July 31, 1945. H. C. GESSLER 2,380,906

DISPENSER

Filed March 3, 1943

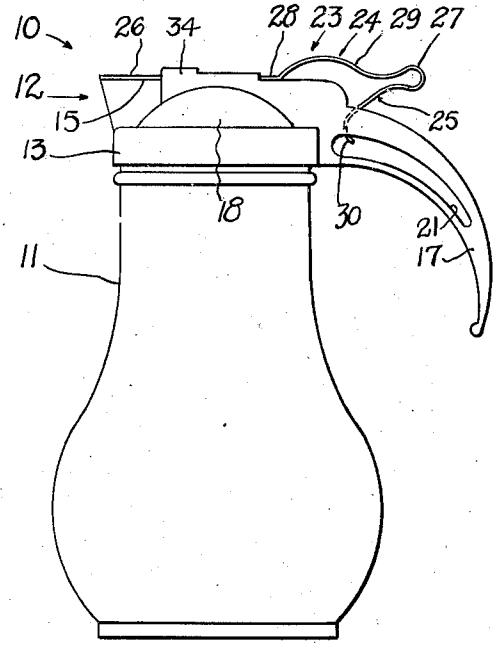


Fig. 1

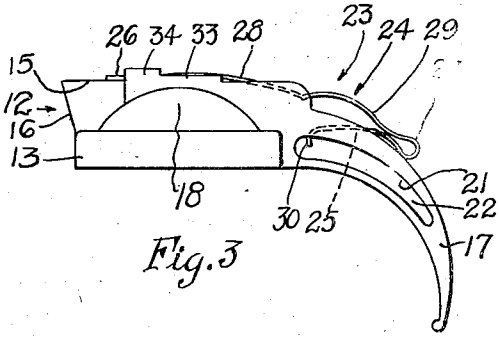


Fig. 3

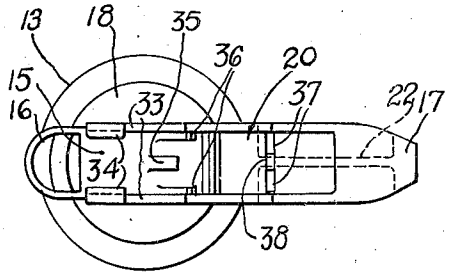


Fig. 4

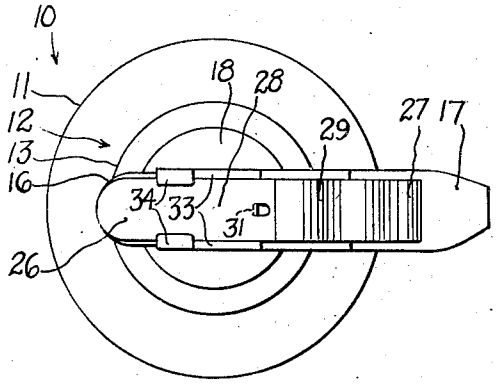


Fig. 2

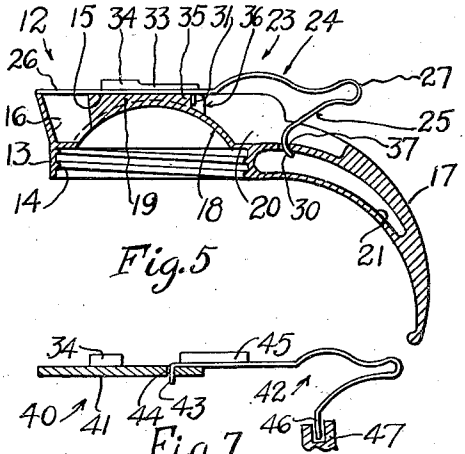


Fig. 5

Fig. 7

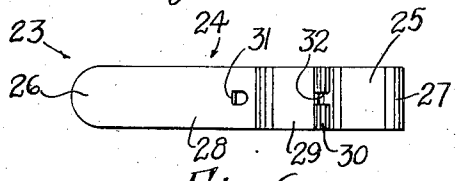


Fig. 6

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UNITED STATES PATENT OFFICE

2,380,906

DISPENSER

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Application March 3, 1943, Serial No. 477,892

1 Claim. (Cl. 222—473)

This invention relates to dispensing devices, and has particular reference to spring actuated valves therefor.

One object of the invention is to provide an improved device of the character described having few and simple parts, and which is particularly easy and quick to assemble and to clean, and which is neat and attractive in appearance, and durable, reliable and efficient in use.

Another object of the invention is the provision of a device of the nature set forth having a one-piece valve, finger piece and spring, these parts being cooperative with each other for a simplified mounting without requiring screws, rivets, pins or the like, whereby the structure need merely be snapped into fully operative position.

Another object of the invention is the provision of a device of the type mentioned wherein the operating structure is resilient to afford a more uniform and greater range of spring action than is available with a coil spring, at the same time omitting the expense for assembling and mounting the latter.

Another object of the invention is to furnish a device of the class alluded to wherein a finger piece for opening the valve constitutes a spring for closing the valve.

Another object of the invention is to construct a device of the nature set forth, wherein a slide part, which may be the valve or the immediate actuator therefor, forms a strip spring which causes closing of the valve in cooperation with other parts.

Another object of the invention is to furnish a device as stated, wherein a slide valve element is connected at an acute angle to an actuator, or pivot member, these being so related to each other that upon retraction of the valve element the angle is decreased or the distance between the plane of the valve element and the pivot point is diminished, whereby a spring portion can be provided in the valve element or at the connection in the pivot member, so that downward pressure on the connection functioning as a finger piece causes opening of the valve, and release of the pressure causes the spring to increase the angle or distance referred to in order to project the valve along its plane to closing position.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claim, and illustrated on the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a view in side elevation showing a device embodying the invention with the valve closed.

Fig. 2 is a top plan view thereof.

Fig. 3 is a view in side elevation of a cap embodying the invention, like that of Fig. 1, but with the valve retracted to open position.

Fig. 4 is a top plan view of cap, but with the valve-spring unit removed.

Fig. 5 is a central sectional view of Fig. 2

Fig. 6 is a bottom plan view of the valve-spring unit.

Fig. 7 is a diagrammatic sectional view of a modification.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which this invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Referring in detail to the drawing, 10 denotes a device embodying the invention. The same may include any container, such as a glass bottle 11, having a flow control means 12 suitably connected thereto. For example, the means 12 may comprise a cap 13 internally threaded at 14 for detachable connection to the container 11. Formed in or on the cap 13 is a valve seat 15 which is desirably elongated, and with which communicates an outlet or part 16. If the latter be arranged as a spout, the port is preferably at one end of the valve seat 15. Adjacent to the other end of the valve seat, and lying in the central vertical plane of the latter is a handle 17 connected to the cap, and desirably extending downwardly. For reasons hereinafter apparent, the horizontal plane of the valve seat 15 is spaced a substantial distance above the handle 17. More specifically, the decorative dome wall 18 carries a thickened wall portion 19 that forms a portion of the seat 15, and an upward opening recess or chamber 20 being formed lateral to the dome and above the handle. While the handle may be variously constructed, it is hollowed out

at 21 for lightness, and reenforced by a central web 22.

The valve-spring unit 23 is preferably made of a single piece of resilient material such as sheet stock consisting of steel, plastic, or other materials. It may be of generally U-shaped form, having arms 24, 25, disposed at an angle to each other. The arm 24 may include a slide valve portion 26, and is primarily lineally movable. This arm is therefore substantially longer than the arm 25 which operates mainly angularly as by a pivotal action or the like. As the arm 25 controls retraction of the valve by said angular movement, it may be called an actuator. The bight portion 27 of the unit 23 serves as a finger piece to cause the angular movement of the arm 25. It will be noted that the arm 24 may comprise a section of substantial length between the valve part 26 and the finger piece 27. For example, this section may include a part 28 plane with the valve and a part 29 which is curved for added flexibility and as a portion of the finger piece 27. The free end of the arm 25 may have a hook portion 30 that may be made by a reverse curve. If need be, a stop 31 may be formed by striking out a tongue from the part 28, and a notch 32 may be cut in the end of the hook 30. This completes the valve-spring unit 23.

Means is provided for slidingly guiding the arm 24 along the valve seat 15, including a pair of lips or flanges 33, which may have enlarged undercut portions 34 that confront each other. The lips 33 retain the valve in a true lineal sliding path while the undercut parts 34 prevent separation of the valve from the seat 15. For cooperation with the stop 31, a stop portion 35 may be cast on the top of the dome wall 18, to function as in Fig. 5, the recess 20 affording ample clearance space for the stop when the valve is retracted. The stops may be omitted, and are useful mainly at the instant of release of the finger piece 27 and consequent throw of the valve 26 by spring action, when there is some tendency for the valve to move too far, for the instant. For additional support, track elements 36 may be formed at the sides of the recess 20, so that the arm 24 may rest thereon, without interference by the stop 31. The recess 20 may extend into the upper part of the handle 17, at the base of this recess there being two openings 37 for receiving the tines of the notched hook 30. These tines extend in part into the openings 21, so that a lost motion pivotal action is obtained, because the hook 30 slides in and out relative to its receiving openings 37 in course of the angular movement of the arm 25. For instance, the maximum inward movement is shown in Fig. 1, in which the closed end of the notch 32 rests on the top of the rib, a result which is possible because the openings 37 are interconnected by a slot 38, which may be optionally provided.

It will now be clear that in the position of Fig. 1, the valve-spring unit 23 is automatically retained in operative valve closing position. Thus the valve cannot be withdrawn accidentally because the hook 30 prevents such movement. Likewise the arm 25 could not drop out of place, because the undercut lips 34 prevent such movement of the unit. Thus the latter is secured horizontally at one end and vertically at its other end, with spring pressure effective between the ends to maintain the required positioning. Further, the curved hook 30 provides for pivotal lost motion of the short arm 25, and since the socket is an opening 37 in a thin plate-like portion, the curved hook is adapted to slide on an edge of the socket to accommodate the swinging action of the arm 25, with the hook moving in an outward direction upon downward swinging movement of the short arm. The entire unit 23 is removable for thorough cleaning of the device, by upwardly springing the short arm 25 to remove the portion 30 from its socket.

For assembling, the arm 24 is first inserted and engaged in the undercut lips 34, and then the arm 25 is bent upward and the hook 30 is snapped into the openings 37, which constitutes an extremely simple operation.

For opening the valve 26, the operator holds the handle 17 and presses down on the finger piece 27, causing the valve-spring unit 23 to assume the position of Fig. 3. When this occurs the hook 30 turns and slides on an edge of the openings 37, some deflection occurs in the arm 25, the bight 27 tends to close and may move into contact with the handle as a stop, deflection occurs in curved spring part 29, and deflection also occurs in the straight part 28. The deflection of the part 28 is clearly shown in Fig. 3 and is beyond the supporting track 36, but there is ample clearance for the stop 31. It is therefore noteworthy that the valve arm 24 serves as a spring, particularly the section comprising the parts 28, 29 thereof. But the valve 26 and the immediately adjacent part remains quite plane.

It is desirable to note that when the valve is retracted, the angle between the arms 24, 25 diminishes and also the distance between the pivot point of the arm 25 and the arm 24 as evidenced by the downward flexure of the parts 28, 29. In a sense, therefore, the unit as a whole may be considered as bent, with the arm 25 serving as a motion controlling link or guide. Because of the substantial length of the sections 28, 29 and the provision of the bight 27, there is ample, large range resilience, without undue variation in stress, so that deflection of the arm 25 need not occur, as would be the case if the part 30 were fixed instead of forming a lost motion pivot. But if the arm 25 were so fixed, the tension would increase much more sharply. Another important advantage is an ample leverage, which is well placed for easy and convenient action at the finger piece 27.

It is noteworthy that the valve spring unit is well balanced and stable, even the arm 25 being guided by the side walls of the recess 20 and having a reliable footing at the openings 37.

Upon release of the finger piece, the unit returns to initial position instantly, until limited by the stop engagement at 31, 35. The unit is again completely balanced and stable. This would not be the case if a hinge were provided instead of the folded portion 27, but would obtain if a spring hinge were used, although the latter would complicate the device and would require a casing to function as a finger piece in place of the bight at 27.

In Fig. 7 is shown a modification 40 embodying the invention. As hereinbefore indicated, the valve-spring unit may be made of resilient plastic, but the elasticity of certain plastics is often limited. Hence it may be desirable to use a valve part made of plastic with a spring actuator made of metal. If both be made of plastic, two tone color effects are obtainable and certain manufacturing advantages result. Accordingly there is shown a valve part 41 made of plastic, and a separate spring part 42, these being interconnected as by a tongue 43 freely inserted through

a slot 44 in the valve part, and projecting to form a stop such as 31. Undercut retaining lips 34 may be provided for the valve and corresponding lips 45 for the spring, the latter being in other respects like the spring shown in the device 10, except that it is provided with a toe 46 inserted in a slotted member 47 that is stationary, whereby the short arm of the spring is flexed to a desired degree when the valve is retracted as in Fig. 3. Thus there is a greater degree of spring pressure for advancing the valve, and this is sufficient to overcome any friction with the guide 45 in the angular deformed position of the spring. Incidentally this illustrates an advantage of the device 10 in which the guide 34 is remote and hence causes little friction because the leverage is great. In the device 40, the only bottom support for the long arm of the spring may be the valve itself, hence this arm is subjected to less flexure than the arm 24 of the device 10, but this is compensated in part by flexure of the shorter arm. There may be any desired clearance in the opening 44 to assure smooth working of the device.

I claim:

A closure device including a member having an elongated horizontal seat and having an outlet at one end portion of the seat, an approximately horizontal strip means having a generally U-shaped expansion spring element having a long arm and a short arm, tending to move resiliently apart, the element having a resilient bight portion between the arms, the long arm having a valve portion slidable along the seat for controlling the outlet, the member having means adjacent to the outlet for retaining the long arm in sliding engagement with the seat, the short arm and a portion of the long arm lying beyond the member at the opposite end of the seat, the strip means haivng a curved end portion on the short arm remote from the bight of the element, the said end portion and the member having male and female releasably interengaged means comprising a thin, plate-like portion having an upright open ended socket therethrough and a male portion cooperating with the socket for lost motion pivotal engagement in the socket, the male and female means cooperating with the spring element and the retaining means so that said portions of the male and female means are maintained in operative engagement with each other by the resistance to contraction of the spring element and being releasable for removal of the strip means by pressing the arms toward each other, the bight of said element being adapted to be downwardly pressed to cause swinging movement of the short arm to retract the long arm for moving the valve portion to open position with the pressure on the bight portion causing said portions of the male and female means to remain engaged with each other, said male portion constituting a hook-like curved part bent downwardly at an angle to the plane of the seat, the socket portion being adapted to slidingly, swingably receive the hook-like part and having a section at the mouth thereof on which the curve is adapted to slide and pivot for said lost motion pivotal engagement, said curved part moving in an outward direction relative to the socket portion upon downward swinging movement of the short arm, said strip means being removable upon upwardly springing the short arm to disengage the hook-like portion from the socket.

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