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(54) **Anchoring device for a push-fit plug in the drain of sanitary ware**

(57) This invention relates to an anchoring device for a drain plug of sanitary ware comprising anchoring hooks (22), a stop spider (23) and a screw stay (24), where said anchoring hooks are projected to fit into said radial openings (15) of a drain moving from the bottom towards the top, said spider is housed and rests in said top flaring of the drain from the top towards the bottom and has a central threaded hole (23'), and said screw stay connects the anchoring hooks and the spider, locking them one to the other and in the drain, and in which the stable element of said spring device is fixed to a part of the screw stay protruding out of said spider.

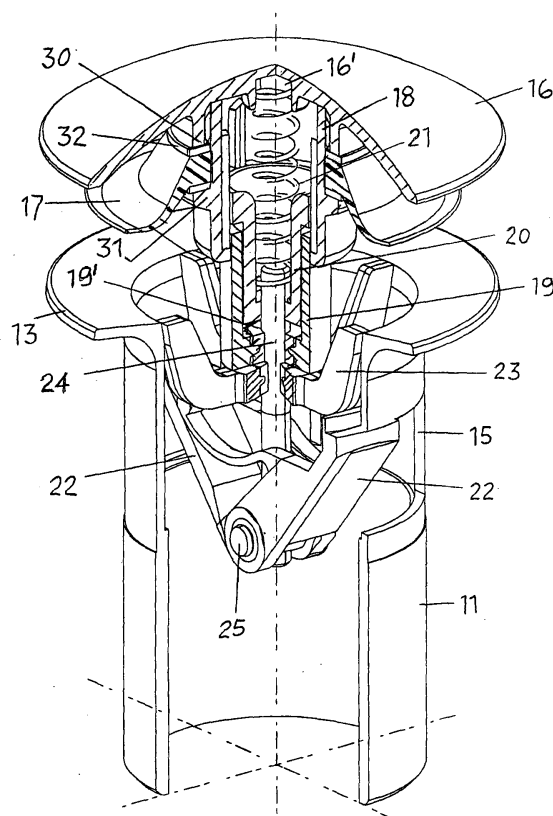


FIG.4

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Description

Field of Invention

[0001] This invention belongs to the sanitary ware field and concerns in particular a waste plug for said items, including a device to fix the plug to each drain.

State of the Art

[0002] The sanitary ware, such as washbasins, sinks, bidets, bathtubs, etc., used to contain water, is usually equipped with a drain with a plug.

[0003] For use in this sector, plugs associated with a device which allows closing and opening by applying pressure by hand on the top of the plug have already been presented.

[0004] Plugs of this type are to be found, for example, in patents FR-1 570 679, US-4 103 372 and US- 4 420 844. They are made up in particular of a control device, including elements with rotary-translatory motion which, by means of an initial pressure enables a plug to fit into and lock the plug in the closing position of the drain, and by using a second pressure to release the plug and enable it, thrust by a spring, to return to the open position. They are in fact spring loaded plugs which can be single acting when one spring is used to return the plug to the open position whereas the closed one depends on its weight, or double action when two springs are included, one of which to hold the plug in the open position and the other to ensure its closed position.

[0005] These plugs however, must operate together with specific drains, each one having its own supporting system which implies the presence of an anchoring point in the centre of its respective drain and integral with it. In fact, the drain must have internal spokes converging towards the centre where they form the anchoring point for the plug support. Plug and drain must therefore be made one for the other with complementary structures otherwise if they did not exist the plug would be unable to operate. In other words, a plug with a push-fit control device to operate together with a drain cannot be used with other different drains and at the same time a drain shaped to house a plug cannot house other types of plugs.

[0006] In addition, it cannot be excluded that, in the known push-fit type spring devices, particles or dirt can penetrate and deposit that over a period of time can reduce and jeopardise the operating capacity of the plug.

Objectives and Summary of the Invention

[0007] One objective of this invention is to introduce an efficient and user friendly blocking system, which enables a plug to be applied, equipped with a closing and opening device, to drains without the latter having to be equipped with an integral blocking system.

[0008] Another objective of the invention is, however,

to create the conditions whereby a plug equipped with a push-fit closing and opening device can be applied to all types of drains, both new and already being used, as long as they have, as in fact is usual, radial openings at the same level as the overflow of the sanitary ware to which it is fixed.

[0009] Yet another objective of the invention is to equip a plug, of the type mentioned above, with means so that it will be self-centring and lock into a drain so that it can be removed and therefore easily replaced should its sealing capacity begin to fail due to wear of its seal.

[0010] Another objective of the invention is to supply a so-called long lasting spring plug instead of and to replace the normal plugs, above all without interfering with the "push-fit" control, when present.

[0011] Still another objective of the invention is to propose a push-fit plug for drains produced so as to avoid deposits of particles or dirt inside it and so ensure efficiency over the years.

[0012] These objectives and implicit advantages which stem from them are achieved, in compliance with the invention with a device according to claim 1.

Brief Description of Drawings

[0013] The invention will however become more evident in the continuation of this description made in reference to the enclosed indicative and not limiting drawings, in which:

Fig. 1 shows a blow up view of the components of the plug and blocking system in a first configuration: Figs. 2 and 3 show the plug operating with a drain, in the open and closed positions respectively; Fig. 4 shows a section of assembled plug and drain; Fig. 5 shows a variation of the blocking means of the plug in a drain; and Fig. 6 shows a blow up of the components of the plug and blocking system in a second configuration.

Detailed Description of the Invention

[0014] An example of a drain 11 and a plug 12 operating with it are shown in said drawings.

[0015] The drain 11 has a top flange 13 enclosing an axial hole with a top flared entrance 14 and at least two radial overflow openings 15.

[0016] The plug 12 is made up of a head 16 which will rest on the top flange 13 of the drain with interposition of a seal 17. The head 16 is fixed, preferably by a click-in action or however by being pressed into a guide sleeve 18 so as to fit in the flared entrance 14 of the drain, without interference, leaving a circular passageway for the water. The seal 17 is positioned and held between the head 16 of the plug and the sleeve 18 as described below.

[0017] The guide sleeve 18 holds a control device which, by applying pressure, enables the movements of

the plug from the open position - Fig.2 - to the closed position -Fig.3 - and vice versa. This device is made up of two complementary cam elements 19, 20, one inside the other, and at least one coaxial return spring 21. One 19 of the cam elements is stable, whereas the other 20 is open to rotary-translatory motion compared to the stable one, and the return spring 21 is positioned between the element with rotary- translatory movement and the head 16 of the plug. Hence by applying initial pressure on the head of the plug, the latter moves down from the open to the closed position remaining blocked, and by applying pressure the second time, the plug is released and returns to the open position under the thrust of the spring. The head 16 of the plug, the guide sleeve 18 and the cam elements 19, 20 are usually and advantageously made of plastic.

[0018] The plug structured in this way is applied to the drain 11 by means of a blocking system which includes two anchoring hooks 22, a spider 23 and a screw stay 24. Said hooks 22 can be made of plastic, whereas the screw stay 24 is metal.

[0019] The anchoring hooks 22 are made to engage with the radial openings 15 of the drain 11; the spider 23 positions itself and rests in the flared entrance 14 of the drain and has a central threaded hole 23' preferably in the form of a nut embedded in the body of the spider; the screw stay 24 connects the hooks 22 to the spider 23 blocking them simultaneously in the drain.

[0020] The spider 23 can be made of metal, but it would be preferable if made out of plastic with arm ends not engaged - Fig. 1. However to prevent excessive flexing of the arms that could fail to ensure the blocking action when the spider is plastic, its arms can be connected to a ring 123 with an external diameter compatible with the diameter of the entrance flaring 13 of the drain 11. Moreover, one or more adapter rings 124 - Fig. 6 - with a different external diameter depending on the internal size of the drain the plug has to fit into, can be selectively applied to the ring 123 that connects the arms of the spider 23. The use of these adapter rings 124 will therefore enable the anchoring device to adapt to all drains, even when the latter have different entrance diameters.

[0021] In one production form, as shown in Figs 1 and 3, the blocking hooks 22 are levered on a pin 25 with a spider boring 26, they diverge from the bottom towards the top starting from said pin, and each of them has a square end 27 made to rest both against the top side of the corresponding radial opening 15 of the drain and the internal surface of the latter adjacent to said top side of said opening - Fig. 4. The screw stay 24 is made to pass from the bottom of the spider boring 26 of the pin 25 supporting the blocking hooks 22, and the spider is screwed to the screw stay 24 by means of its threaded hole 23', hence the locking system can in this way be inserted into the drain and blocked by screwing the spider down tightly onto the screw stay.

[0022] But in a preferable production form, as shown

in Figs. 5 and 6, the anchoring hooks 22' are joined together, without the need for an intermediate pin, and integrated with a screw stay 24' forming a single unit, to which the spider 23 can be screwed, either with free arms or with arms connected to a ring 123.

[0023] In both cases the blocking system is self-centring with the drain and, when tightly connected by means of the screw stay 24 or 24', hooks 22 or 22' become anchored from the bottom towards the top to the upper sides of the radial openings of the drain, whereas the stop spider 23 is blocked from the top towards the bottom in the flared entrance of the drain itself.

[0024] Once the blocking system has been positioned and blocked in the drain, the screw stay 24 or 24' extends upwards above the spider 23, and the plug unit is applied to it. For this application, the fixed element 19 of the control device of the plug is equipped at the bottom with a threaded female boring 19' so that the element itself can be screwed to the screw stay 24 or 24' as shown in Fig. 4.

[0025] It should also be noted that the screw stay then extends part way into the inside of the cam element 19, 20 undertaking in this way also the guide-spring function for one end of the spring 21 of the control device, the other end of which is on the contrary centred in a housing 26' envisaged on the underside of the plug head.

[0026] Then, and advantageously, on the bottom at least of the guide sleeve 18, slots have been machined and radial cuts 19" have been machined around the stable cam element 19 as shown in Fig. 6. The slots 18' and cuts 19" are positioned to allow particles and dirt to be evacuated from the gaps between elements 18, 19, 20 connected to each other, an evacuation which is forced in response to the movements of the movable elements 18, 20 in regard to the stable element 19. In other words, the plug pressure control device becomes self cleaning and able to operate correctly without unwarranted hitches.

[0027] As the plug described above is addressed also to, although not exclusively, the spare parts market and therefore to many different drain models, it has also been conceived so that the position of its seal 17 can easily be adjusted, even by the user, to adapt it to the shape of the top flange of the drain. For this purpose and as shown in Fig. 4, the seal 17 is assembled between a stop plane 30 integral with the head 16 of the plug and a shoulder 31 integral with the sleeve 18 with the interposition of one or more washers 32. By placing the washers 32 one on top of the other under the seal, or both on or under, it is possible to vary in height, the position of the sealing lip of the gasket by altering its distance from the top flange of the drain. This expedient also enables adjustment of any deformation over a period of time of the seal and also to conceal the top flange of the drain when it is necessary to

Claims

1. Anchoring device of a drain plug for sanitary ware, where the drain has a top flange and forms an axial hole with an entrance flaring and at least two radial overflow openings and where the plug operates in conjunction with a device which controls closing and opening through pressure, which is made up of a guide sleeve (18) attached to the head of the plug, two complementary cam elements (19, 20) supported by said sleeve, one stable and the other susceptible to rotary-translatory motion in answer to the pressure applied on the head of the plug and at least one coaxial return spring (21) placed between said elements and the head of the plug, said two elements hooking on to each other when the plug is pressed a first time to move from the open position to the closed one and coming unhooked to return to the open position when the plug is pressed a second time, **characterised by** the fact of including anchoring hooks (22), a stop spider (23) and a screw stay (24), where said anchoring hooks are projected to fit into said radial openings (15) of the drain moving from the bottom towards the top, said spider is housed and rests in said top flaring of the drain from the top towards the bottom and has a central threaded hole (23'), and said screw stay connects the anchoring hooks and the spider, locking them one to the other and in the drain, and in which the stable element of said spring device is fixed to a part of the screw stay protruding out of said spider. 5 10 15 20 25 30
2. Anchoring device according to claim 1, in which one or more adapter rings (124) of different diameters can be placed between the spider and the entrance flaring of the drain. 35
3. Anchoring device according to claim 1, in which the spider has some flexible arms with ends not engaged, and in which at least one adapter ring is positioned around said arms. 40
4. Anchoring device according to claim 1, in which the spider has some arms connected to a ring (123), and in which at least one adapter ring (124) is associated with the ring connecting said arms. 45
5. Anchoring device according to claim 1, in which said anchoring hooks are levered on a pin (25) having a through crossways hole (26) and diverging from the bottom towards the top starting from said pin, in which said screw stay (24) extends from the bottom in said crossways hole of the pin supporting the hooks, and in which said spider is screwed to the screw stay (24), the stable element of the pressure control device being positioned above said spider and fixed to the screw stay. 50 55
6. Anchoring device according to claim 1, in which said anchoring hooks (22') are connected to each other and attached to the screw stay (24') forming a sole unit, in which said spider (23) is screwed to said screw stay, and in which the stable element of the pressure control device is positioned above said spider and connected to said screw stay.
7. Anchoring device according to claims 5 or 6, in which each anchoring hook (22, 22') has a square end (23) projected to rest both against the top side of the corresponding radial opening of the drain and the internal surface of the latter adjacent to said top side of said opening.
8. Anchoring device according to any of the previous claims, in which the screw stay (24, 24') extends in said cam elements and forms a guide-spring for the spring of said pressure control device.
9. Anchoring device according to claim 1, in which at least on the bottom of the guide sleeve (18) and around the stable cam element (19) slots or inserts (18', 19') have been prepared to evacuate the particles or dirt from the gaps between the elements (18, 19, 20) so that the device is self-cleaning.
10. A plug for drains of sanitary ware in combination with an anchoring device to a drain according to the previous claims.

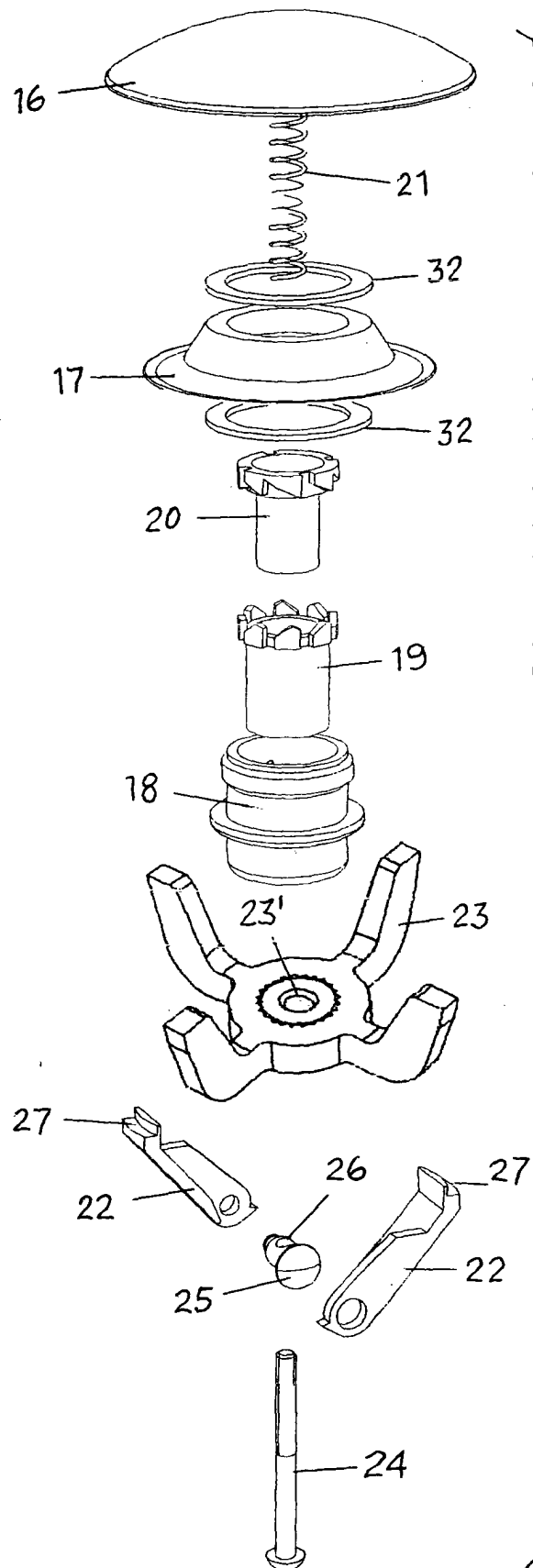


FIG.1

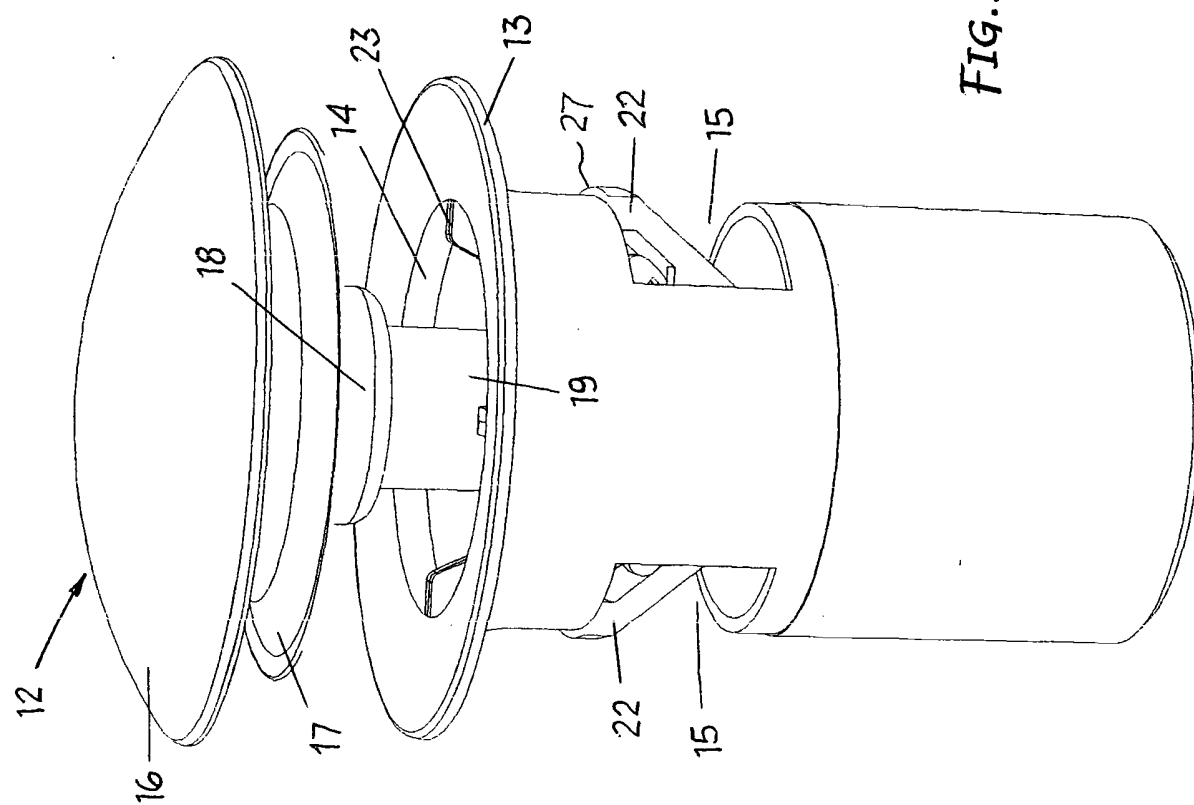


FIG. 2

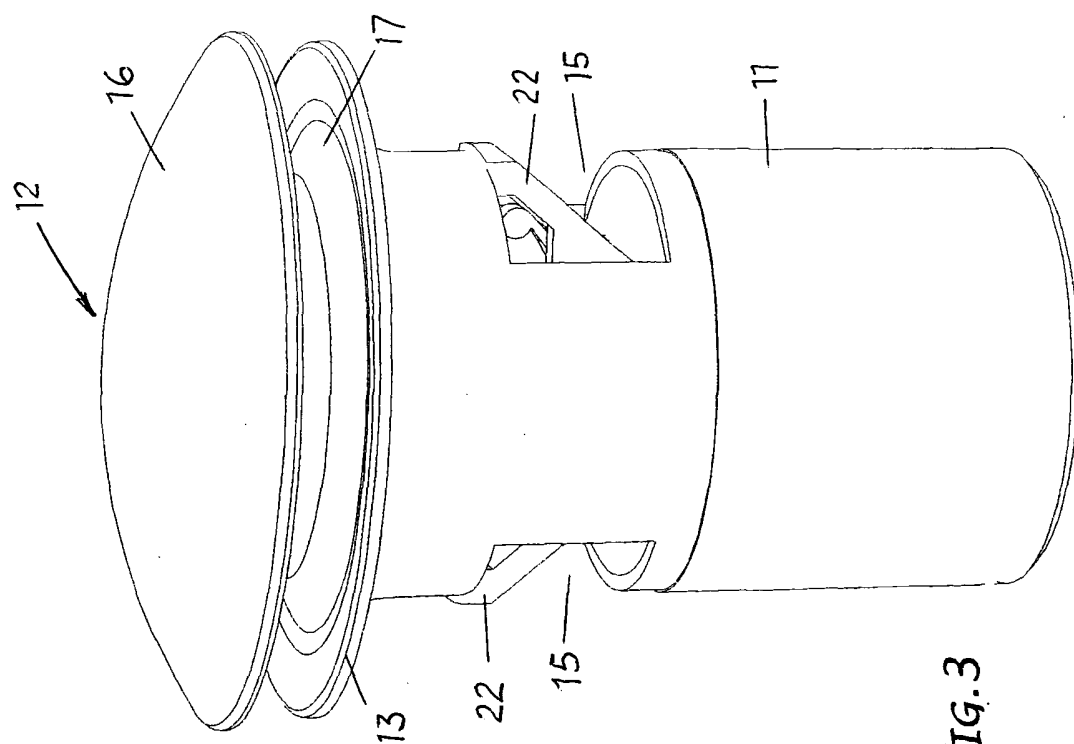


FIG. 3

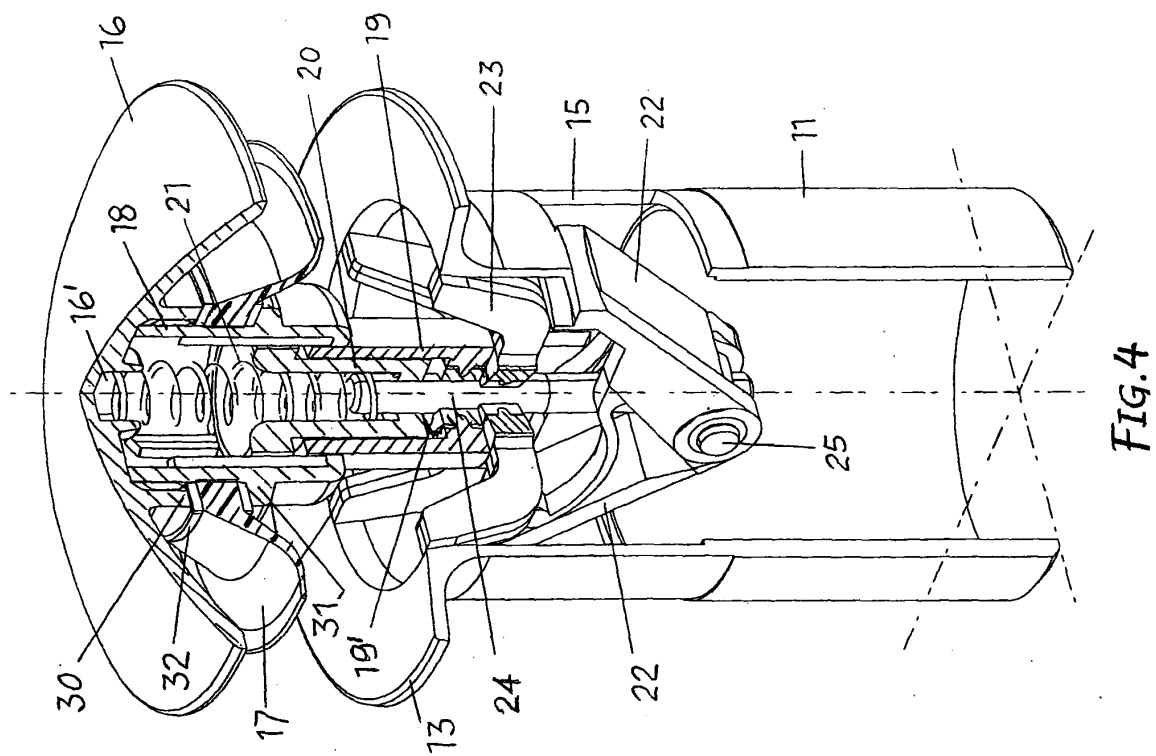


FIG. 4

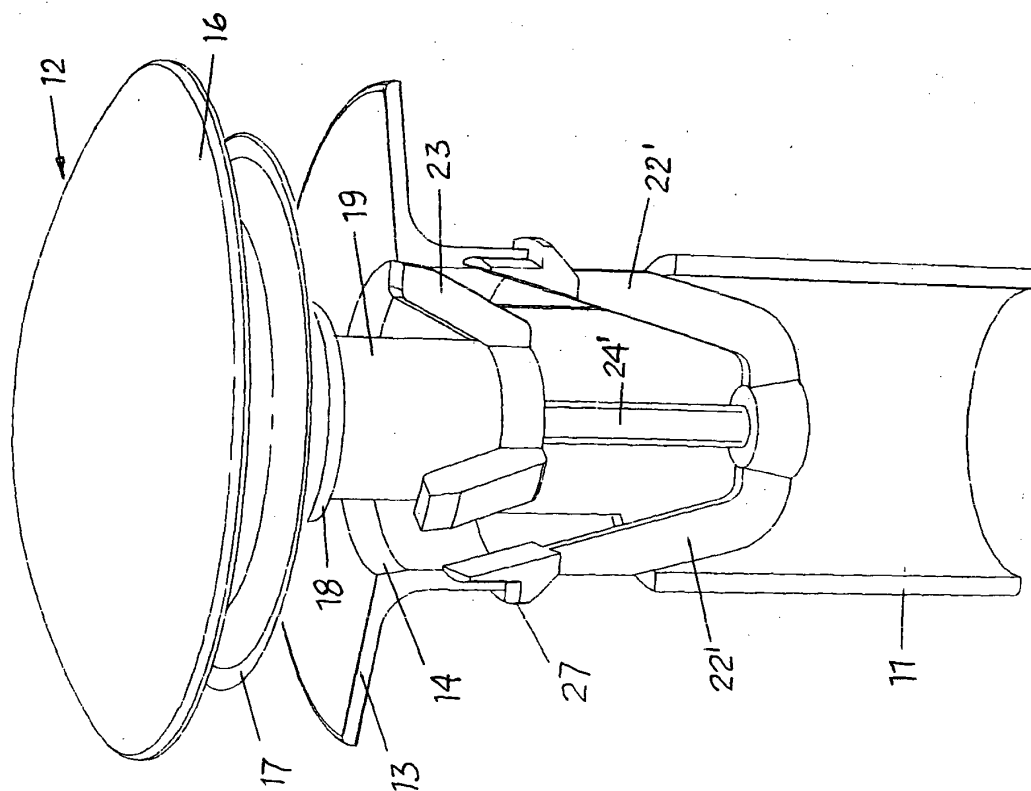


FIG. 5

