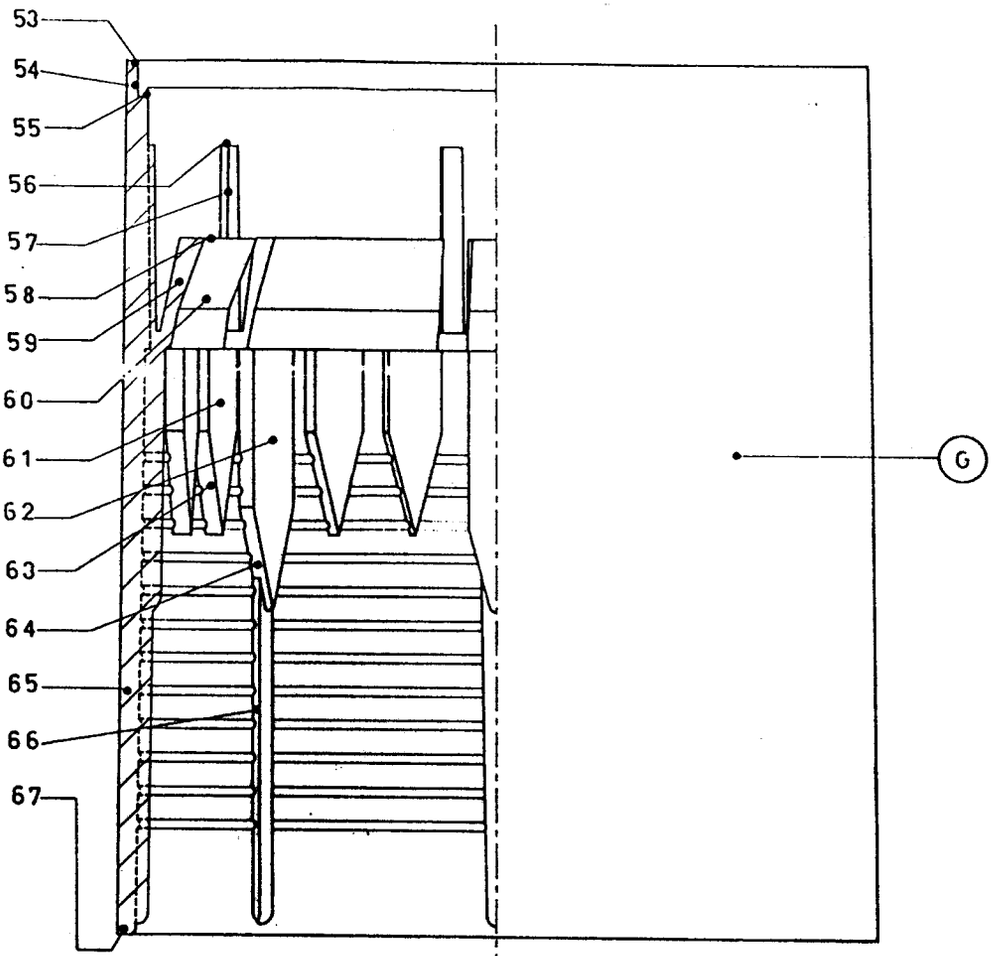

FIG. 8

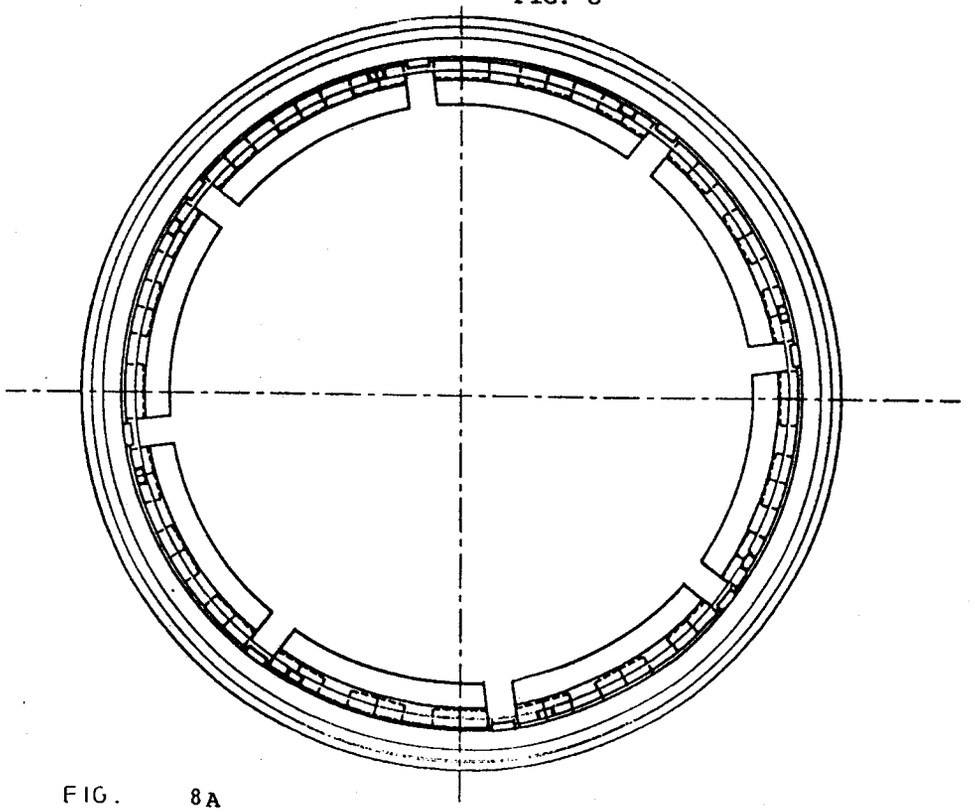

FIG. 8A

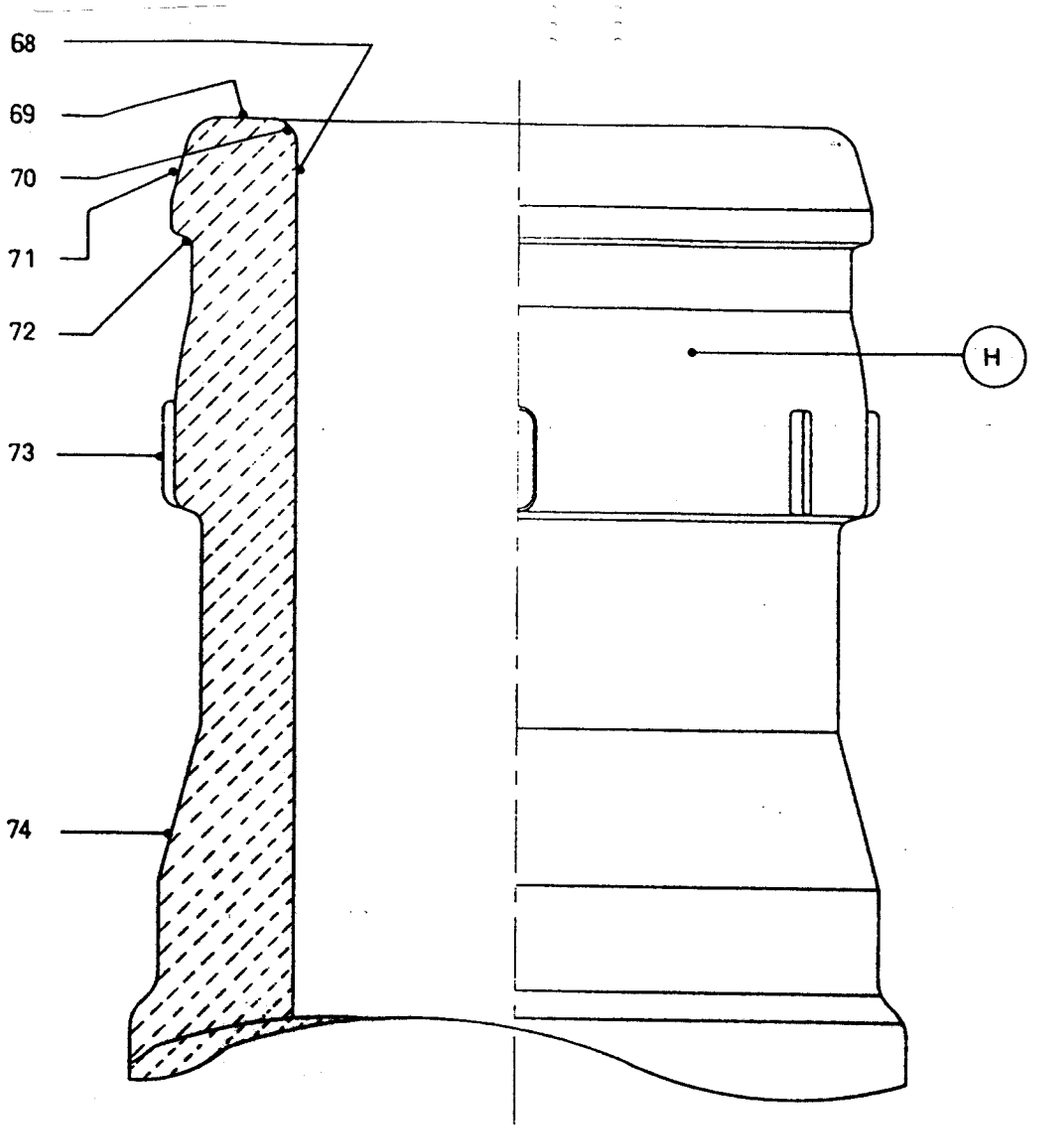

FIG. 9

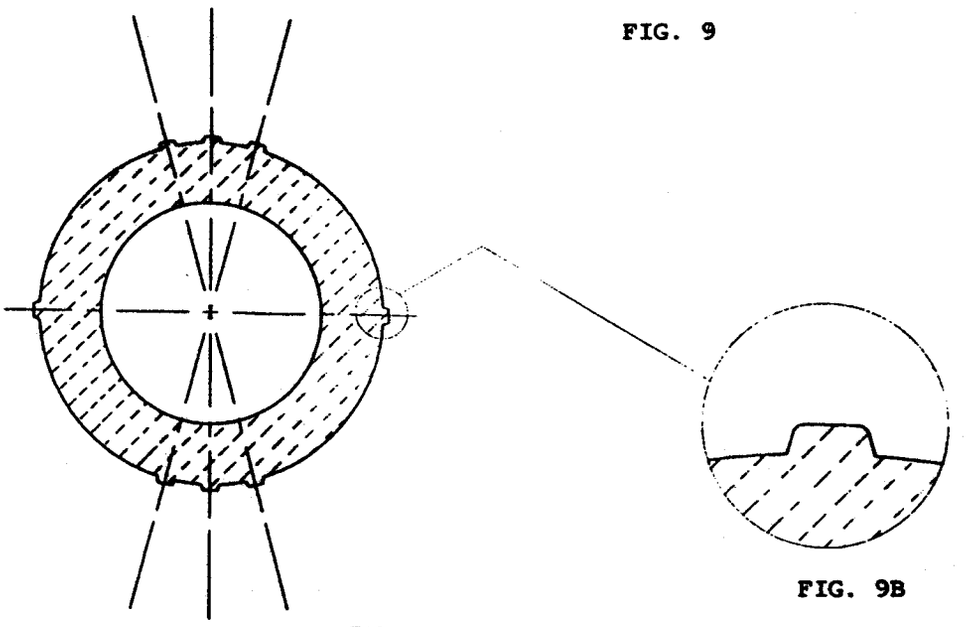

FIG. 9A

FIG. 9B

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 6350

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR-A-2 666 307 (GRUPO STEVI)	1,2,4,5, 9-11	B65D49/06
Y	* page 9, line 36 - page 16, line 15 * * page 18, line 26 - page 20, line 13; figures 1-7,14,15 *	3,6-8	
Y	GB-A-2 125 382 (COPE ALLMAN LPASTICS LTD) * the whole document *	3	
Y	FR-A-2 155 905 (BEREZIAT) * the whole document *	6-8	
A	EP-A-0 502 379 (GUALA) * column 2, line 6 - line 50; figure 1 *	1,5,6, 9-11	
A	GB-A-2 274 837 (D. MONTGOMERY & SON LTD) * page 6, line 16 - page 11, line 6; figures 1-5 *	1,6,9-11	
A	US-A-4 497 415 (DELONGHI) * the whole document *	1,9-11	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	FR-A-2 444 621 (FISCHER)		B65D
A	US-A-4 382 520 (ALEFF)		
P,A	GB-A-2 285 623 (D MONTGOMERY & SON LTD)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 December 1995	Martens, L

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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