July 1, 1947. J. W. ARPIN 2,423,220

WATER PISTOL

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FIG. 1.

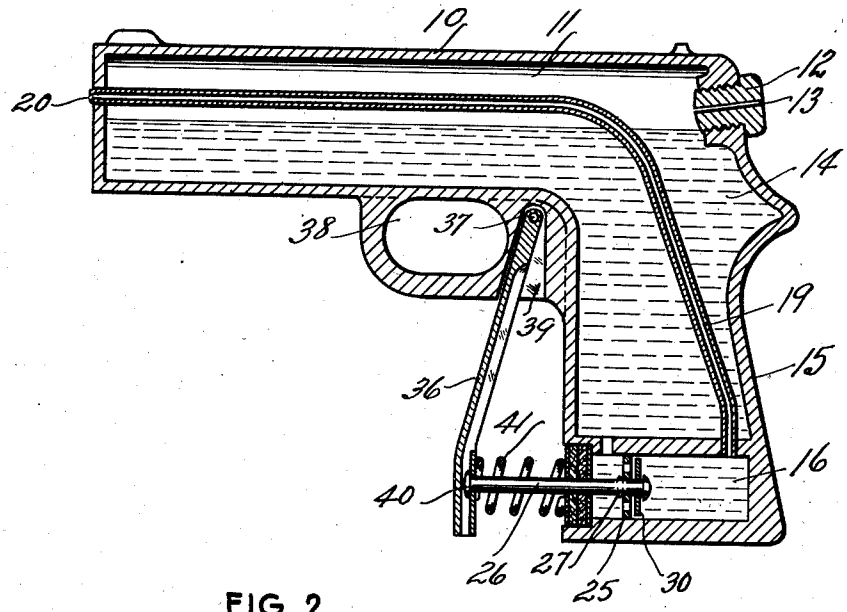


FIG. 2.

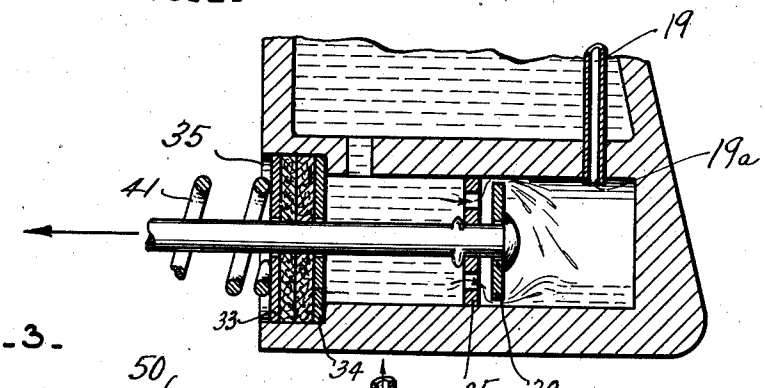
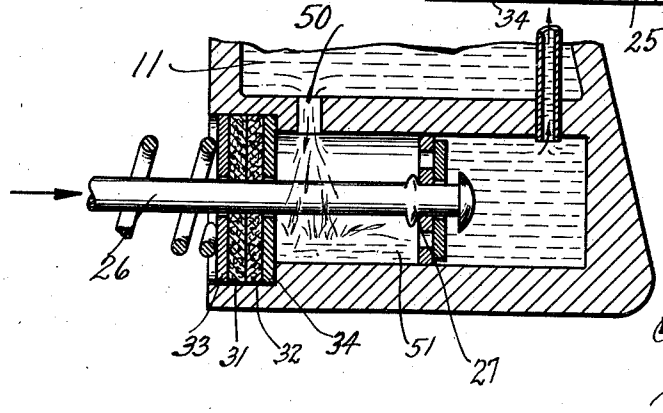


FIG. 3.



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FIG. 4.

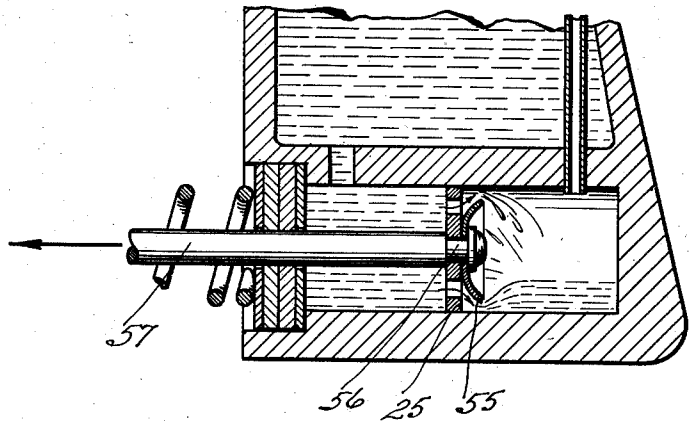
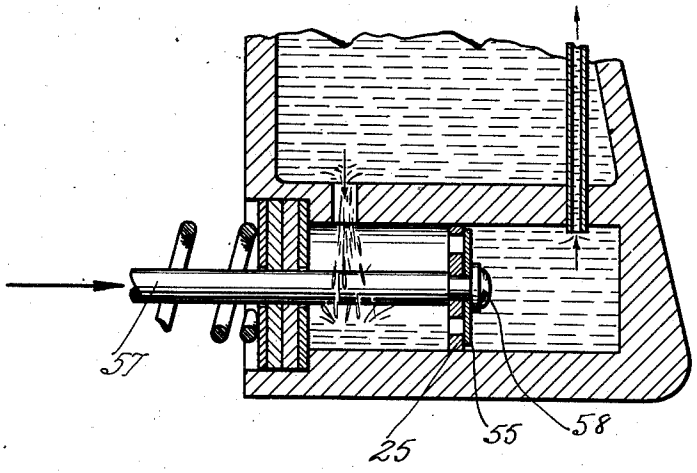


FIG. 5.



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WATER PISTOL

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5 Claims. (Cl. 222—79)

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This invention relates broadly to a toy pistol for ejecting water, of the type generally referred to as a water pistol.

One of the objects of this invention is to provide a multi-shot water pistol having a marked simplicity of operation and assembly in that parts heretofore thought necessary in the construction of such pistols are eliminated. Allied with this object is the provision of a valve in connection with a water pistol which operates through water pressure rather than spring pressure so that no springs operating in water are required and the pistol has therefore a longer life and more positive action.

Another object of this invention is to provide a water pistol having a trigger wherein the trigger operates a piston and valve through a packing in the housing of the device and wherein the packing, piston and valve are assembled as a subunit so as to facilitate construction of the device. There is further provided an external spring acting upon the trigger so as to maintain it in a normally outward position, the spring also serving to maintain tension on the packing so as to insure against leaking of the water therethrough.

Other objects of my invention will be apparent from the following description, it being understood that the above general statements of the objects of my invention are intended to describe and not limit it in any manner.

Referring to the drawings:

Fig. 1 is a longitudinal section of a water pistol embodying the instant invention.

Fig. 2 is an enlarged fragmentary view illustrating the filling action of the cylinder.

Fig. 3 is a view similar to Fig. 2 and illustrating the discharge action of the cylinder.

Fig. 4 is a fragmentary view illustrating the filling action of a modified cylinder.

Fig. 5 is a view similar to Fig. 4 and illustrating the discharge action of the modified cylinder.

The pistol is of generally conventional design and includes a body 10 which may be made of plastic, metal or any other suitable material. Body 10 is hollow so as to define a chamber 11 which serves as a reservoir for the water which is to be discharged. The butt of the pistol is provided with a threaded filler cap 12 having an air inlet opening 13 formed therein. Accordingly, the chamber 11 may be filled with the water 14 by unscrewing the cap 12 and pouring or otherwise applying the water through the opening in the butt of the pistol.

Within the handle 15 of the pistol is formed a cylinder 16 which may be round in cross-section,

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Communicating with cylinder 16 is a conduit 19 through which the water streams under pressure within the cylinder. The water is then discharged in a forceful stream through the nozzle 20.

The cylinder 16 is operative to prepare a charge of water for discharge through the conduit and to replenish the charge after the water has been ejected. A perforated plate 25 serves as a piston in applying such pressure to the water charge in cylinder 16 that it is forced upwardly through the conduit 19. Perforated plate 25 is substantially of the same diameter of the cylinder and is fixed in position on the piston rod or shaft 26 as by being forcefitted thereon. Rod 26 has upset portions 27 formed thereon so as to serve as stop or rest means for the plate 25.

A disk sealing member 30 is maintained on rod 26 and has a central opening whereby it may float freely on the rod. Member 30 is thus arranged to seal the perforations of plate 25 on the firing stroke so that a piston action is produced as pressure is applied to the water charge.

In order to permit rod 26 to reciprocate without leaking of the water contents, a packing is provided for an end wall of cylinder 16. Such a packing may comprise the leather washers 31 and 32 maintained between plastic plates 33 and 34 which are frictionally maintained within an annular opening 35 leading to the cylinder 16. Manual actuation of the rod 26 is accomplished by the trigger 36 which is pivoted at the point 37 adjacent the simulated trigger opening 38. An opening 39 in the body 10 permits the required movement of trigger 36 in actuating the rod 26.

Rod 26 is formed with an enlarged inner end 40 which is received in a suitable opening in trigger 36 to effect the required connection and transmission of movement. A coil spring 41 is maintained around rod 26 between the trigger 36 and the packing in order to maintain the trigger in a normally outward position. The spring 41 thus not only serves to reset the trigger and piston after each stroke as hereinafter described, but it further maintains constant pressure on the packing so as to prevent accidental displacement thereof.

The operation of the pistol is as follows:

On the firing stroke, the trigger 36 is pressed inwardly against the action of spring 41. Sealing member 30, which is of smaller diameter than the cylinder and freely movable on the rod, is acted upon by the water charge so that its forward movement is prevented. On the other hand, the plate 25 is brought forward and the pressure of the water has substantially no effect thereon be-

cause of its tight fit on the rod and because of the upset portions 27. Accordingly, plate 25 meets member 30 which effects a closure of the perforations of plate 25. It will be observed that the perforations are spaced radially outwardly of the disk 25 so that they do not register with the central opening of member 30. As illustrated in Fig. 3, the effect of producing contact between the plate and sealing member is to produce a solid piston or plunger which operates against the water charge in cylinder 16 so as to force it under pressure through the conduit or tube 19. At the same time, water from chamber 11 is sucked in through the opening 50 so as to fill the rear part 51 of cylinder 16. As the spring is then permitted to return to its normal condition, plate 25 moves rearwardly as illustrated in Fig. 2. Accordingly, the water in portion 51 flows through the perforations of the plate and insures a separation between the plate 25 and sealing member 30 by the pressure thereof. Thus, the water flows upwardly around the periphery of sealing member 30 and refills the discharge portion of cylinder 16. It is desirable that the combined area of the perforations in plate 25 be greater than that of opening 50 in order to discourage any tendency for the water to flow back through opening 50 instead of to the discharge portion of cylinder 16. It is also desirable, although not necessary, to form the end 19*a* of conduit 19 of smaller diameter than the remainder of the conduit in order to produce a capillary attraction which will maintain the water in the conduit instead of permitting it to flow out after discharge of the water in cylinder 16.

Inasmuch as the water will fill the cylinder 16 each time that the spring 41 resets the trigger 36 to its outward or non-operating position, a new charge will be prepared after each operation of the trigger. Accordingly, the water can be ejected in single shots until the supply thereof is exhausted. The plate 25 and sealing member may be fabricated of either metal or plastic material, as desired. The perforations of plate 25 may be arranged in a radial design and any convenient number of perforations, such as from 4 to 10 or more, is entirely satisfactory.

It will be observed that the trigger 36 being of elongated construction may be engaged by three or four fingers of a user so that considerable pressure can be applied when actuating the rod 26. Thus, a firm grip and more positive operation is produced.

Referring to Figs. 4 and 5, a modified embodiment is enclosed wherein a sealing disc 55 of flexible material is employed. The plate 25 and sealing member 55 are both mounted on a reduced portion 56 of rod 57. The centers of the sealing member and plate are maintained adjacent each other but the nature of the contact between the members determines the filling or discharging operations in the cylinder. Thus, in the action illustrated in Fig. 5, the rod 57 is actuated inwardly according to the description above so that the plate 25 and sealing member 55 are rendered coplanar by the action of the water charge thereagainst. It will be observed that the outer edges of the member 55 seal the open area or perforations of the plate 25. The enlarged rivet head 58 prevents the disassembly of the components.

On the retraction or filling stroke the outer edges of the flexible sealing member 55 are caused to be bent outwardly and away from the plate so as to uncover the perforations. Accordingly,

the water flows through the perforations into the front or discharge portion of the cylinder. Member 25 may be of a thermoplastic synthetic resin material such as one of the vinyl resins, cellulose acetate or equivalent materials. When the plate 25 and member 55 are in sealing contact, pressure may be applied to the water charge so as to discharge it forcefully and when member 55 is bent away from the plate so as to move out of such sealing contact, refilling occurs.

While there has been described what at present are considered preferred embodiments of the invention, it will be evident that many changes and modifications may be made therein without departing from its spirit. It is therefore aimed in the appended claims to cover all such changes and modifications which fall within the true spirit and scope of the invention.

I claim:

1. A water ejecting toy pistol comprising a body having a water chamber formed therein, a cylinder for receiving charges from said water chamber, a manually operated piston for applying pressure to a charge in said cylinder, a conduit communicating with said cylinder whereby the charge under pressure is forced through said conduit and forcibly ejected from the body, and valve means embodied in said piston for re-charging said cylinder after ejection of water therefrom, said conduit being restricted whereby to retain water therein during re-charging of said cylinder, an elongated trigger pivoted at one end to said body and operatively connected adjacent its other end to said piston, and a spring separating the piston connected end of said trigger from said cylinder to maintain said trigger in its outwardly pivoted or reset position.

2. The article according to claim 1 and wherein the trigger is pivoted at its said one end externally of said body, said spring being maintained likewise externally of said body.

3. A water ejecting toy pistol comprising a body having a water chamber formed therein, a cylinder for receiving charges from said water chamber, a manually operated piston for applying pressure to a charge in said cylinder, a restricted conduit communicating with said cylinder whereby the charge under pressure is forced through said conduit and forcibly ejected from the body, and valve means embodied in said piston for recharging said cylinder after ejection of water therefrom, said valve means comprising a plate in said cylinder having a portion of its area perforated so as to permit water from the chamber to traverse said perforated area and charge the cylinder, a sealing member arranged for movement relative to said plate whereby said plate and sealing member may contact each other to seal said perforated area or may separate to permit water to flow therethrough, a trigger operatively connected to said piston, said plate and sealing member being arranged in said cylinder so as to come into mutual contact to produce the piston action when said trigger is pressed and to separate when said trigger is retracted, said cylinder being horizontal and disposed entirely below said water chamber so as to be superimposed by said water chamber and being formed with an upwardly disposed water feed opening communicating with said water chamber.

4. The article according to claim 3 and wherein said perforated area is larger in extent than said water feed opening so as to offer less resistance to flow from the feed opening to the cylinder than is offered in the reverse direction.

5. A water ejecting toy pistol comprising a body having a water chamber formed therein, a cylinder for receiving charges from said water chamber, a manually operated piston for applying pressure to a charge in said cylinder, a conduit communicating with said cylinder whereby the charge under pressure is forced through said conduit and forcibly ejected from the body, valve means embodied in said piston for recharging said cylinder after ejection of water therefrom, a pivoted trigger operatively connected to said piston, a spring maintained externally of said body to maintain said trigger in its outwardly pivoted or reset position, said cylinder being horizontal and disposed entirely below said water chamber so as to be superimposed by said water chamber and being formed with an upwardly disposed water feed opening communicating with said water chamber.

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