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M. M. BARNARD ET AL
DOOR OPERATED SPRAY DEVICES

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2 Sheets-Sheet 1

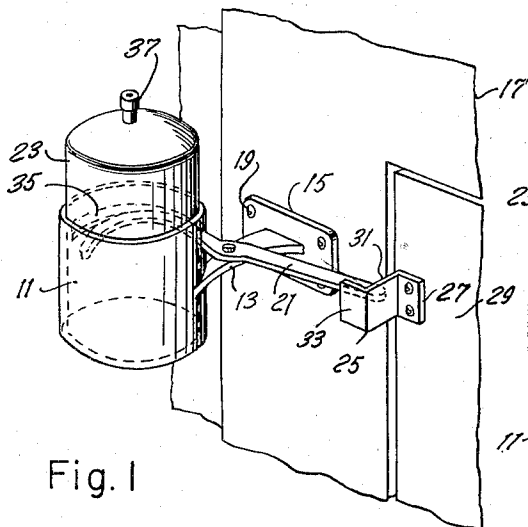


Fig. 1

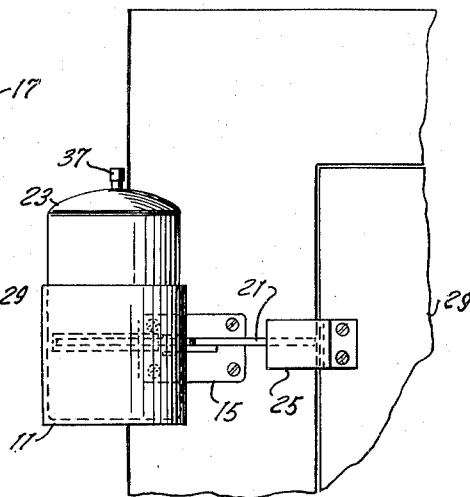


Fig. 2

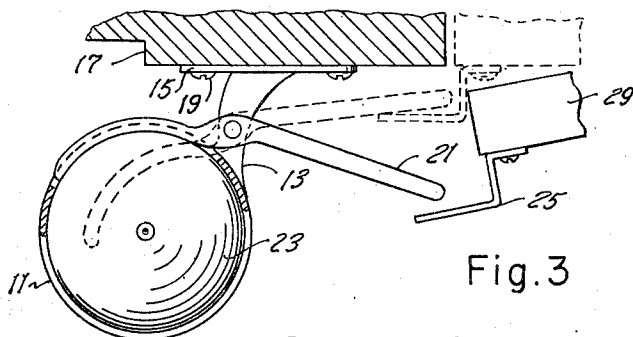


Fig. 3

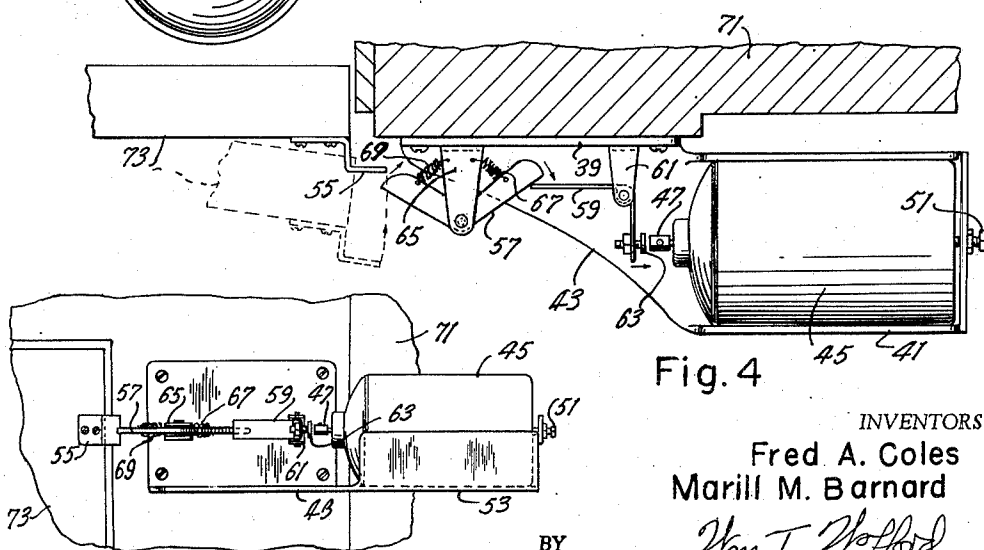


Fig. 4

Fig. 5

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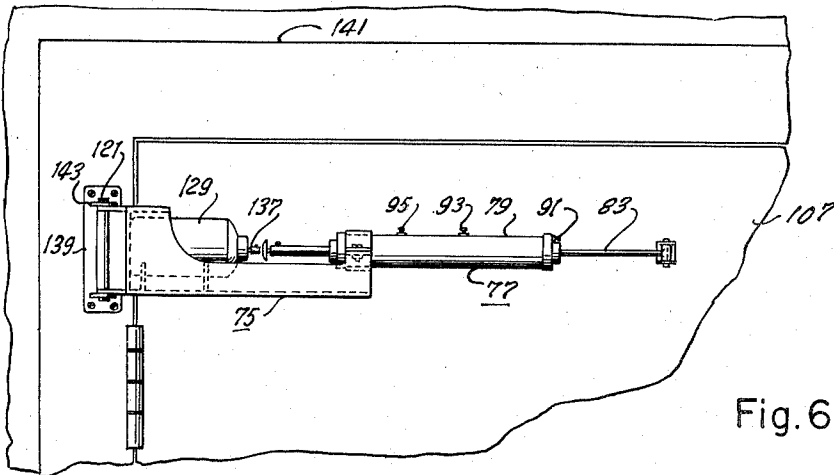
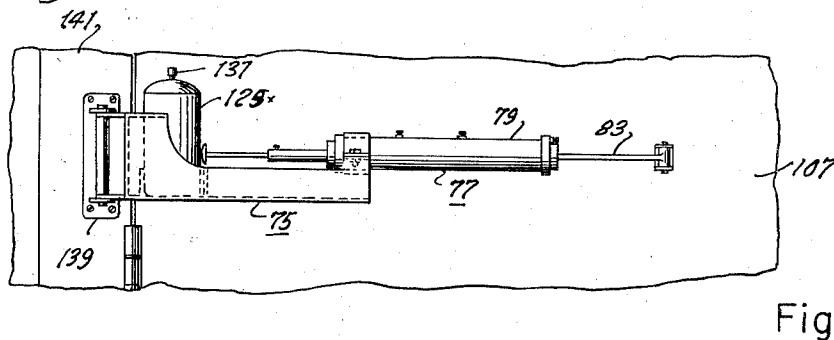
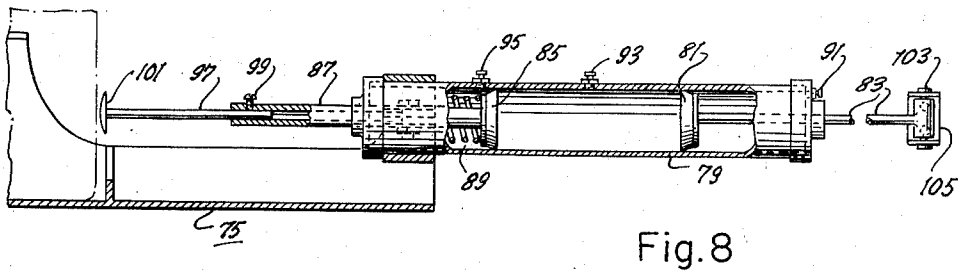
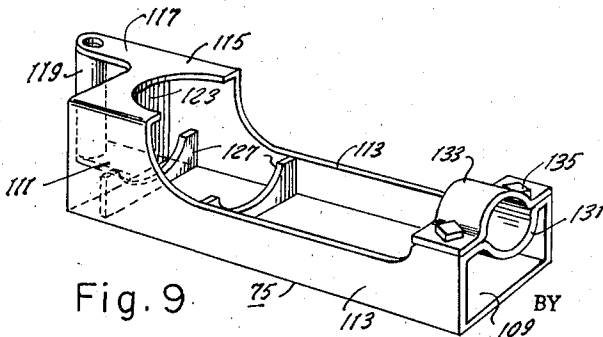
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DOOR OPERATED SPRAY DEVICES

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1 Claim. (Cl. 299—82.5)

Our invention relates to spray devices, and more particularly to devices for spraying fluids or gases into an enclosure when actuated by movement of the enclosure door.

Many such devices of the prior art of which we are aware employ permanent or fixed reservoirs, which are difficult to keep clean, are subject to rapid deterioration and clogging, and are inconvenient to re-charge. Some prior art devices of which we are aware employ non-permanent type reservoirs but these appear to be unduly complex, expensive to manufacture, lacking in versatility, and the reservoirs are inconvenient to remove and replace.

It is accordingly an object of our invention to provide novel and improved door operated spray devices of the replaceable reservoir type.

It is another object of our invention to provide improved door operated spray devices which are easy to keep clean and are not subject to clogging and deterioration.

Another object of our invention is to provide improved door operated spray devices of the non-permanent reservoir type which are simple, economical to manufacture, and in which the reservoir may be conveniently removed and replaced.

Another object of our invention is to provide door operated spray devices which incorporate a desirable degree of versatility.

Another object of our invention is to provide door operated spray devices wherein the reservoir may be a flexible container of a readily available commercial type, having a built in spray nozzle.

Another object of our invention is to provide an improved door operated spray device wherein the reservoir may be a can or bottle of a readily available commercial type having a trigger or push button operated spray nozzle.

Another object of our invention is to provide an improved door operated spray device wherein the reservoir may be either a flexible container or a trigger type can or bottle.

These and other objects are effected by our invention as will be apparent from the following description taken in accordance with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a schematic perspective view of a door operated spray device in accordance with a preferred embodiment of our invention;

Fig. 2 is a front elevational view of the device of Fig. 1;

Fig. 3 is a plan view of the device of Fig. 1.

Fig. 4 is a plan view of a door operated spray device in accordance with another embodiment of our invention;

Fig. 5 is a side elevational view of the device of Fig. 4;

Fig. 6 is a side elevational view of a door operated spray device in accordance with a further embodiment of our invention;

Fig. 7 shows the device of Fig. 6 used with a different type reservoir;

Fig. 8 is an enlarged view, partially in section, of a portion of Fig. 7 showing details of the reservoir actuating mechanism; and,

Fig. 9 is an enlarged perspective view showing details of the reservoir holder of Figs. 6 and 7.

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The device shown by Figs. 1, 2, and 3 is designed to hold a flexible type reservoir and to produce a spray action upon the closing of a door. The holder body is an open-topped cylinder 11 held rigidly in the upright position by a bracket arm 13 which is fixed at one end to the body and extends outwardly therefrom and is fixed at the other end to a mounting plate 15 which is firmly secured to the door facing by screws 19. An actuating arm 21 is pivoted on the bracket arm for movement about a vertical axis. One end of the actuating arm 21 is crescent shaped to conform generally to a portion of the outer surface of the side wall of a reservoir 23 held upright in the holder, while the other end is adapted for intermittent engagement by a striker 25. The striker is a step-shaped strap having one step portion 27 securely fixed by screws to the door 29 adjacent its swinging edge, the riser portion 31 extending outward perpendicular to the door surface, and the other step portion 33 extended parallel to the door surface and beyond the door edge. The reservoir holder body 11 is provided with a transversely extending slot 35 opening on its back side which allows movement of the crescent end of the actuator arm 21 into the body 11 and into contact with the reservoir wall. The flexible reservoir 23 which has a spray nozzle 27 at its top is simply set down in the holder. As the door is closed, the striker strap 25 will engage the actuating arm 21 and cause a squeezing action on the reservoir which will then emit a spray. When the door is opened again the reservoir will restore itself to its normal shape and be ready for the next spray action. The reservoir is preferably a flexible plastic bottle of the general type now commonly used to dispense numerous products.

The device shown by Figs. 4 and 5 is designed to use a reservoir having a trigger or push button type spray nozzle. The body of the device comprises a rectangular mounting plate portion 39, a reservoir holder portion 41, and a support portion 43. The holder portion 41 is in the shape of a rectangular box having an open end and an open top. The reservoir 45 is laid on its side in the holder with its spray nozzle 47 at the open end of the holder. The holder bottom and side walls are dimensioned so that the reservoir is snugly confined. An adjusting screw 51 is mounted in the holder end wall to provide for adjustment of the reservoir in the longitudinal direction. The holder support portion is actually an extension of the holder bottom 53 and has the general shape of a right triangle one leg of which coincides with the holder open end and the other leg of which coincides with the bottom edge of the mounting plate 39 which extends upwardly from and perpendicular to the support surface. The trigger or push button actuating mechanism comprises a striker 55, a V-shaped lever 57, and an L-shaped lever 59. The L-shaped lever is pivoted at the junction of its arms for movement about a vertical axis. The pivot support 61 is fixed to the mounting plate. In the neutral position, one arm of the L-shaped lever is perpendicular to the reservoir longitudinal axis. This arm carries an adjustable actuator button 63 which is aligned with the reservoir trigger so that counter-clockwise rotation of the lever 59 depresses the trigger. The V-shaped lever 57 is pivoted at its apex for movement about a vertical axis with the lever legs extending inwardly toward the mounting plate. The pivot support 65 is fixed to the mounting plate in a position such that clockwise movement of the V-shaped lever 57 brings the right hand arm into contact with the left hand arm of the L-shaped lever 59. The V-shaped lever is biased by a pair of springs 67, 69 to a neutral position such that the lever arms make substantially equal angles with the plane of the mounting plate 39. The striker 55 is identical to the

striker 25 of Fig. 1 and is mounted in the same manner. The mounting plate 39 is located on the door facing 71 in a position such that the striker 55 makes momentary contact with the left arm of the V-shaped lever 57 each time the door 73 is opened or closed. When the door is opened, the striker causes the V-shaped lever to move slightly counter-clockwise, allowing the striker to pass but not actuating the reservoir trigger. When the door is closed the striker again contacts the V-shaped lever causing it to move slightly clockwise which in turn causes the L-shaped lever to move slightly counter-clockwise to depress the reservoir trigger for a brief time. The length of time the reservoir trigger is depressed can be varied by adjusting the lost motion space between the actuator button and the reservoir trigger.

Figs. 6, 7, 8 and 9 show a door operated spray device which can accommodate either a trigger type or the flexible squeeze type reservoir. The major components of this device are a reservoir holder 75 and an actuator assembly 77. The actuator assembly is an air operated device having a closed cylinder body 79. Within the body are a driving piston 81 having its rod 83 extending out through the right hand end of the body 79, and a driven piston 85 having its rod 87 extending out through the left hand end of the body. The driven piston is lightly spring biased to the right by a compression spring 89. The body carries three valve ports. The first 91 is located at the right hand end of the body, the second 93 at the middle, and the third 95 to the left of the middle for purposes to be hereinafter explained. All these valves are adjustable from a full open to a full closed position. The rod 87 of the driven piston has a central bore at its left end adapted to receive a plunger 97. The plunger is adjustable longitudinally of the bore and is fixed in the selected position by a set screw 99. The plunger carries an actuating button 101 at its outer end which engages the reservoir to either depress a trigger or squeeze the reservoir body as the case may be. The outer end of the drive piston rod 83 carries a pivot pin 103 which mounts on to a pivot bracket 105 which is in turn fixed to the door 107 so that the actuator assembly pivots at that end about a vertical axis. The reservoir holder 75 is a box-like configuration having a rectangular bottom 109 with an extension 111 at the left end. The holder side walls 113 are identical. The side walls have their bottom edges contiguous with the side edges of the holder bottom 109 and extend upward from the bottom at right angles to it and parallel to each other. The left hand edges of the side walls are straight and are perpendicular to the plane of the holder bottom. The top edges of the side walls beginning at the upper left corner extend first parallel to the bottom edge, then in a curve downward and to the right, then parallel to the bottom edge, then in a curve upward and to the right, then again parallel to the bottom edge to the end. The side walls are bridged at their upper left end straight portion by a top plate 115. The top plate has an extension 117 matching that of the holder bottom. These extensions mount a sleeve 119 bearing adapted to receive a pivot pin 121 so that the holder may be pivoted about a vertical axis. The left end of the holder is closed by a rectangular end plate 123. The right hand edge of the top plate 115 presents a concave circle segment surface which will conform to the outer surface of a cylindrical reservoir 125 set upright in the holder as in Fig. 7. The holder has a pair of parallel spaced transverse partition pieces 127 at its left end portion. The partitions are separated by a distance corresponding to the transverse dimension of an upright reservoir as shown in Fig. 7. The top surfaces of the partition are concave so that they form a cradle support for a reservoir 129 laid on its side as in Fig. 6. The side walls at the right end portion are bridged by the bottom half 131 of a cylinder clamp the upper surface of which presents a concave shape at its central portion to accommodate the surface contour of the actuator as-

sembly body 79. The upper half 133 of the clamp matches the lower half and is removably secured thereto by screws 135. The actuator assembly 77 is clamped at its left end to the holder body as shown by Figs. 5, 6 and 7. When the actuator assembly is clamped in the holder its longitudinal axis substantially coincides with that of a reservoir laid on its side, so that the actuating button 101 is in position to depress the reservoir trigger 137 when the plunger 97 moves to the left. A mounting plate 139 is secured to the door facing 141 by screws and carries a pivot bracket 143 which extends outwardly therefrom. The left end of the holder body is pivoted to the bracket by means of the sleeve bearing and pin aforementioned. In operation, when a trigger type reservoir 129 such as that shown in Fig. 6 is to be used, the plunger 97 is adjusted so that the actuating button is just out of contact with the reservoir trigger 137. The first valve port 91 is opened and may be adjusted to give varying degrees of door closing resistance if that is desired. The second valve port 93 is opened and adjusted to give the desired amount of plunger travel and to provide the equivalent of some lost motion. The third valve port 95 is opened. When the door is opened, the drive piston 81 will move to the left and air pressure generated in the cylinder between the pistons 81, 85 will cause the driven piston 85 to also move to the left causing the actuating button 101 to depress the reservoir trigger 137. Since in the present instance only a trigger is to be operated, very little movement of the driven piston is required, and the second valve port is adjusted accordingly. As soon as the driven piston is past the third valve port the pressure in the cylinder is released allowing the drive piston to be moved by the compression spring 89 back to the neutral position. Thus the reservoir trigger depressing action is only momentary. When the door is closed the drive piston 81 returns to its normal position and the device is ready for the next spray action. When a flexible type reservoir 125 is used as shown in Fig. 7, the plunger 97 is adjusted so the actuating button 101 is just out of contact with the reservoir side wall. The adjustment of the first valve port 91 remains the same as before. However, in this case much more travel of the drive piston is required so the second valve port 93 is closed. Since it is not necessary that the actuating button contact be momentary, the third valve port 95 is also closed. Now when the door is opened the driven piston 85 will move to the left sufficiently to cause a reservoir squeeze spray action. The driven piston travel can of course still be adjusted by adjustment of the second valve port.

While we have shown our invention in several forms, it will be apparent to those skilled in the art that it is not so limited but is susceptible to various modifications and changes without departing from the spirit thereof.

We claim:

A door operated spray device comprising a reservoir holder adapted to be pivoted at one end about a vertical axis fixed to a door facing, and actuating mechanism having a driving piston at one end adapted to be pivoted at its rod end about a vertical axis fixed to a door, said holder incorporating means for removably holding either a flexible reservoir in the upright position or a trigger type reservoir in the horizontal position, said actuating mechanism incorporating a driven piston attached to a plunger, means at the free end of said holder for clamping the free end of said mechanism so that movement of said plunger will either squeeze a flexible reservoir or momentarily depress the trigger of a trigger type reservoir, and means for varying the travel of said plunger caused by opening a door.

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