United States Patent [19]

Hengesbach

[11] **3,711,028**

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[54] SPRAY DEVICE

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[21] Appl. No.: **134,605**

[52] **U.S. Cl.**.....**239/288.5,** 239/530
[51] **Int. Cl.** **B05b 11/00**
[58] **Field of Search**.....239/288, 288.3, 288.5, 82, 239/83, 530, 586, 526, 527, 528; 137/379

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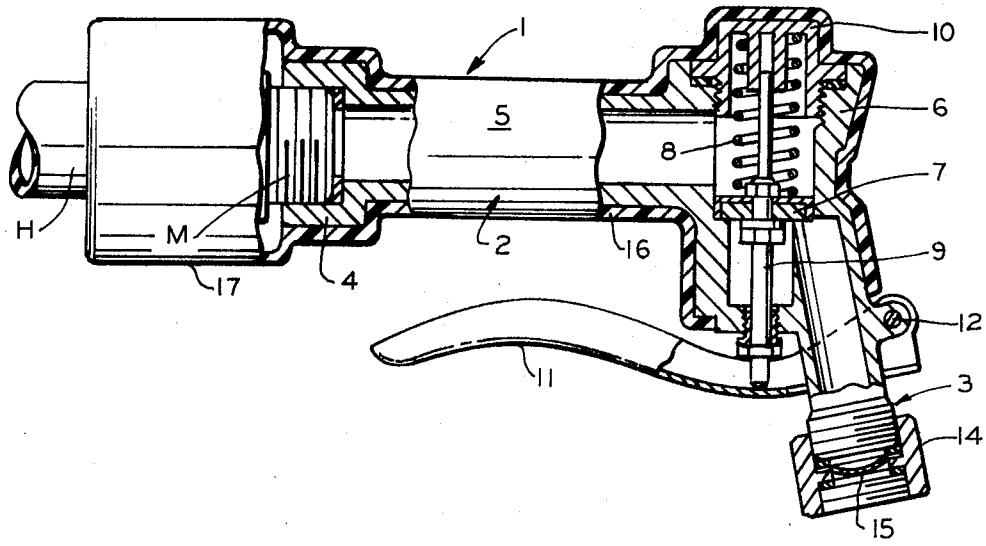
Primary Examiner—Allen N. Knowles
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[57] **ABSTRACT**

The spray device comprises an elongated metal body having at one end a discharge nozzle and at the other end an integral internally threaded inlet fitting adapted to be detachably coupled to a conventional external threaded outlet fitting such as provided on a garden hose. Intermediate its ends the body has a hand grip portion. The body is enclosed in sealed relation in an imperforate, heat insulating, flexible, vinyl plastisol jacket which extends from adjacent the nozzle to and beyond the inlet fitting. The portion of the jacket which extends beyond the inlet fitting is in the form of a shield of larger internal diameter than the inlet fitting and extends beyond the inlet fitting a distance such that when the hose fitting is screwed into the inlet fitting, the joint therebetween is within and fully surrounded by the shield so that hot water or dangerous chemicals being fed to the spray device and escaping at the joint is prevented from striking the operator.

The jacket is soft enough to absorb shocks when the device strikes hard objects.

7 Claims, 6 Drawing Figures



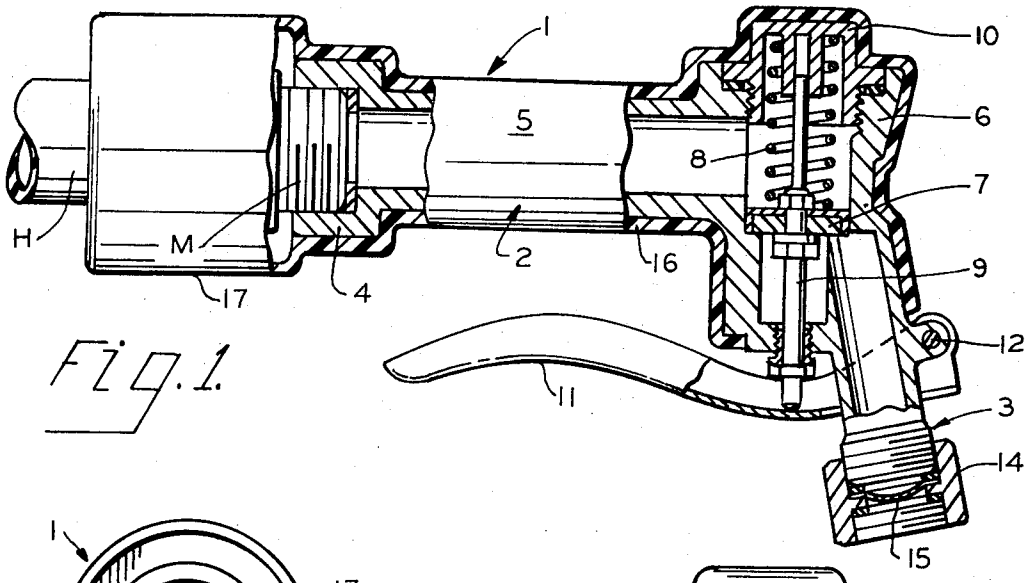


Fig. 1.

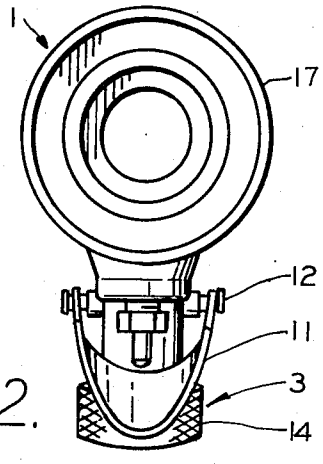


Fig. 2.

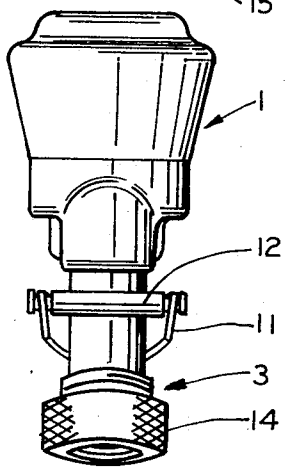


Fig. 3.

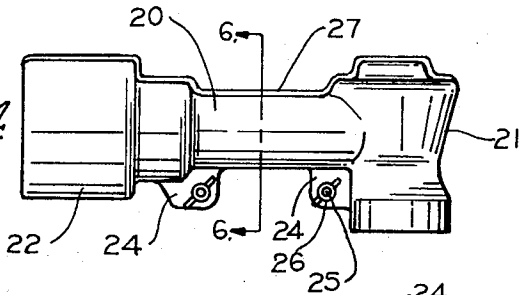


Fig. 4.

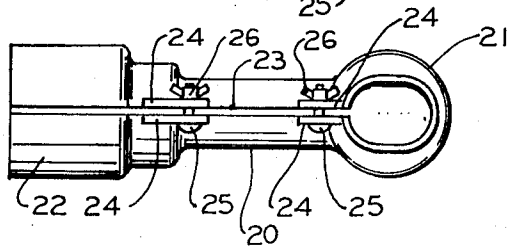


Fig. 5.

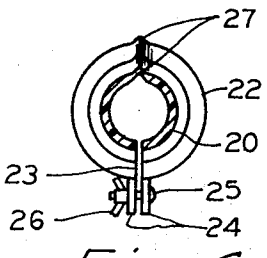


Fig. 6.

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SPRAY DEVICE

The spray device is an improvement on the one described in my copending application, Ser. No. 723,377, filed Apr. 23, 1968 and entitled Spray Nozzle, now U.S. Pat. No. 3,532,046 issued Jan. 4, 1972.

BACKGROUND OF INVENTION

1. Field of Invention

The invention is directed to a hand supported and manipulated spray device detachably connectable to a flexible supply hose.

2. Description of Prior Art

Heretofore, spray devices of the general character herein described have been known and have been arranged for attachment to conventional outlet fittings of flexible hoses, such as garden hoses and the like, which supply water from the household supply, or of hoses which supply chemicals and insecticides, from pressurized tanks. In general, prior spray devices have been made of metal and become heated rapidly if hot water is supplied thereto. In such cases, an asbestos or insulating glove must be worn on the hand holding and manipulating the device and operating its control valve. A less frequent, but more dangerous situation is created by the loosening of the connection between the fittings of the device and the hose, and the resultant leakage through the joint of the liquid being supplied to the spray device under relatively high pressure. Due to the threads and arrangement of the fittings, the leaking liquid discharges radially of the fittings, so that it strikes the hand, arm, or the body of the operator.

The present device is arranged to protect the hand of the operator against the heat transferred from the liquid by conduction through the metal body, and to prevent any fluids or liquids escaping from the connection between the fittings from striking the operator. It is also constructed so that it is less susceptible of damage as a result of being dropped onto cement floors or striking hard objects.

DESCRIPTION OF DRAWINGS

Various objects and advantages of the present invention will become apparent from the following description, wherein reference is made to the drawings.

FIG. 1 is a side elevation of a spray device embodying the principles of the present invention, part thereof being shown in section for clearness in illustration;

FIG. 2 is a left end elevation of the device illustrated in FIG. 1;

FIG. 3 is a right end elevation of the device illustrated in FIG. 1;

FIG. 4 is a side elevation, similar to FIG. 1, but on a reduced scale, illustrating a modification of the invention;

FIG. 5 is a bottom plan view of the structure illustrated in FIG. 4; and

FIG. 6 is a fragmentary cross sectional view taken on the line 6—6 in FIG. 4.

Referring to the drawings, the spray device, indicated generally at 1, comprises a body 2 having at one end a discharge portion 3 and at the other end an inlet fitting 4 which is integral with the body. The inlet fitting 4 is internally threaded for detachable connection to a male fitting M on a conventional garden hose H, so that liquid or gases can be supplied to the device and the device can be manipulated by hand.

Between the discharge portion 3 and the inlet fitting 4 the body has an integral hand grip portion 5 adapted to be gripped in the hand of an operator for supporting and manipulating the device.

As disclosed in my above identified patent, the body 2 is provided, at a location between the discharge portion 3 and the adjacent end of the hand grip portion 5, with an enlarged hollow valve housing portion 6. A valve 7, seated by a spring 8, is mounted in the portion 6. The valve has an operating stem 9 which extends to the outside of the body through the underside of the housing portion 6. The valve is installable directly in the housing portion 6 through a top opening closed by a threaded cap 10.

For operating the valve, a handle 11 is pivotally connected by a pivot 12 to the body 2 adjacent the discharge portion 3. The handle 11 extends alongside the hand grip portion 5 so that while the hand grip portion is held in the hand of the operator, the handle can be swung closer alongside the hand grip portion to open the valve by normal flexure of the fingers. The discharge portion 3 carries a threaded detachable spray cap 14. The cap 14 is threaded so that it can be screwed onto the discharge portion of the body either end foremost, selectively. The cap carries a perforated disc 15 so arranged that in one endwise position of the cap, the disc causes the liquid to discharge from the device in a wide spreading conical pattern, and in a reversed endwise position of the cap to discharge as a long concentrated forceful stream.

The spray device thus far described is known in the art and is described in my above identified patent. Such devices are sold in the trade for both household and industrial use. While quite often they are used on the ends of conventional garden hoses for discharging cool water, they are frequently used on flexible hoses which deliver hot water, and highly caustic or dangerous chemicals or insecticides and the like, oftimes heated to high temperatures, and frequently scalding water and steam for automobile washing.

In the case of heated liquids the heat quickly passes by conduction through the body so that the hand grip portion soon approaches the temperature of the liquid being discharged, and thus may render the hand grip portion uncomfortable to the touch or too hot to be gripped safely in the bare hand.

Even greater potential for danger resides in the threaded joint between the inlet fitting 4 and the male fitting M of the hose H. Considering the nature of use, there is always danger that this joint will become loosened with the result that the liquid or gases being supplied to the spray device will leak out. This leakage, particularly if the source of liquid is under substantial pressure, tends to be in considerable volume and spreads and flies out radially of the fitting 4, thus endangering the hand and body of the operator of the device.

In order to eliminate these undesirable characteristics and potential dangers, in accordance with the present invention, the entire body 2, beginning a short distance from the discharge end of the discharge portion 3 and extending entirely to and beyond the inlet fitting 4, is enclosed in the jacket 16. This jacket is imperforate and preferably is firmly bonded to the body throughout the enclosed extent of the body, preferably by molding it in situ directly on the body.

FIG. 2 is a section through the device of FIG. 1 along the line II — II.

FIG. 3 is a plan view of a partial section through a rotating bottle table used in a bottle opening machine.

FIG. 4 is a section through a part of the gripping means and a bottle held thereby, along the line IV — IV in FIG. 2.

The rotating bottle table shown in the drawings comprises a central rotating shaft 1, having mounting means 2 fixed to the lower end at regular distances along its circumference by means of lock screws 3. The mounting means 2 serves for the securing of a rotating disc 4 and a disc 5. The rotating disc 4 is secured to the lower end of the mounting means 2 by means of bolts 6. The disc 5 is secured to the upper edge of the mounting means 2 by means of a bolt 7. Thus rotating disc 4 and the disc 5 are mounted to the central shaft 1 in a manner that rotation of the discs with respect to the shaft is avoided. The rotating bottle table further comprises a lower bottle dial plate 8, the circumference of which is provided with moonlike recesses 9 at regular distances. The dial plate 8 is mounted at some distance above the rotating disc 4 and is fixed near its inner circumference to mounting means 10, which is in turn mounted to the rotating disc 4. A second dial plate 11 is mounted relatively high above the disc 5. This dial plate 11 is provided with the same number of moonlike recesses 12 as the recesses 9 of dial plate 8 at regular distances, with the recesses 12 being of smaller diameter than the recesses 9 of the dial plate 8. The dial plate 11 is secured to the disc 5 by a long bolt 13, and between the lower side of the dial plate 11 and the upper side of the disc 5, a distance tube is provided in order to keep the dial plate 11 at a spaced distance from the disc 5.

The bottles 14 to be guided by the rotating table as shown in FIG. 2 rest with their neck part in the recesses 12 of the upper dial plate 11 and with their lower part in the recesses 9 of the lower dial plate 8, with the bottoms resting on the rotating disc 4. During rotation of the shaft 1, the bottles 14 are taken along with the rotating disc 4 and the dial plates 8 and 11. The bottles thus taken along, are guided under screw clamps for turning caps to or from bottles, and placed above the rotating bottle table. The bottles during the turning motion of the caps should not be allowed to rotate. For this purpose, gripping mechanisms are provided in the rotating table, and a gripping mechanism is added to each set of corresponding recesses 9 and 12. The mechanism comprises an arcuated grip arm 15 extending around the circumference of a bottle 14 by a recess defined therein from a point at some distance beyond the circumference of the recess at the inner side of the dial plate to beyond the dial plate. Each grip arm 15, is mounted to a vertical shaft 16 by the inner ends so that rotation with respect to the shaft is avoided. The upper end of the shaft 16 is supported in a bearing 17 mounted in an opening in the disc 5. The lower end is supported in a bearing 18 in the rotating disc so that the shaft 16 extends below the rotating disc 4. The extending end of the shaft 16 is provided with one end of a swing lever 19 fixed to the shaft 16 so that rotation with respect to the shaft is avoided. The other inwardly extending end is provided with a roller 21 freely rotatable around a vertical shaft 20. The roller 21 rests on the periphery of a cam disc 22 coaxially mounted to the central shaft of the rotating table and is secured under the rotating disc 4. The roller 21 is pressed to the cam disc 22 by a torsion spring 23 placed around the shaft 16. When the shaft 1 is rotated in the direction of the arrow in FIG. 1, the rotating disc 4 and the dial plates 8 and 11 are rotated. Thus, the lever 19 and the roller 21 are turned along, the roller 21 following the periphery of the cam disc 22. In FIG. 1, when the cam roller 21 passes the stretch *a–b* of the cam disc, the position of the swing levers 19 and the grip arms 15 on the shafts 16 is thus that the free ends of the grip arms 15 are resting on the bottles 14. In this position, the bottles are kept secured and cannot rotate when caps are screwed on the bottles. Passing the stretch *b–c* of the cam disc 22, the levers 19 are forced to swing counterclockwise, so that the grip arms 15 also swing counterclockwise, and the ends of the arms become released from the bottles, liberating the bottles. In this position, the bottles may be removed from the bottle table. The rotating bottle table shown in FIG. 1 is suitable for bottle closing machines, in which, during turning of the cap, a torsion moment is exerted to the bottles by the screw clamps in a clockwise direction. Movement of the bottles in that direction is avoided by the grip arms 15 when mounted as shown in FIG. 1.

The free ends of the grip arms 15 are preferably provided with rubber blocks 24 which are mounted in such a position with respect to the shaft 16 that, due to friction of the blocks 24 and the bottles, the grip of the arms 15 is further increased.

The increase of the gripping force may be derived from FIG. 4, which indicates the forces appearing when a bottle 14 is gripped by a gripping means 15 and a moment is exerted on the bottle caused by the capsulation action. That moment causes a force R acting on the bottle, composed of a normal force N and a friction force F. The direction of the force R is through the point O of the shaft 18. When the moment exerted on the bottle increases, the force F increases proportionally, which means that N increases, since the direction of the resultant force R should go through O. In other words, the force exerted by the gripping means 15 on the bottle 14 increases proportionally. This is true as long as the friction angle ϕ is smaller than the maximum friction angle ϕ_m. Thus, the force exerted on the gripping means 15 by the spring 23, may be small, and needs only to be sufficient to bring the gripping means 15 from the open position to the bottle. It is an advantage, therefore, that only very small forces are exerted on the bottle when it is opened or closed, so that bottles, which are very fragile or can collapse very easily, may be capsulated or opened in a proper manner.

The bottles may, in a way known per se, be supplied continuously to the bottle closing machine according to FIG. 1 by means of a rotating bottle table 25, and may be taken away continuously by means of a rotating bottle table 26.

In bottle opening machines, in which, during the action of opening clamps, a torsion moment is exerted in a reverse direction with respect to the moment exerted when bottles are closed with caps, the grip arms 15 may be placed in a 180° reversed position on the shafts 16 with respect to the position shown in FIG. 1. Such a use is shown in FIG. 3, in which the rotating bottle plate is rotatable in a counter-clockwise direction as shown in

said jacket, at the end opposite the shield, terminates endwise of the body short of the stem and pivotal connection, but close to the pivotal connection, and is in sealed relation to the body at its point of termination; and

said jacket has a slit at at least one side extending endwise the entire length of the body and shield so that the body can be received laterally through the slit of the jacket when the jacket portions at opposite sides of the slit are stressed apart so that the jacket is open along the entire length of the body and shield; and means are provided for securing the edges of the slit together with the body enclosed in the jacket

5. A spray device according to claim 4 wherein the body has a wall portion extending endwise thereof generally parallel to, and offset peripherally from, the slit arranged for flexing hingedly readily for facilitating spreading said portions of the body between said wall portion and edges of the slit apart from each other.

6. A spray device according to claim 1 wherein the outermost end of the inlet is substantially at the innermost end of the shield, and the jacket firmly embraces the body from the outermost end of the inlet at least partway toward the other end of the body.

7. A spray device according to claim 1 wherein a flexible hose is provided and has an outlet fitting in screw-threaded engagement with the internally threaded inlet;

said fitting and the joint between it and the hose being disposed within the shield and spaced from the open end of the shield.

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