Oct. 31, 1950 J. W. ARPIN 2,527,614

WATER PISTOL

Filed Jan. 29, 1948

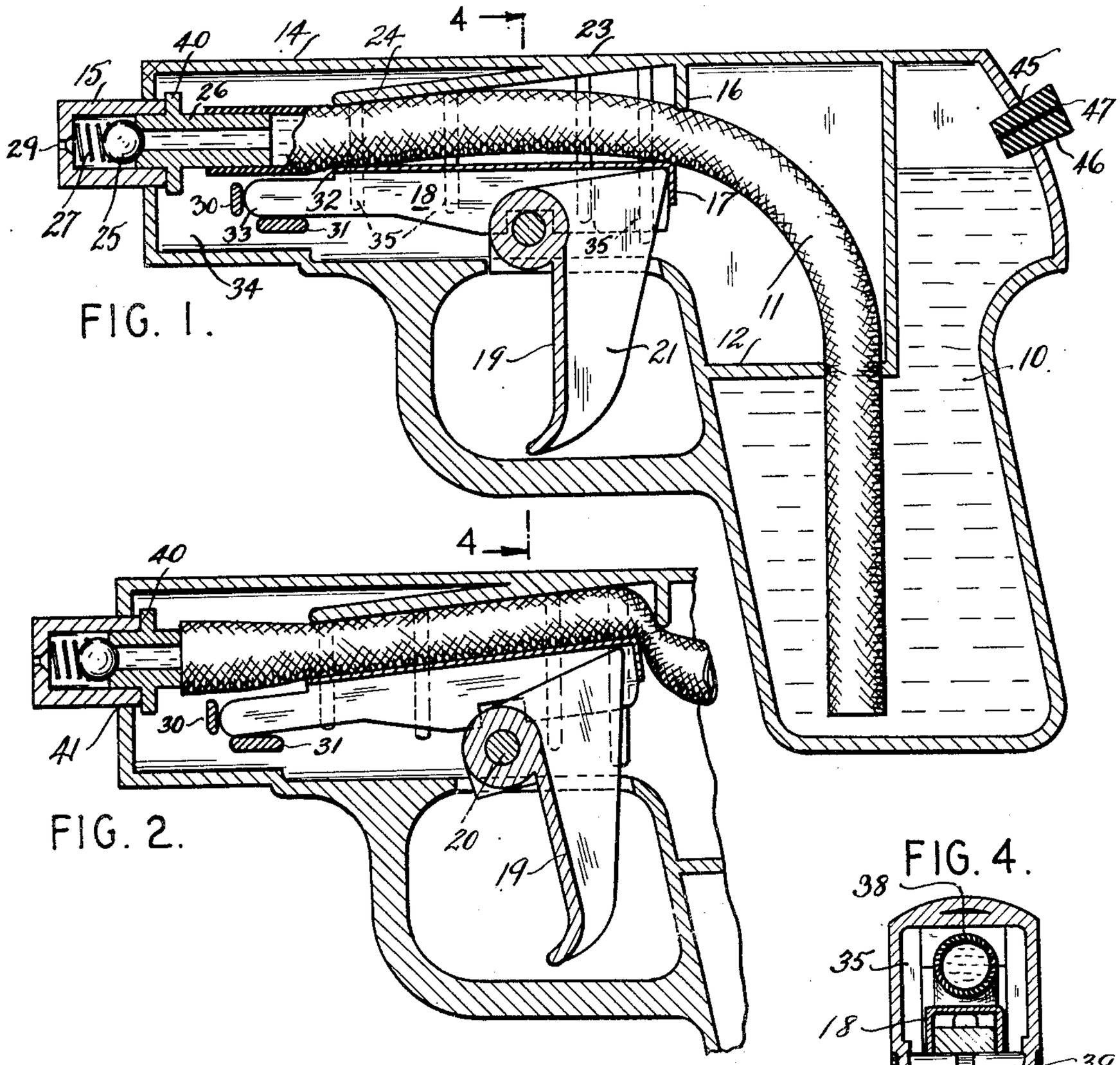


FIG. 1.

FIG. 2.

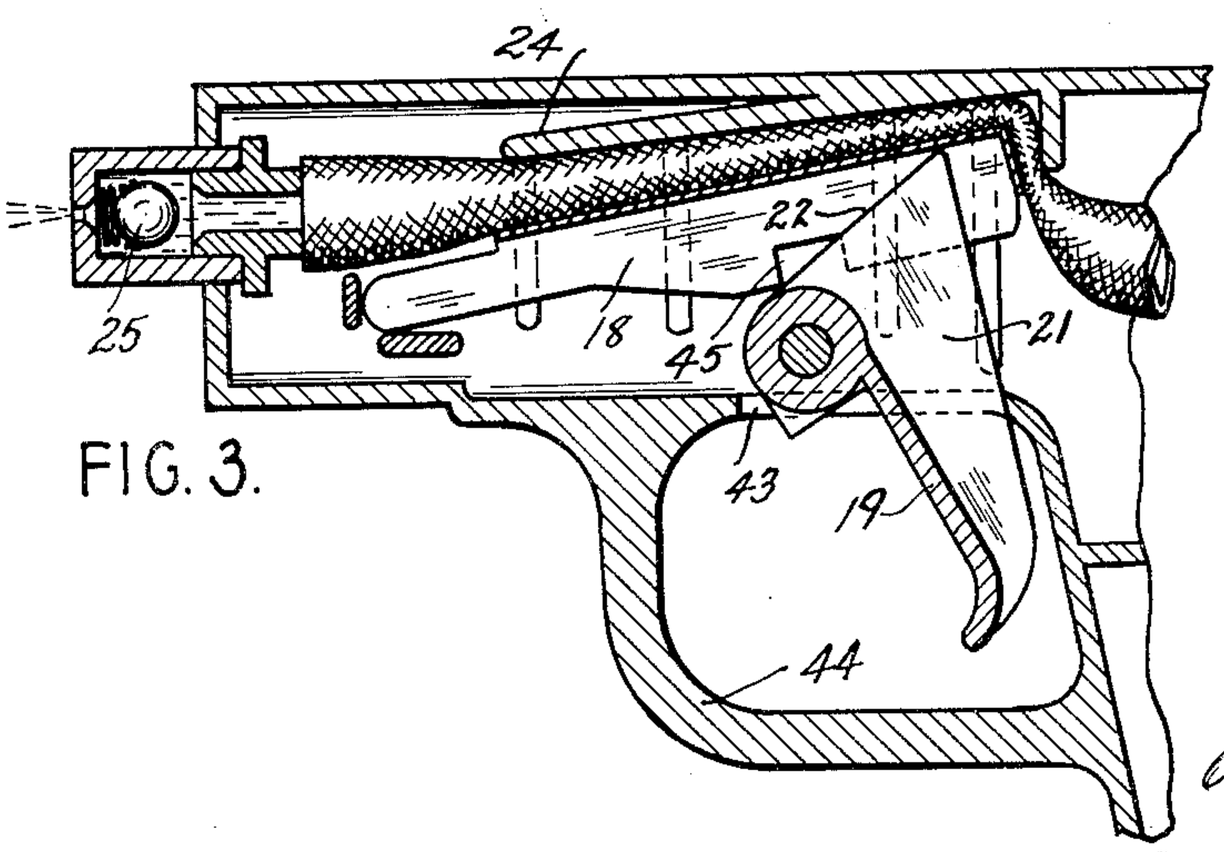
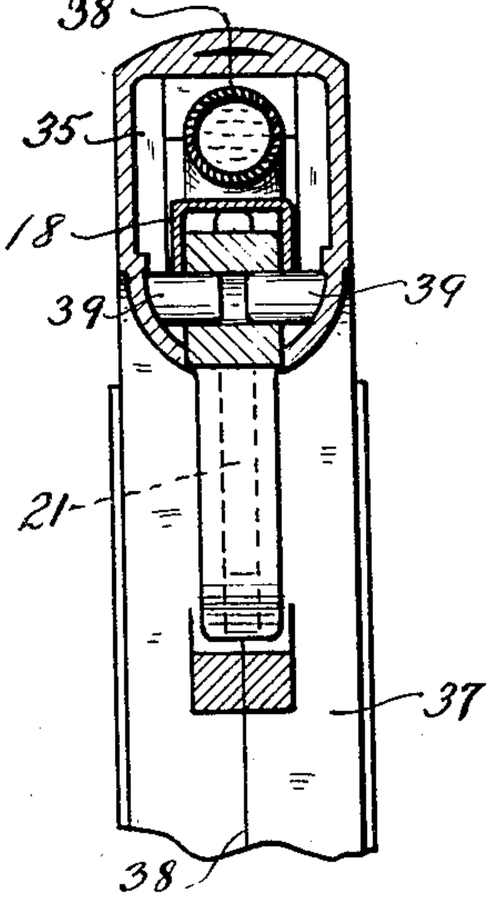


FIG. 3.

FIG. 4.



INVENTOR.
John William Arpin
By S. Stephen Baker
ATTORNEY.

Patented Oct. 31, 1950 2,527,614

UNITED STATES PATENT OFFICE

2,527,614

WATER PISTOL

John William Arpin, Verona, N. J.

Application January 29, 1948, Serial No. 5,050

14 Claims. (Cl. 222—79)

1

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

Water pistols of the multi-shot type are known, but most of them have been subject to various objections, such as complexity of manufacture and assembly, inadequacy of pressure, the necessity for employing specially constructed bulbs or tubes, the requirement that specially finished parts or springs be used, and other such difficulties including the objection that the pistols did not easily lend themselves to economy in production.

According to the present invention, the foregoing and other difficulties and objections are largely overcome and a device is provided which requires no expensive finishing of parts, is very easily assembled, is rugged and effective, and is, for the most part, producible from stamped metal or molded plastic parts.

To attain these and other ends, the handle is shown as a reservoir for holding the water, and the "barrel" of the device is shown as carrying a resilient or highly elastic rubber tube which dips into the reservoir and extends past a compression device to a normally closed nozzle. Operation of the trigger first constricts the tube so as to close its central channel above the reservoir, and compression of the tube then follows, so that the contained water forces open the nozzle causing a forceful ejection of water. The tubing shown, may be of a single, unitary length of uniform diameter of surgical tubing, highly elastic, and little affected by heat or cold.

The release of the trigger releases the tube so that it expands and the nozzle automatically closes. The resulting vacuum in the tube sucks up a new charge of water. The device is then ready for a second operation of the trigger, and the operation is repeated until the reservoir is empty. A large number of shots is possible because the tube is small in proportion to the reservoir. The number can be increased by using a smaller tube or larger reservoir and it is practical and very easy to provide a pistol capable of well over a hundred shots with each loading.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Fig. 1 shows the pistol in sectional side view ready for operation;

Fig. 2 is a similar side view showing the trigger operated to close the tube;

2

Fig. 3 is a similar view showing the trigger compressing the tube;

Fig. 4 is a sectional end view on the line 4—4 of Fig. 1.

In the form shown, the pistol includes an enlarged hollow handle 10 forming a reservoir, into which dips the end of a rubber tube 11 which is bent forwardly above the water, and is held in place by a partition 12 which closely fits the periphery of the tube so that the water in the reservoir may stand well above the horizontal part of the partition 12. The tube 11 is preferably but not necessarily of smaller outside diameter than the opening in the partition 12 so no packing is needed to make a tight joint.

The tube 11 lies in a barrel 14 so as to deliver its contained water to a nozzle 15 at its end.

In the form shown the tube, where it turns almost to horizontal, passes beneath a partition or lug 16 which extends across the pistol and holds the tube 11 bent. The tube, near that point, passes over a floating lug 17 forming part of a channel bar 18, which may be of aluminum or the like, so that when the channel bar 18 rises, the tube 11 is pinched, as shown in Fig. 2, thus closing it.

To thus close the tube 11, the trigger arm 19 is pulled rearwardly, swinging the trigger around its pivot 20. In the form shown, the trigger includes a web 21 having an upper edge or surface 22 which underlies the channel bar 18 and swings the bar 18 upwardly near its rear end, so that the lug 17 rises, as mentioned above, and begins to pinch the tube 11 against the flat face of the lug 16, so as to close the tube 11 at that point which is rearward in relation to the discharge portion of the tube.

As the trigger arm 19 is pulled further back the whole of the channel bar 18 rises, compressing the front length of the tube 11 which extends between the partition 16 and the nozzle 15, and forces water out of the nozzle 15 with force enough to carry it many feet.

In thus rising, the channel bar 18 presses the tube 11 either against the roof 23 of the barrel, or against a false ceiling 24 which closely conforms to the natural lay of the tube 11 in the barrel.

In forcing the contained water through the nozzle 15, the water unseats a ball 25 which closes the outer end of a internal nipple 26 around which the tube 11 is stretched at its end. The ball 25 is normally held in a small compartment against the outer end of the nipple 26 by a coil

spring 27 seated in the terminal thimble 28 of the nozzle 15, and when forcibly unseated by water the ball 25 permits the water to flow around it and through the coils of the spring 27 and out through a suitable small end perforation 29 for directing the water outwardly.

It is found unnecessary, and, in fact, advantageous not to pivot the channel bar 18, but to guide it by the depending lug 17 at the rear, and to limit its travel and throw in front by a lug 30 at the forward end and a supporting lug 31 underneath its forward end. The channel bar 18 may have its top cut off at 32 so that its projecting sides 33 may rise if need be on opposite sides of the tube 11 where it is stretched over the cylindrical rear end of the nipple 26.

The lugs 30 and 31 may be molded integral with a side 34 of the barrel 14. Side lugs or partitions 35, 35 shown as four in number, project from that side and serve to keep the tube 11 and channel bar in longitudinal position. The side partitions or lugs of the opposite side 37 function similarly.

The sides 34 and 37 may be separated as shown diagrammatically at 38, for ease in assembling, and the pivot 20, as shown in Fig. 4, may take the form of two half lugs 39.

For ease in assembling, the nozzle is shown as provided with a collar 40 which enables the nipple 26 to have the tube 11 easily slipped over it, while the other end of the tube is pushed through its opening in the partition 12.

Then the tube is laid in place against the end of partition 16, and the sides of partition 35. Then the nozzle 15 is laid in the opening 41 after being pushed down over the nipple 26 to the collar 40.

The channel bar 18, with the trigger web 21 lying within it, is then laid in place, and the trigger slipped over its pivot 20 while the projecting sides of the bar 18 lie in place near or against the lugs 30 and 31.

The side 37 may then be laid in place and held by suitable fastenings means or methods, closing the side of the slot 43 through which the trigger handle 19 projects, and may form one half side of the trigger guard 44 and the reservoir 10. It is satisfactory to make the sides as identical (except rights and lefts) parts and unite them by solvent softening of edges and pressing together to make a water tight joint.

It has been found desirable to cut the sides of the channel bar 18 as at 45 so as to permit the bar to rest, in its normal position, on the pivot lugs 39. This expedient serves to stabilize the rest position of the channel bar. It is further to be noted that whereas the absence of a positive connection for the channel bar is of particular utility in facilitating assembly and manufacture of the device, a further advantage thereof is that a great degree and symmetry of pressure may be applied to the tube inasmuch as the front end of the channel bar is permitted to rise in response to trigger actuation, a circumstance which might be impeded were a positive pivot to be employed.

The handle 10 may be provided with a filling opening 45 to receive a cork or rubber stopper 46. Either an air vent such as air vent 47 may be provided to admit air as water is expelled or the cork may have a poor fit within the opening 45 so that an air vent would be inherently provided around the edges of the opening.

While there has been described what at present is considered a preferred embodiment 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.

Having thus described one embodiment of the invention in some detail, what is claimed is:

1. A water pistol comprising in combination a handle forming a receptacle, a front nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and the receptacle, an abutment, and a trigger including trigger actuated means for pressing said tube against said abutment to effect a pinching of the tube at a rearward point thereof to form a closure and then compress a forward length thereof to expel contained liquid through the nozzle.

2. A water pistol comprising in combination a handle forming a receptacle, a nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and the receptacle, a pivot, a trigger turning on the pivot, an abutment and a bar actuated by the trigger to first press the tube against the abutment to form a closure and then compress a length of it to expel contained liquid through the nozzle.

3. A water pistol comprising in combination a receptacle for liquid, a front nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and the receptacle, a floating channel bar below the tube, lugs limiting the motion of the bar, a trigger, and an extension of the trigger lying within the channel of the bar to raise the bar, said bar being operable when raised by the trigger to first close the tube at a rearward point and then compress a forward length thereof to expel contained liquid through the nozzle.

4. A water pistol comprising a handle forming a receptacle, a front nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and the receptacle, a pivoted trigger, a longitudinal bar along the tube and actuated by said trigger so as to rise when the trigger is actuated, said bar being operable when rising to pinch a rearward portion of the tube to form a closure and then compress a forward length thereof to expel contained liquid through the nozzle, a side carrying a lug adapted to center the bar, and also carrying part of a pivot for the trigger, and a second side carrying a corresponding lug and the remaining part of the pivot.

5. A water pistol comprising a reservoir, a barrel, a front discharge nozzle, a resilient tube having its rear end connected into the reservoir and extending through said barrel and having its front end connected to said discharge nozzle, said resilient tube being a unitary length of substantially uniform diameter rubber, a lug disposed along said barrel at a point approximately midway of the length of the tube and on one side thereof, a manually operated pivoted trigger and trigger actuated means disposed on the other side thereof, said trigger actuated means being raisable so as to initially pinch a small portion of the tube against said lug when the trigger is manually operated so as to close off a front length of the tube from the reservoir and thereafter compress a substantial portion of said front length so as to discharge water therein through said nozzle.

6. A water pistol according to claim 5 and wherein said trigger actuated means comprises a pressure bar extending along said front length of the tube and raisable to both pinch a small portion of the tube and compress said substantial portion of said front length, operation of said trigger initially causing one end of said bar to lift and pinch the tube against said lug and thereafter lifting substantially the full length of the pressure bar to effect compression of said portion of said front length of the tube.

7. A water pistol according to claim 6 and wherein said pressure bar floats between said trigger and said tube, a pivot for said trigger, and stop means for preventing lateral movement of said pressure bar, said stop means comprising both a cut-out formed in said bar in which said pivot may be received, and a lug abutting one end of said bar.

8. A water pistol comprising in combination a handle forming a rear receptacle, a front nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and the receptacle and being normally filled with liquid from said reservoir, a longitudinal bar along said tube, a first abutment, a trigger for raising the bar when actuated so as to press the tube against said first abutment so as to pinch it thereagainst and form a rearward closure, a second abutment, the raised bar thereafter compressing a front length of the tube against said second abutment to expel contained liquid through the nozzle.

9. A water pistol comprising in combination a handle forming a rear receptacle, a front nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and the receptacle, a metal channel bar along the tube, a trigger and an extension of the trigger to raise the bar when the trigger is operated, a first abutment, said bar pressing against the tube when raised by the trigger so as to first pinch the tube against said first abutment to form a rearward closure, a second abutment on a higher vertical plane than said first abutment, said bar serving when it is further raised by said trigger to compress a front length of the tube against said second abutment to expel contained liquid through the nozzle.

10. A water pistol comprising in combination a barrel and a handle forming a receptacle, a front normally closed nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and receptacle and extending within and along the barrel, a manually raisable trigger, an elongated bar actuated by the trigger and lying directly below the tube, a lug depending from an inner wall of the barrel and above the tube opposite a rearward end of the bar, said bar floating above said trigger and contacting said trigger at said rearward end of the bar whereby said end is raised when the trigger is raised so as to pinch the tube against said lug to form a rearward closure, an abutment above said tube and forwardly of said lug, further operation of the trigger lifting the bar bodily to compress a forward length of said tube against said abutment to expel liquid through the nozzle, the expulsion of liquid automatically opening the nozzle.

11. A water pistol comprising in combination a barrel and a handle forming a receptacle, a front normally closed nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and receptacle and extending within and along the barrel, a manually raisable, pivoted trigger, an elongated bar actuated by the trigger and lying directly below the tube, a lug depending from an inner wall of the barrel and above the tube opposite a rearward end of the bar, said bar floating above said trigger and contacting said trigger at said rearward end of the bar whereby said end is raised when the trigger is raised so as to pinch the tube against said lug to from a rearward closure, further raising of said trigger pivoting the same with respect to said bar so that said bar contacts said trigger at a point inwardly of said rearward end whereby a forward portion of said bar is raised, an abutment above said tube and forwardly of said lug whereby raising of said bar forward portion compresses a forward length of said tube against said abutment so as to expel liquid through the nozzle, the expulsion of said liquid automatically opening the nozzle.

12. A water pistol according to claim 11 and wherein said bar is channel-shaped and is formed with a cut-out for receiving the pivot of said trigger, and end lugs disposed adjacent the forward end of the bar for limiting forward or lateral and downward movement thereof.

13. A water pistol comprising in combination a handle forming a receptacle, a front nozzle for projecting liquid contained in the receptacle, a resilient tube connecting the nozzle and the receptacle, a trigger, and means responsive to trigger actuation for first pinching said tube so as to close off a forward length thereof from the receptacle and for thereafter compressing said forward length to expel contained liquid through the nozzle.

14. A water pistol according to claim 13 and wherein said means responsive to trigger actuation comprises a floating bar disposed below said tube, and contacted by said trigger, a lug positioned above said tube and adjacent the rear end of said bar, said bar being raisable by the actuation of said trigger so as to pinch the tube between said rear end thereof and said lug, said means responsive to trigger actuation further including a forward abutment above said tube for compressing a forward length of said tube between said forward abutment and said bar after said tube has been pinched between said bar rear end and said lug.

JOHN WILLIAM ARPIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,298,668	Will	Oct. 13, 1942
2,393,838	Tarbox	Jan. 29, 1946

FOREIGN PATENTS

Number	Country	Date
637,600	France	Feb. 6, 1928