Jan. 6, 1953 P. C. HOLTE 2,624,622

GUN FOR DELIVERING A DETERGENT IN FOAM FORM

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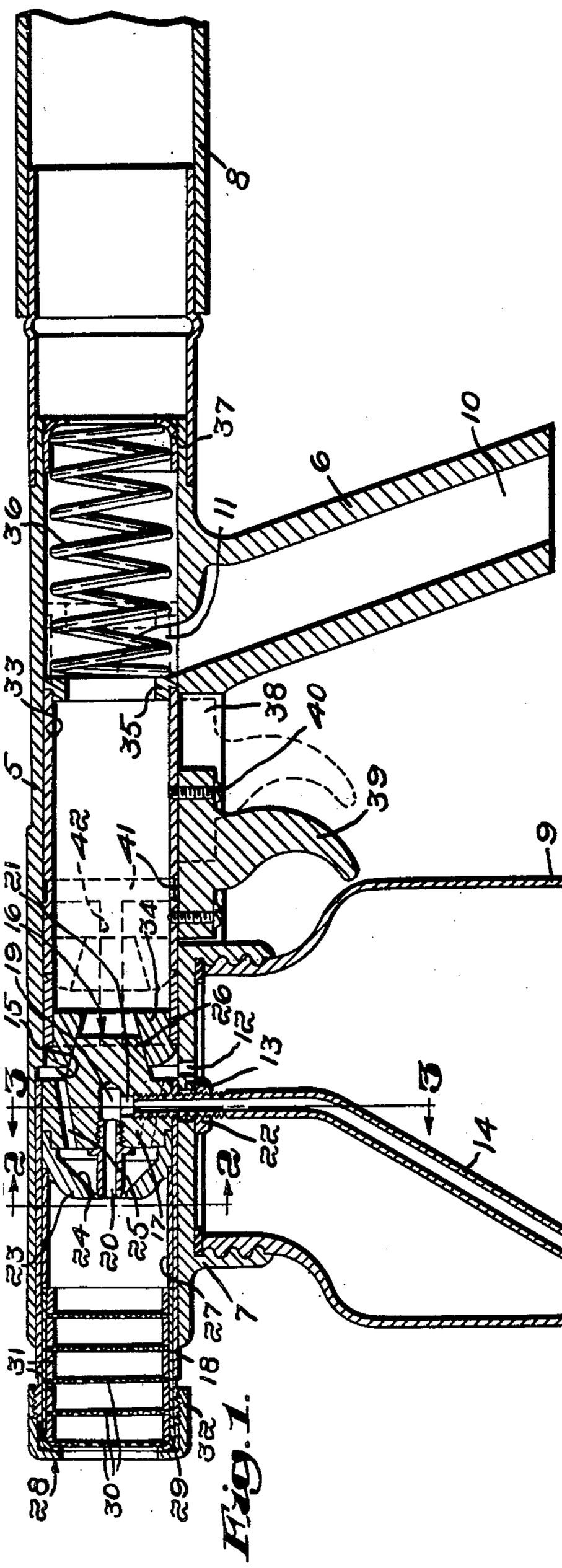

Fig. 1.

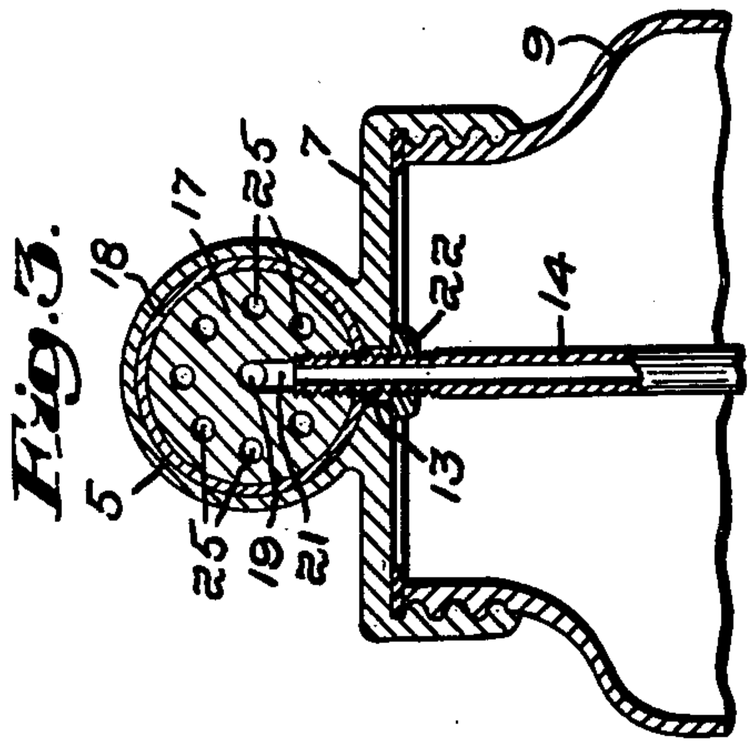

Fig. 3.

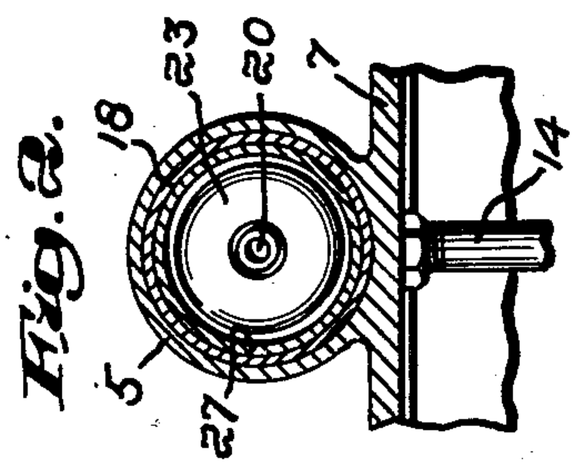

Fig. 2.

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GUN FOR DELIVERING A DETERGENT IN FOAM FORM

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6 Claims. (Cl. 299—89)

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My present invention relates to a gun to be connected to an air source for use in delivering a detergent in foam form to a surface to be cleaned.

It has been proposed to utilize such gun as attachments for vacuum cleaners so that by connecting them to the exhaust side thereof, they could be used to foam suitable detergents and deliver such to rugs and upholstery as an efficient means of shampooing them. Such proposals have been objectionable because of their general structural features and because, in particular, there was no relief of air when the gun was closed against foam delivery thereby subjecting vacuum cleaner motors to the risk of damage since their cooling is dependent on the continuous flow of exhaust air.

In accordance with my invention, I provide a gun for delivering a detergent in foam form to surfaces to be cleaned that consists of a barrel, the butt end of which is to be connected to an air source such as the exhaust side of a vacuum cleaner and which has screen means in its muzzle. Adjacent the rear end of the barrel is a butt having an air relief passage in communication with the interior of the barrel and adjacent the muzzle thereof is a mount to detachably support a detergent container and having a port to effect communication therebetween and the interior of the barrel. An atomizer in the barrel forwardly of that port has a port opening towards the rear end of the barrel and a supply tube extending through the mount to enter an attached detergent container. In the rear part of the barrel are trigger controlled valve means movable between a first position in which said ports are blocked and the relief passage is open and a second position in which the ports open and that passage is blocked. The valve means include a spring urging them into the first position but yieldable, when the trigger is actuated, to effect said second position.

By this construction, release of the trigger controlled means automatically ensures adequate relief of air safeguarding the motor of the vacuum cleaner against injury from overheating. At the same time, such a gun is well adapted to be economically produced and to be easily assembled and disassembled.

In the accompanying drawings, I have shown an embodiment of my invention which illustrates these and other of its novel features and advantages. In the drawings:

Fig. 1 is a longitudinal section through a detergent foaming gun in accordance with my invention, and

Figs. 2 and 3 are sections along the lines 2—2 and 3—3, respectively, of Fig. 1.

A gun, in accordance with my invention, for delivering soaps or detergents to the surface to be

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cleaned in soap form, consists of a barrel 5, a hand grip 6 adjacent its rear end, and a mount 7 adjacent its front end. Preferably, the barrel 7, the hand grip 6, and the mount 7 are parts of an integral casting.

The rear end of the barrel 5 receives a hose 8 attached to an air source such as the exhaust side of a vacuum cleaner, not shown, and the mount is shown as internally threaded to receive the exteriorly threaded mouth of a soap or detergent container 9.

I form the hand grip 6 with an air relief passageway 10 opening through its butt end with a port 11 effecting communication between it and the interior of the barrel 5 and as will be apparent from Fig. 1, the port 11 is of substantial width but of relatively short axial length. The barrel 5 also has a port 12 opening through the mount 7 so that air from that source may also be delivered into the attached container 9. Forwardly of the port 12, there is an opening 13 dimensioned to receive freely the threaded end of the supply tube 14.

I form the barrel 5 so that its front portion is of slightly greater diameter than its rear portion thereby to provide a shoulder 15 just to the rear of the port 12. In accordance with my invention, I provide an atomizing unit, generally indicated at 16, shown as consisting of a body 17 located at the end of a sleeve 18 which is a sliding fit in the front portion of the barrel 5 and which is of sufficient length so that when properly positioned it protrudes from the muzzle thereof.

The body 17 has an axial port 19 opening towards the muzzle into which is threaded a jet establishing member 80 and which has a radial passageway 21 in communication with the rear end of the port 19 and opening through the sleeve 18. The passageway 21 is threaded to receive the threaded end of the supply tube 14 by which the atomizing unit 16 is anchored in position with the nut 22 serving as a lock nut.

My atomizing unit 16 also includes a cap 23 having a shouldered connection with the body 17. The cap 23 has forwardly and inwardly inclined faces 24 defining a port closely encircling the end of the jet 20. I form the body 17 with a plurality of air ports 25 extending from end to end thereof to effect communication between the interior of the cap 23 and the rear end of the barrel 5 and preferably these ports are forwardly and inwardly inclined.

I provide the rear face of the body 17 with a projection 26 of frusto-conic form spaced inwardly of the rear ends of the ports 25 and extending rearwardly a substantial distance beyond the port 12.

Removably seated on the cap 23 and slidably in the sleeve 18 is a spacer sleeve 27 for the screen

means, generally indicated at 28, and shown as consisting of a sleeve 29 slidable in the sleeve 18 and positioned properly by engagement with the spacer sleeve 27. The front end of the sleeve 29 is inturned to retain the screens 30 shown as spaced from each other by the rings 31 which fit freely within the sleeve 29 but which are held in place by the spacer sleeve 27. A cap 32 threaded on the sleeve 18 holds the screen means 28 in place.

Rearwardly of the atomizing unit 16 is a sleeve 33 slidably fitting the rear part of the barrel 5 and carrying at its front end a valve seat member 34 engageable with the projection 26 to block the flow of air through the member 34 and being spaced thereby from the body 17 to leave the ports 12 and 25 in communication with each other so that residual pressure in the container 9 may then be quickly relieved. At its rear end, the sleeve 33 has a ring 35 engaged by one end of a spring 36 the other end of which seats against a spring retainer 37 locked in the rear end of the barrel 5 so that the spring 37 functions yieldably to seat the valve member 34 against the projection 26.

I form the barrel 5 with a slot 38 intermediate the mount 7 and the hand grip 6 which slidably guides the trigger 39 attached to the sleeve 33 by screws 40. The sleeve 33 is of such length, as may be seen by its full line position in Fig. 1, that when the valve member 34 is seated on the projection 26 the rear end of the sleeve 33 is forwardly of the port 11, while, as shown by its dotted line position, the slot 38 is of such length that the sleeve 33 may be pulled rearwardly by the trigger 39 into a position in which its rear part blocks the port 11. The thus established valve means has, accordingly, a first position in which the ports 12 and 25 are blocked and the port 11 is open to provide for the relief of air and a second position, effected by actuation of the trigger 39, in which the ports 12 and 25 are open and the relief port 11 is closed.

While the sleeve 33 may, of course, be dimensioned to so fit the rear part of the barrel 5 that air leakage therebetween is not a factor, I prefer, for purposes of economy, to have the sleeve 30 a relatively free fit therein. To avoid the objectionable results of leakage when the valve means is in its first position, I form the sleeve 33 with an annular groove 41 intermediate the trigger attaching screws 40. As the trigger 39 is a free fit in its slot 38, the leakage between the sleeve 33 and the barrel 5 is vented through the groove 41 and the slot 38. The periphery of the sleeve 33 may also be grooved as at 42 to establish a relief passageway in communication with the port 12 so that residual pressure in the container 9 may also be vented through the slot 38.

It will also be apparent that a gun in accordance with my invention is well adapted to economical production and to ease of assembly and disassembly. For example, the screen means 28 may be easily detached by unscrewing the cap 32 while it and the atomizing means 16 may be removed simply by releasing the lock nut 22 and unthreading the supply tube 14 from the body 17. Thereafter, the sleeve 33 and the spring 37 are released by disconnecting the trigger 39 from the sleeve 33.

What I therefore claim and desire to secure by Letters Patent is:

1. A gun to deliver a detergent in foam form, said gun comprising a barrel, the rear end of which is to be connected to an air source, screen means in the muzzle of said barrel, a butt adjacent the rear end of said barrel having a relief passage in communication with its interior, a mount adjacent the muzzle of said barrel to detachably support a detergent source and having a port to effect communication therebetween and the interior of the barrel, atomizing means in said barrel forwardly of said port having a port extending from front to rear thereof and including a tube extending through said mount to enter said detergent source when attached thereto and an axial seat extending rearwardly of said ports, a sleeve in the rear part of said barrel dimensioned to slidably fit therein and including an annular valve member engageable with said seat, a spring housed in said barrel rear part urging said sleeve forwardly into a first position in which said valve member engages said seat to block the flow of air through the sleeve into said ports and to space said valve member to leave said ports in communication with each other, said sleeve being of such length that in said first position said relief port is unblocked, and a trigger connected to said sleeve and slidably supported by said gun for such movement that said sleeve may be moved rearwardly into a second position blocking said relief port.

2. The gun of claim 1 in which the barrel has a slot freely receiving the trigger and the periphery of the sleeve has an annular groove in communication with the trigger slot when the valve member is positioned against its seat.

3. A gun to deliver a detergent in foam form, said gun comprising a barrel, the rear end of which is to be connected to an air source, screen means in the muzzle of said barrel, a butt adjacent the rear end of said barrel having a relief passage in communication with its interior, a mount adjacent the muzzle of said barrel to detachably support a detergent source and having a port to effect communication therebetween and the interior of said barrel, atomizing means comprising a sleeve slidable in the front part of said barrel, and including a body having a jet establishing passageway, ports extending from end to end of said body, and a radial passage in communication with said passageway, a cap having a port closely encircling said passageway and receiving air from said body ports, and a delivery tube threaded into said passage and extending through and locked to said mount to enter said detergent source when attached thereto, and operator controlled valve means having a first position blocking said ports and unblocking said passage and a second position unblocking said ports and blocking said relief passage.

4. A gun to deliver a detergent in foam form, said gun comprising a barrel, the rear end of which is to be connected to an air source and has a relief passage, a mount adjacent the muzzle of said barrel to detachably support a detergent source and having a port to effect communication therebetween and the interior of said barrel, a sleeve slidable in the front part of said barrel, atomizing means carried by said sleeve, said atomizing means having a port opening towards the rear of the barrel and including a delivery tube threaded thereto and extending through and locked to said mount to enter a detergent source when attached thereto, operator controlled valve means to deliver air in the alternative to said ports and said relief passage, said sleeve being of sufficient length that its front end protrudes

from said muzzle, screen means in said sleeve, and a cap threaded on said sleeve to retain said screen means therein.

5. The gun of claim 4 and a spacer sleeve slidable in the sleeve and seated against the atomizing means and positioning the screen means for engagement by the retaining cap.

6. The gun of claim 4 in which the screen means comprises a sleeve slidably in the first sleeve, a plurality of screens and rings freely entrant of the second sleeve spacing the screens in desired relation to each other, a third sleeve slidable in the first sleeve and with its rear end engaging the atomizing means and its front end engaging one of the rings, and a cap on the first

sleeve to hold the screen means against the third sleeve.

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