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T. ARMSTRONG ET AL
FLUSHING VALVES FOR CISTERNS

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Filed Feb. 10, 1956

2 Sheets-Sheet 1

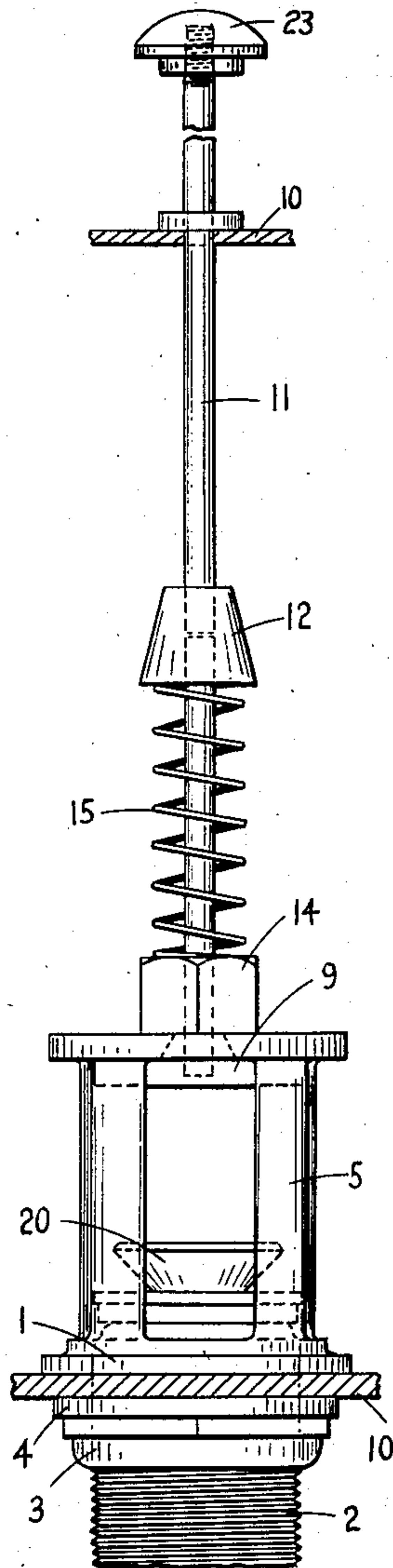


Fig. 1.

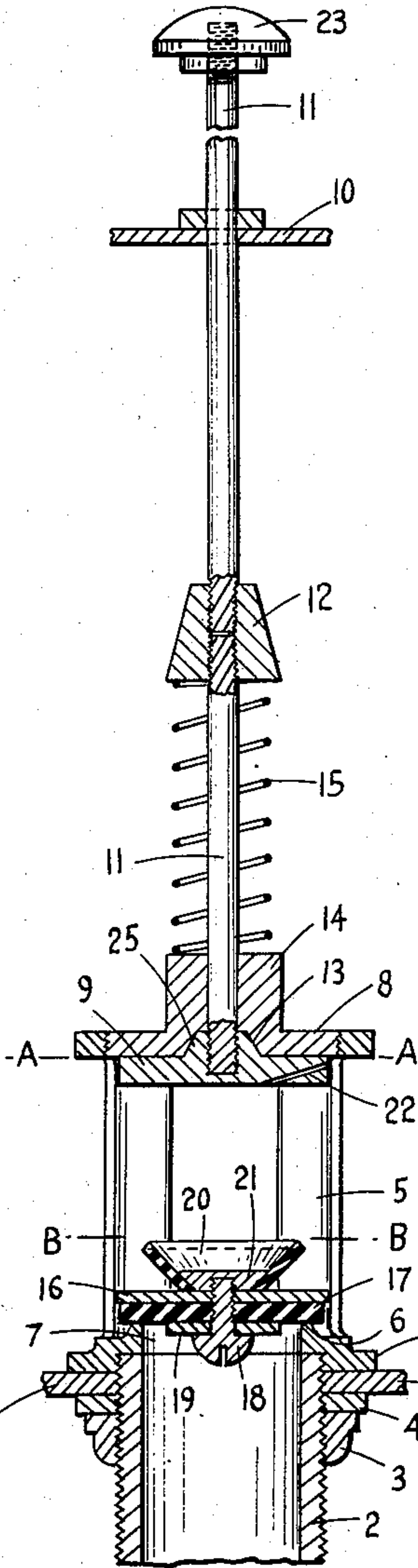


Fig. 2.

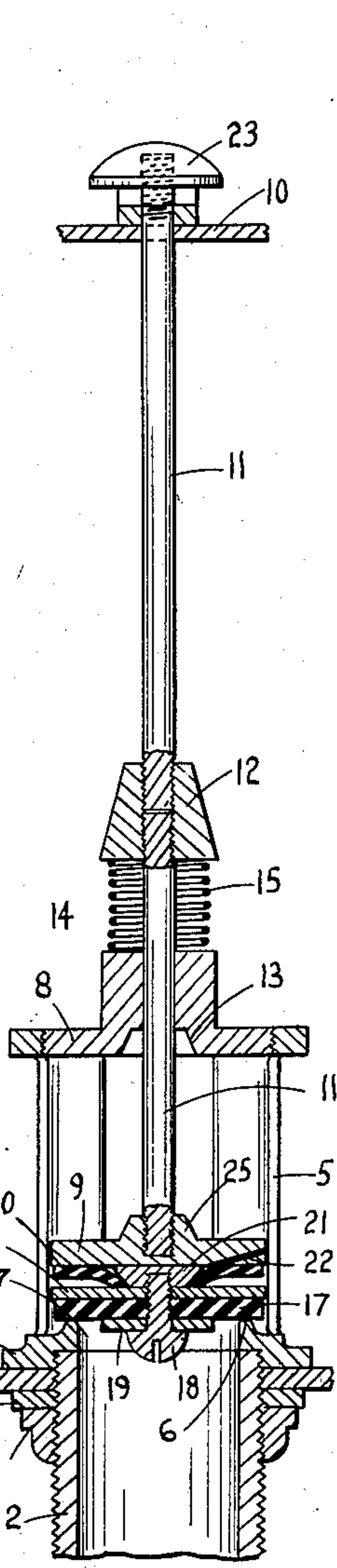


Fig. 3.

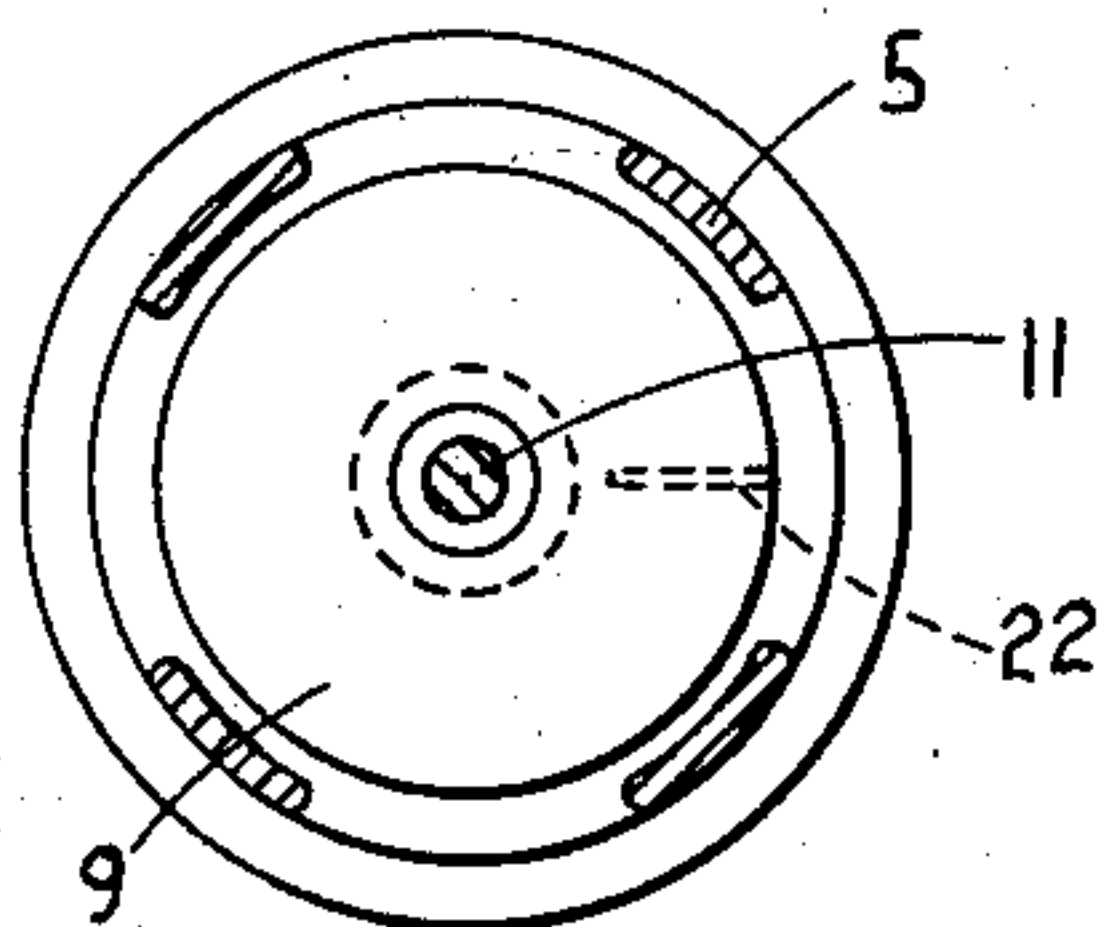


Fig. 5.

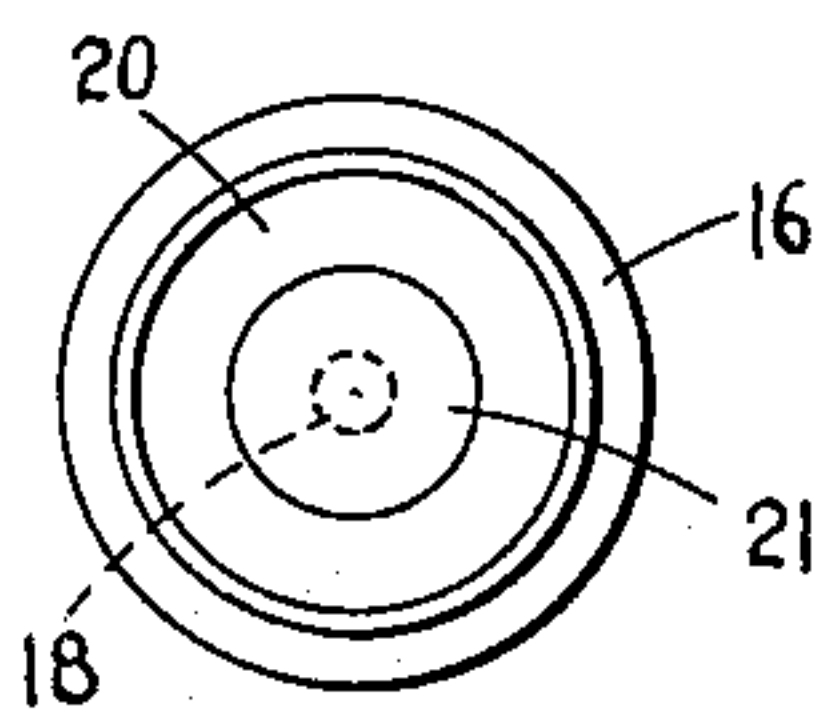


Fig. 6.

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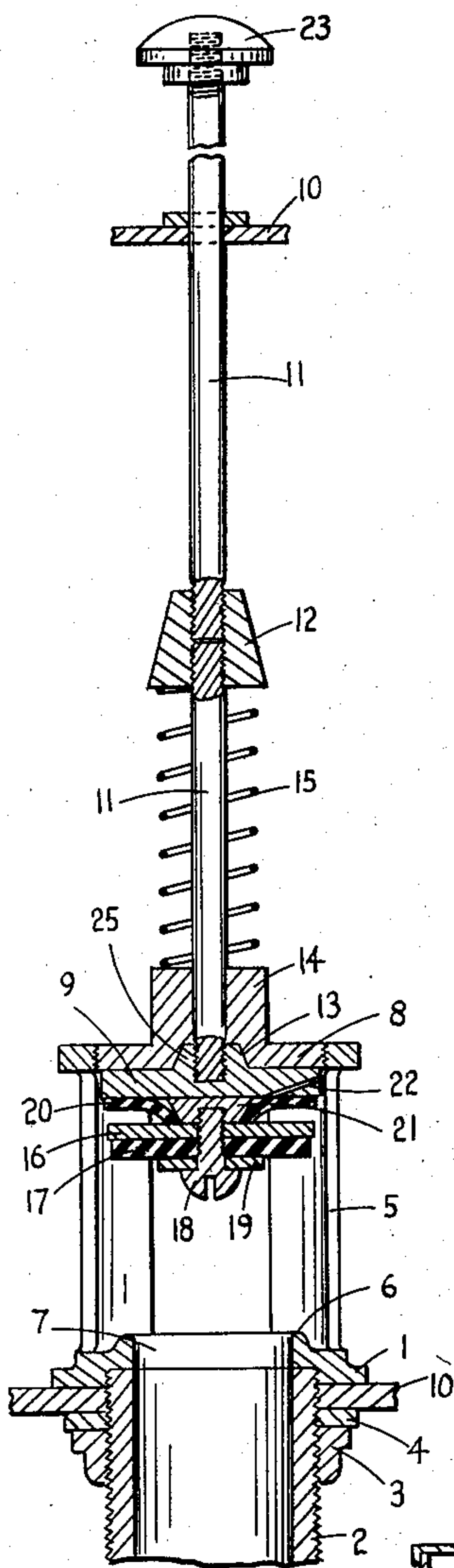


Fig. 4.

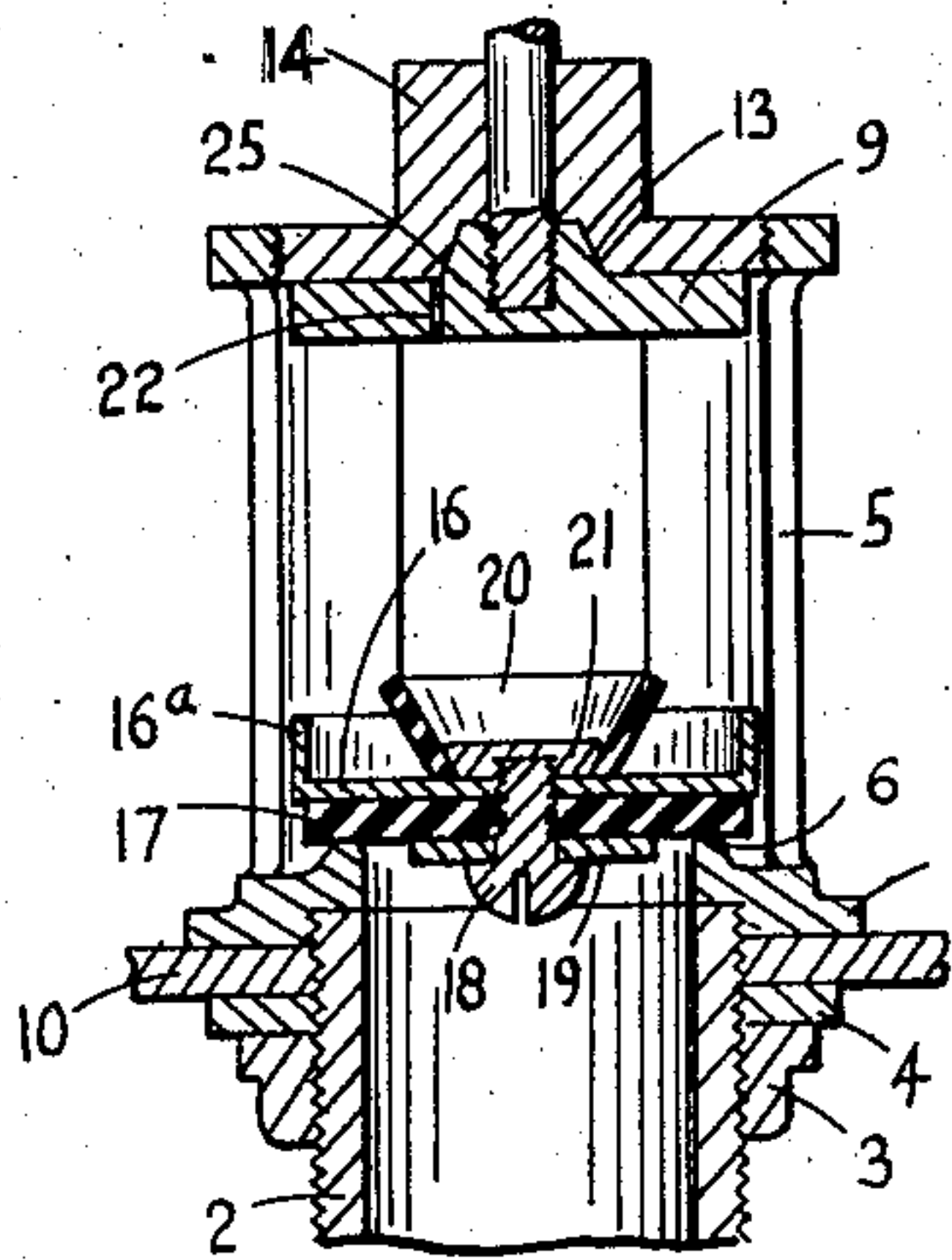


Fig. 7.

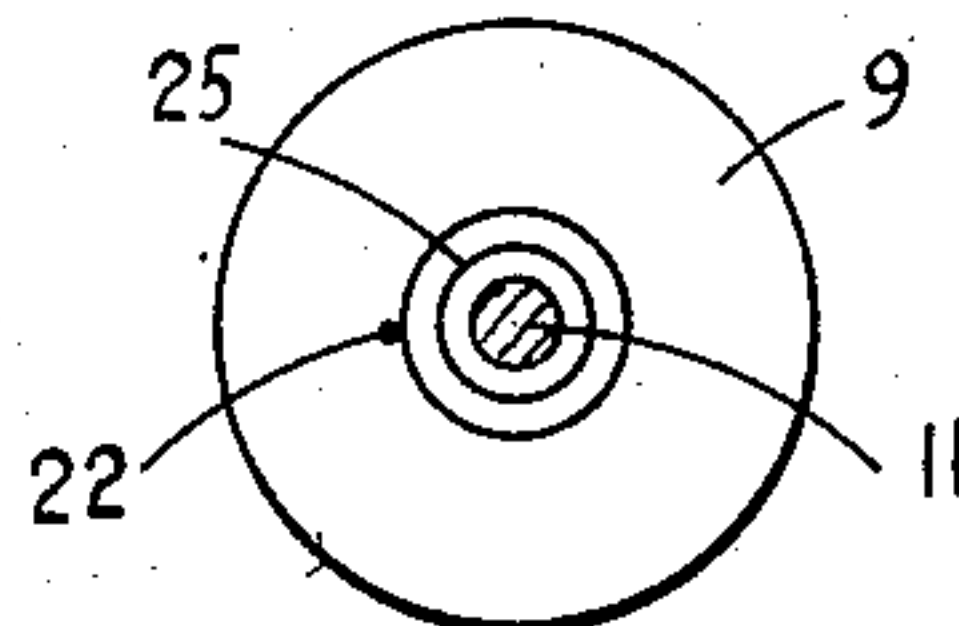


Fig. 8.

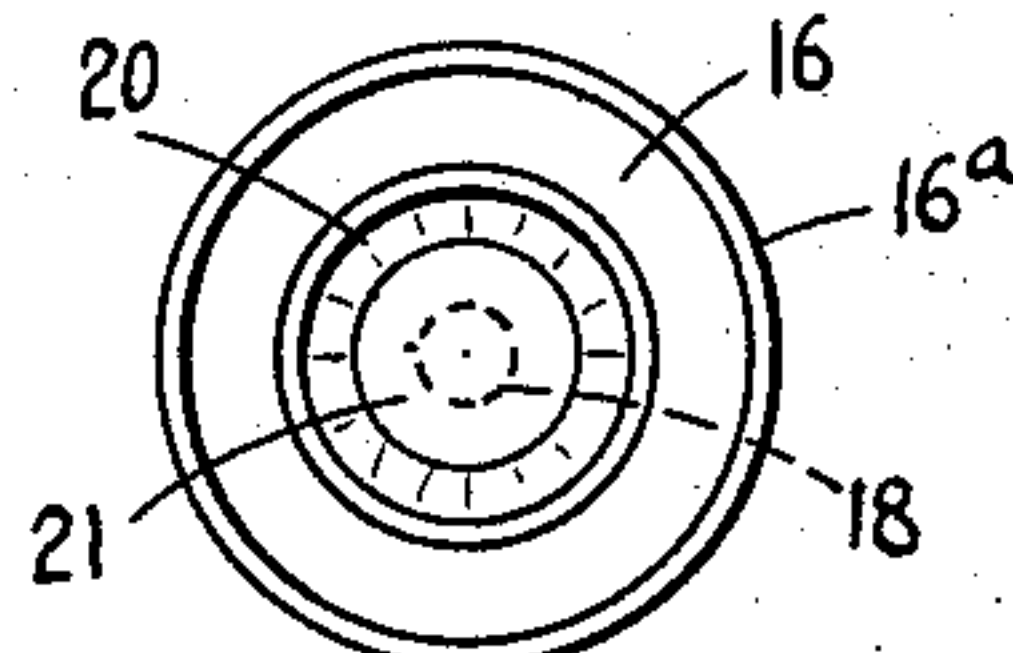


Fig. 9.

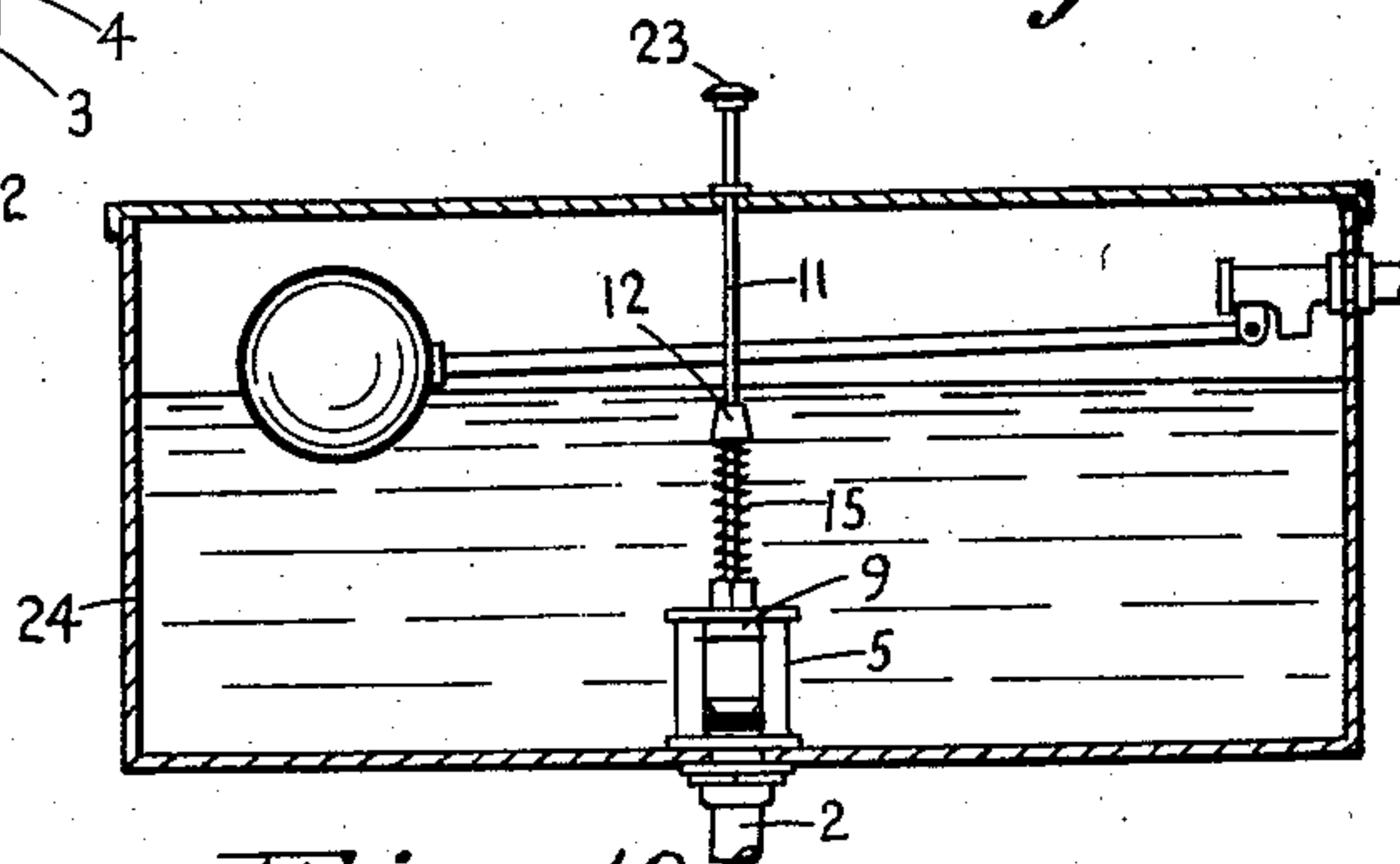


Fig. 10.

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FLUSHING VALVES FOR CISTERNS

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5 Claims. (Cl. 4—67)

This invention relates to flushing valves for use with cisterns of the kind in which the down pipe conveys liquid directly from the bottom of the cistern to provide for a gravity flow of the liquid as required in flushing water closets.

Such flushing valve for a cistern has the general features which include an outlet leading to a downpipe, and the outlet is closed normally by a gravity valve, and the flush of liquid from the cistern is effected by lifting the valve from its seating so that the valve is maintained in a raised position until the cistern is emptied of water when the valve is released to cause the valve to fall back upon its seating about the outlet. Thereafter the cistern is supplied and filled with liquid to a desired level ready for a further flushing operation.

According to this invention the improved flushing valve for a cistern comprises a valve having a lower face arranged to seat on a seating about an outlet leading to a down pipe, and the valve having an upper face supporting an upturned suction cup and a holed plunger arranged to press upon the upturned cup to effect a suction within the cup whereby the valve is pulled from its seating and maintained in a raised position until the level of the water in the cistern is below the raised valve and the suction in the cup is relieved by air passing through the holed plunger to the interior of the upturned suction cup to cause the valve to fall on to its seating again.

The invention is now further described with reference to the accompanying drawings, in which

Fig. 1 is a full view of the flushing valve and includes both forms of the invention,

Fig. 2 is a central sectional view of the flushing valve according to one form of the invention showing the flushing valve in its closed or normal position, when the cistern is full.

Fig. 3 is a similar view of the flushing valve as that shown in Fig. 2, illustrating the plunger about to lift the valve.

Fig. 4 is a similar view to Fig. 2, showing the flushing valve in its raised position.

Fig. 5 is a plan on line A—A Fig. 2,

Fig. 6 is a plan view of the flushing valve on line B—B Fig. 2,

Fig. 7 is part central sectional view showing a modified form of the invention.

Fig. 8 is a plan view of a plunger as shown in Fig. 7,

Fig. 9 is a plan of a valve shown Fig. 7,

Fig. 10 is a diagrammatic view showing the positioning of the invention in a cistern.

Referring to the drawings and as they concern both forms of the invention, the valve has a body 1 which is screw threaded for attaching to a down pipe 2 arranged to pass liquid from a cistern indicated at 10 when the valve is open. The body 1 and the down pipe 2 are sealed on and attached to the bottom of the cistern 10 by a washer 4 clamped by a lock nut 3 on to the cistern 10.

The body 1 supports an open work housing 5 in which

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is a seating 6 formed on the body 1 about an outlet 7 leading to the down pipe 2. The upper end of the housing 5 has a holed cap 8 which is formed integral with or screw threaded on to the housing 5. The cap 8 has a centrally formed hole 13 which is tapered upwards as shown in Figures 2, 3 and 4 of the drawings. The upper surface of the cap 8 is provided with a holed guide 14 in the form of a boss provided with a bore therethrough; and the holed guide 14 is hexagonal in outline so that the guide 14 can be gripped for attaching or detaching the cap 8 to or from the housing 5 by the screw thread between the cap 8 and housing 5.

A holed plunger 9 is accommodated in the housing 5 and the plunger 9 is actuated reciprocally in the housing 5 by a control rod 11 which is in two parts conjoined by a collar 12, the lower end of the control rod 11 is threaded into the plunger 9. A coiled spring 15 is situated between the guide 14 and the collar 12 whereby the spring 15 influences the control rod 11 and the plunger 9 upwards and normally in the position shown in Figures 1, 2 and 4 of the drawings. The upper surface of the holed plunger 9 is formed with a centrally situated and holed collar 25 which is conical in form to fit in to the centrally formed hole 13 of the cap 8. As shown more particularly in Figure 2, the valve consists of a valve plate 16 having on its lower surface a valve washer 17, a screw bolt 18, and backing washer 19, and having on the upper surface a suction cup 20 and a nut 21 into which is threaded an end of the screw bolt 18 to hold these parts of the valve together. The suction cup 20 is normally upturned and positioned as shown in Figures 1, 2 and 7 of the drawings, and the plunger 9 can be brought into contact with the rim of the suction cup 20, and as in the form of the invention shown in Figures 2, 3 and 4 of the drawings a hole 22 defining a bore or passageway given ingress or egress to the upturned cup 20 with the periphery of the plunger 9, while in the form of the invention shown in Figure 7 of the drawings, the hole 22 gives vertical ingress or egress to the upturned cup 20 with the upper surface of the plunger 9. As indicated in the drawings as shown in Figures 1, 2, 3, 4, 5 and 7 of the drawings, the valve is contained in the housing 5, and the housing 5 forms a guide which insures that the valve is guided down on to its seating 6. In Figures 7, 8, and 9 of the drawings there is illustrated a modification of the invention which has particular reference to the valve construction and the holed plunger 9. As shown in Figure 7, the valve plate 16 is formed with turned up vertical and circumferential sides 16a to provide extended sides for ensuring the guidance of the valve in the open housing 5. As stated above, this Figure 7 shows the hole 22 vertically positioned in the plunger 9. The suction cup 20 is made of resilient material and can be rubber which gives way on contact of and under pressure by the plunger 9, when the plunger 9 is moved downwards by downward pressure on a knob 23 on the upper end of the rod 11 and against the spring 15 until the cup is pressed out as shown in Figure 3, and thereafter the suction in the cup 20, caused by the resiliency of the cup 20, permits the plunger 9 to draw the valve upwards to part the valve washer 17 from its seating 6. The plunger holds the valve in its raised position as shown in Figure 4 until the suction in the cup 20 is relieved or broken down by air passing through the hole 22 in the plunger 9 to the interior of the upturned cup 20. Thereafter the valve falls away from the plunger 9 and back on to its seating 6, to seal off the outlet 7 to the down-pipe 2.

Hence where the flushing valve is situated in a tank 24 as shown in Figure 10, the plunger 9 can be actuated to draw the valve off its seating 6 by suction between

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the cup 20 and the plunger 9 while the level of the water in the tank 24 is above the raised position of the plunger 9, that is in the raised position as shown in Figure 4, and the water in the tank 24 passes out the outlet 7. Thereafter, as the level of the water in the tank 24 recedes below the level of the raised position of the plunger 9, air from the tank 24 passes through the hole 22 in the plunger 9 and relieves the suction in the suction cup 20 to permit the valve to fall away from the plunger 9 as stated above.

What we do claim and desire to obtain by Letters Patent of the United States of America is:

1. A flushing valve for cisterns comprising in combination, a discharge pipe and an open sided housing secured in the bottom of the cistern, a valve seat in the said housing surrounding the discharge pipe, a planar valve body having upper and lower faces within the housing and cooperable with the seat to close the discharge pipe, an upturned resilient cup secured to the upper face of the valve body, a plunger head having a planar lower face within the housing, a vertically reciprocable control rod attached at one end to the plunger head and extending to a point exteriorly of the cistern at the other end, an actuating means carried by the other end of the control rod, and spring means operatively connected to the rod and the housing normally urging the plunger head away from the valve body, the said plunger head having aperture means therein extending from the lower face thereof a substantial distance inwardly of the perimeter of the plunger head to a point outside the plunger head so that when the connecting rod is displaced against the action of the spring means, the lower face of the plunger head presses upon the upturned cup to substantially flatten the cup thereby developing suction within such cup whereby when the plunger head is moved away from the discharge pipe by the spring means, the valve body moves

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therewith to open the discharge pipe, with the valve body remaining in such position until the water level in the cistern is below the valve body whereupon air may pass through the open sided housing, through the aperture means to the interior of the resilient cup thus breaking the suction and allowing the valve body to fall in the housing onto the seat to close the discharge pipe.

2. A flushing valve as claimed in claim 1 wherein said aperture means is defined by a bore extending from the lower face of the plunger head to the perimeter of the plunger head.

3. A flushing valve as claimed in claim 1 wherein said aperture means is defined by a bore extending from the lower face to the upper face of the plunger head.

4. A flushing valve as claimed in claim 1 wherein said valve body includes an annular plate, an annular resilient washer disposed beneath the plate and having a diameter slightly greater than that of the valve seat, and a nut and bolt unit securing the plate, washer and resilient cup together.

5. A flushing valve as claimed in claim 1 wherein an annular flange extends upwardly from the perimeter of the valve body to coact with the sides of the housing to guide the valve body in the housing and said aperture means is defined by a bore extending from the lower face of the plunger head to the upper face of the plunger head.

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