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SPRAY GUN

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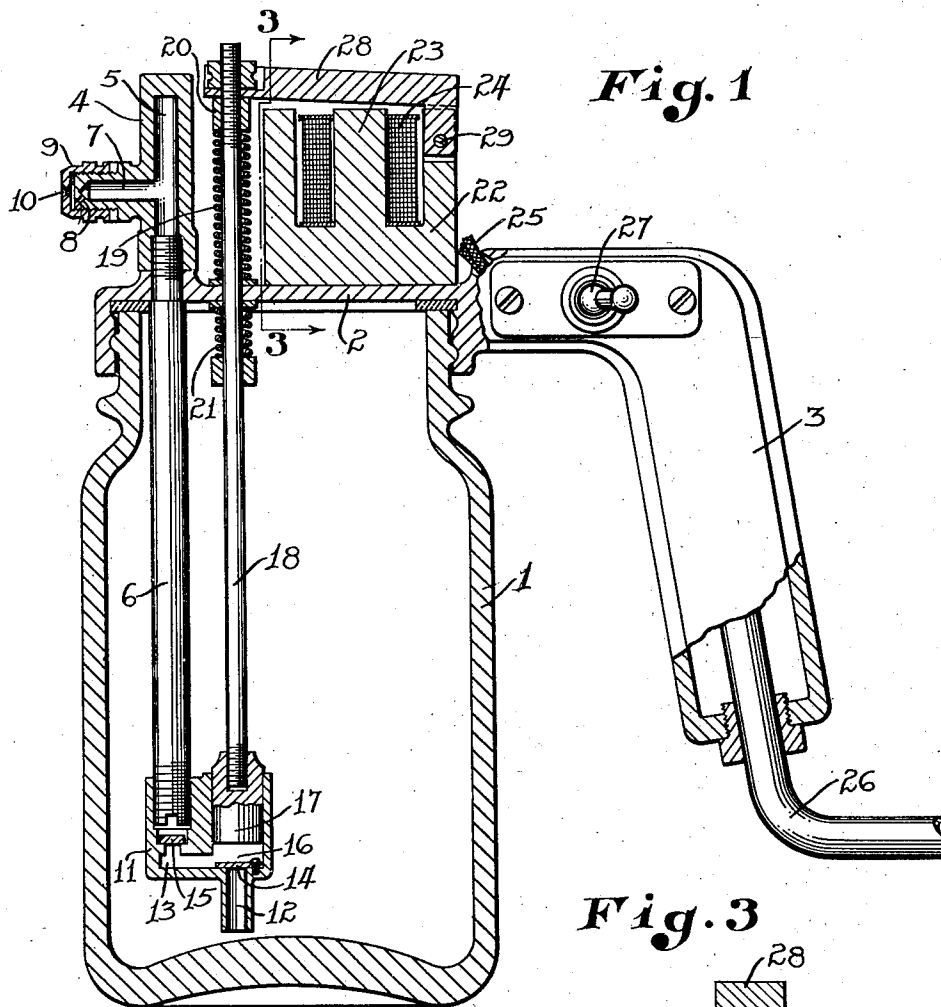


Fig. 1

Fig. 2

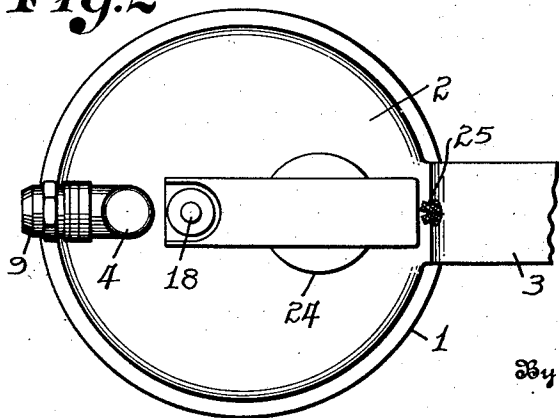
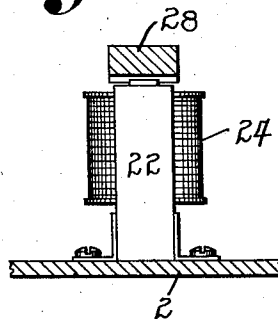


Fig. 3



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SPRAY GUN

Application filed December 8, 1930. Serial No. 500,687.

This invention relates to spray guns of the type wherein the liquid to be sprayed is forced under pressure, or by pump action, in spray form from a discharge nozzle but without the use of an atomizing air stream.

An object of the invention is the provision in a device of this character of simple and efficient means for forcing the liquid to be sprayed to and from the discharge nozzle with considerable force without subjecting the liquid in the associated container to pressure.

A further object of the invention is the provision of a small and compact unitary spray gun and pump structure which is capable of being connected with any liquid receptacle and which is electrically operable to effect a discharge of the liquid in spray form from the receptacle.

The invention is fully described in the following specification, and while in its broader aspect it is capable of embodiment in numerous forms, one embodiment thereof is illustrated in the accompanying drawing, in which—

Figure 1 is a central vertical section of a spray gun embodying the invention with parts in full. Fig. 2 is a top plan view thereof with a part broken away, and Fig. 3 is a fragmentary section on the line 3—3 in Fig. 1.

Referring to the drawing, 1 designates a receptacle for containing a liquid to be sprayed, and 2 a body or cover member therefor adapted, in the present instance, to have removable threaded engagement therewith. To facilitate handling, the member 2 is provided at one side edge with a handle 3, as is customary with devices of this character.

A spray head 4 is mounted on the member 2, preferably near the side edge thereof opposed to that from which the handle 3 projects, and in the present instance, has a vertical bore 5 communicating at its lower end with the interior of the receptacle 1 near its bottom through a tube 6. The head 4 is provided on its outer side, relative to the center of the member 2, with a discharge nipple 7 having its bore communicating with the head bore 5 and closed at its outer end except for a small discharge orifice 8 that is offset from its axis. A nozzle cap 9 is mounted on the

outer end of the nipple and has a central discharge orifice 10, which is offset with respect to the outer end of the orifice 8 and communicates therewith through a space provided between the respective ends of the nipple and cap. It is apparent that liquid under pressure within the bore of the spray head will be discharged in spray form from the cap or nozzle orifice 10.

The lower end of the tube 6 is provided with a foot-member 11 forming a pump cylinder and valve casing and having a liquid inlet passage 12 extending to near the bottom of the receptacle and an outlet passage 13 in communication with the lower end of the tube 6. The passages 12 and 13 are controlled by check-valves 14 and 15, respectively, the former opening inwardly and the latter outwardly with respect to the interior chamber or cylinder portion 16 of the foot-member. A plunger 17 is mounted for reciprocatory movements in the cylinder 16 and when moved upwardly, draws liquid into the chamber 16 through the passage 12, and when moved downwardly, forces such liquid through the passage 13 and tube 6.

A stem 18 projects upward from the plunger 17 through a guide opening in the member 2 and a distance above such member. A coiled expansion spring 19 is mounted around the stem 18 and with its opposite ends thrusts against the top of the cover and a collar 20 on the outer end portion of the stem. A compression or cushioning spring 21 is mounted on the stem 18 at the inner side of the cover and serves to cushion the upward movement of the stem and also cooperates with the spring 19 to normally hold the stem and its plunger 17 in elevated position, or, in other words, at the upward limit of their movements. A block 22 of magnetizable material is mounted on the cover 2, in the present instance between the stem 18 and handle 3, and is notched at its top to provide a core piece 23 around which a solenoid coil 24 is mounted. The lead wires 25 of the coil extend into the handle 3 and therefrom through a flexible sheathing 26 to an alternating electric current supply source or to a direct current supply in which the circuit is suc-

cessively made and broken rapidly by means of an interrupter in the circuit. A control switch 27 for the circuit wires 25 is mounted on the handle 3.

An armature 28 is mounted on the top of the block 22, being pivoted at its outer edge thereto, as at 29, and having its inner edge or that disposed adjacent to the stem 18 loosely connected with such stem and normally held thereby in spaced relation to the top of the block, as shown. An attraction of the armature 28 by an energizing of the coil causes it to move downward into stop engagement with the block 22 and to impart a downward movement to the stem 18 and plunger 17 against the action of the spring 19. Upon a breaking of the coil circuit, the plunger and armature are moved to the elevated position shown by the expansion action of the spring. It is thus apparent that a rapid making and breaking of the solenoid circuit will cause a correspondingly rapid reciprocatory movement to be imparted to the plunger 17, thus effecting an alternate drawing of liquid into the chamber 16 from the container and forcing of the same up through the tube 6 and out of the nozzle discharge orifice 10. The reciprocation of the plunger 17 is sufficiently rapid during operation to cause a steady stream of liquid to be discharged in spray form from the nozzle.

It is apparent in operation that the electromagnet or solenoid and its armature and the spring 19 serve as an electrically operated vibrator motor for imparting rapid pumping impulses to the plunger 17, and that upon each upward stroke of the plunger a small quantity of liquid is drawn into the chamber 16 from the receptacle and upon the next down stroke of the plunger, such liquid is forced into the tube 6.

It is also apparent that the cover 2 and spraying means together with the solenoid operated pump form a unitary structure which may be mounted on any suitable receptacle, and also that it is not necessary for the operation of the device that the cover member be closely mounted on the receptacle, as the device will operate just as satisfactorily as a liquid spraying device if the intake 12 of the foot member 11 is merely submerged in a liquid without having the top of the receptacle in which the liquid is contained closed.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. In a device of the class described, a liquid receptacle, a cover mounted thereon,

a spray head on the cover, a pump suspended from the cover within the receptacle and having its outlet in communication with the spray head and its inlet in communication with the interior of the receptacle, said pump having an operating plunger, a stem projecting from said plunger through the cover, means yieldingly retaining the stem in one position of its movement, a solenoid mounted on the cover and having its armature connected to said stem, whereby an energizing of the solenoid imparts movement to the armature in opposition to said yielding means to effect an operating of the plunger to draw liquid into the receptacle and force it to and from the spray head.

2. In a device of the class described, a liquid receptacle, a cover mounted thereon, a spray head, a plunger-type of pump and a solenoid carried by the cover, the pump being projected into the receptacle and having its outlet and its inlet respectively in communication with the spray head and interior of the receptacle, and means yieldingly retaining the pump plunger in one position of its movement, said solenoid having its armature connected to the pump plunger whereby an energizing of the solenoid actuates the armature to move the pump plunger in opposition to said means.

In testimony whereof I have hereunto signed my name to this specification.

JAMES E. PERRIN.