July 15, 1941. F. E. GREENE 2,249,608

FLUID GAS GUN

Filed July 3, 1939 2 Sheets-Sheet 1

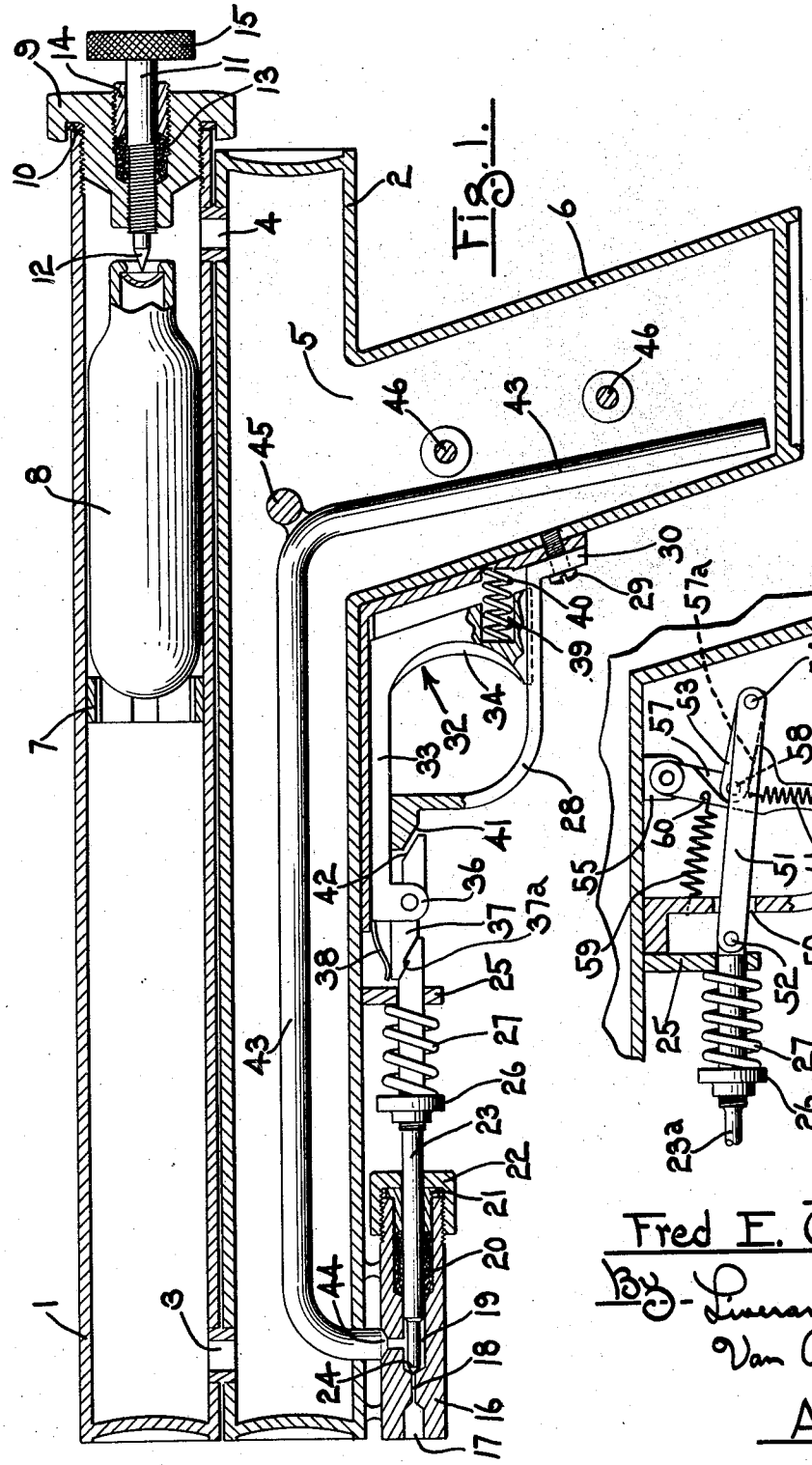

Fig. 1.

Fig. 5.

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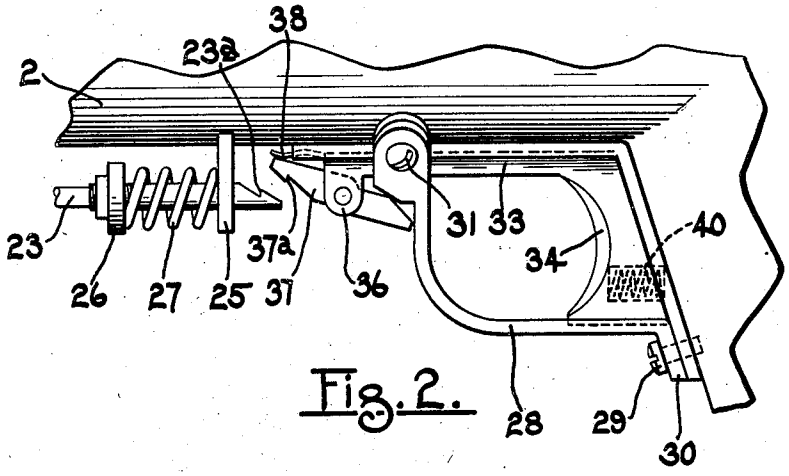

Fig. 2.

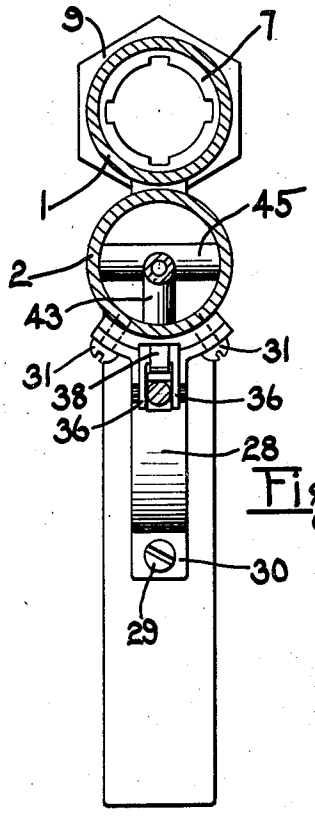

Fig. 3.

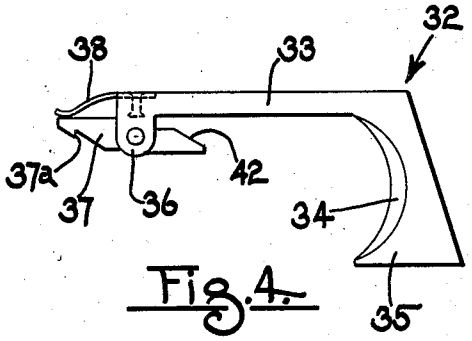

Fig. 4.

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UNITED STATES PATENT OFFICE

2,249,608

FLUID GAS GUN

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15 Claims. (Cl. 221—31.5)

This invention relates generally to guns and more particularly to that type of gun especially adapted to project a stream of fluid under pressure.

The particular purpose for which the gun is designed necessitates the use of a liquid which contains a percentage of aqua ammonia (a solution of a pungent gas, NH_3, in water). I propose to add to this solution a small amount of glycerine which increases the viscosity of the fluid permitting it to evaporate almost instantaneously upon striking the target at which the gun is directed. The greatest use for my invention containing the above described liquid is by guards of reformatories or penitentiaries, or animal keepers, for the purpose of subduing a riotous prisoner or viscous animal. The amount used each time the liquid is projected need not be great, the effect being that when the fluid strikes the person or animal at which it is directed and immediately evaporates, a nauseating vapor is given off which the person or animal is forced to breath and subdues them sufficiently to bring them under control for a period of several minutes.

While I have specified the use of a solution of aqua ammonia and glycerine as the desired solution to be used with the gun of my invention, it is to be understood that any other solution or liquid such as water or the like can be projected equally as well, but of course, such a liquid could not be used for the purposes above outlined. However, it is within the scope of my invention that any liquid whatsoever can be projected from the gun.

Since, in the particular use of the invention above described it is undesirable to utilize an excess of the liquid each time the stream is projected, it is desirable to control the amount of liquid projected in each successive stream. It is therefore the primary object of my invention to provide means to project a plurality of streams of fluid separately and in rapid succession if desired.

A further object of my invention is to provide a means whereby a stream of liquid will be projected immediately upon retraction of the trigger but which stream will be entirely cut off when the trigger reaches its rearmost position.

A still further object is to provide effective but humane means by which viscous persons or animals may be quickly subdued and brought under control.

Other objects and purposes of my invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then, consists of means hereinafter more fully described and particularly pointed out in the claims, said means constituting, however, but one of various ways in which the principle of the invention may be employed.

The annexed drawings and following description set forth in detail certain mechanism by which the invention may be carried out. In said annexed drawings, wherein like reference numerals refer to like parts throughout the various views:

Fig. 1 is a vertical section taken longitudinally through my device, parts being shown in elevation.

Fig. 2 is a fragmentary side elevation of the trigger mechanism showing the same in completely retracted position.

Fig. 3 is a vertical section taken laterally through the gun.

Fig. 4 is an elevation of the separate trigger mechanism, and

Fig. 5 is a fragmentary vertical section and elevation of a modification of the trigger mechanism.

Specifically referring to Figs. 1 to 4, the gun comprises upper and lower elongated tubular members 1 and 2 respectively. The upper and lower members are secured together by means of welding or any other desired means and are provided with communicating passages, the forward one being indicated by the numeral 3, and the rearward one by the numeral 4.

The upper member 1 is closed at its forward end but its rear end is open and threaded for a purpose which will be hereinafter more fully described. The lower member 2 is closed at both ends, but has an opening 5 near the rear end thereof which communicates with the hollow handle member 6. The handle 6 may be made either integral with the lower tubular member 2 or may be secured thereto such as by welding.

Within the upper member 1 is secured the gas cartridge retainer 7 for the purpose of receiving therein one end of the gas cartridge 8, such cartridges being of the character commonly used in siphon bottles. The rear end of the tubular member 1 is threaded to receive a seal nut 9, between which and the end of the tube is located the gasket 10. The seal nut 9 is of the form generally shown in Fig. 1 and is provided at its forward end with a threaded opening which is enlarged rearwardly and terminates in a larger threaded opening at the rear.

A penetrating screw 11 is inserted within the seal nut 9 and is of a diameter such that it may be threadedly engaged at the forward end of the nut with the smaller threaded opening therein. The forward end of the screw 11 is provided with a piercing point 12. An amount of packing 13 is placed within the larger opening in the seal nut 9 and around the penetrating screw 11, which is packed tightly by the packing nut 14 adapted to be threadedly engaged with said larger opening at the rear of the seal nut 9. The penetrating screw 11 is provided with a head 15 at its outer end to facilitate the piercing of the gas cartridge 8. At the forward end of the lower tube 2 and therebelow is secured a nozzle 16 having the preferred cross section as shown in Fig. 1. The forward end of the nozzle is provided with an opening 17 which is reduced in area to provide the constricted opening 18 rearwardly thereof. The passageway is then enlarged as at 19 for a distance when it is enlarged still more for the purpose of receiving the packing 20. The nozzle is further provided with the packing gland 21 which is forced inwardly by the packing nut 22 threaded to the outer rear portion of the nozzle 16.

The packing nut 22 and packing gland 21 are provided with openings through which the valve stem 23 is adapted to pass. The valve stem at its forward end is made smaller and becomes pointed as at 24 so as to effectively close the constricted passage 18. Extending downwardly from the lower tubular member 2 is the valve guide 25. The valve stem 23 is threaded along a portion of its length and receives the spring nut 26, between which and the valve guide 25 is located a coiled compression spring 27 to insure the closure of the nozzle by the valve stem in its normal position.

A trigger guide member 28 of the configuration shown in Figs. 1 and 2 is secured at its lower rear end to the handle member 6 by means of the screw 29 extending through said handle and the downwardly extending portion 30 of the guide member. The upper forward end of the guide member 28 is secured to the lower side of the tubular members 2 by means of the screws 31 (Fig. 3). The guide member 28 is slotted in its lower horizontal portion for the reception and sliding movement therein of the trigger. The upper portion of the guide member between it and the underside of the tubular member 2 provides a guide for the upper portion of the trigger.

The trigger member itself, indicated generally by the numeral 32, is composed of an elongated upper portion 33, a downwardly extending curved portion 34, terminating in a short horizontal portion at the bottom 35. This latter horizontal portion 35 is adapted to slide in the aforementioned groove of the trigger guide 28, and the upper horizontal portion 33 is adapted to slide in the space between the bottom of the tubular member 2 and the upper portion of the guide 28.

The forward end of the portion 33 of the trigger is provided with downwardly extending ears 36 between which, by means of the pivot pin 36a, is pivotally mounted a latch member 37 which is maintained in its horizontal position by means of the spring 38. The rear end of the valve stem 23 is provided with a hook portion 23a complementary to the hook 37a on the latch member 37 and is adapted to engage therewith so that a retraction of the trigger member 32 from the position shown in Fig. 1 to that shown in Fig. 2 will cause a retraction of the valve stem 23.

The lower portion of the trigger is recessed as at 39 and is provided with a coiled compression spring 40 to maintain the trigger in its normal forward position except when it is retracted by the use of manual force.

The upper forward end of the trigger guide 28 is provided with a camming member which has a beveled surface 41 as shown in Fig. 1. The rear end of the latch member 37 is also beveled at 42 in the same manner as the beveled portion 41 and is positioned sufficiently close thereto so that a retraction of the trigger and the latch member 37 will result in a contact of the two beveled surfaces 41 and 42. As the trigger is retracted still farther a camming action will take place resulting in a lowering of the rear portion of the latch 37 and a consequent raising of the front hooked portion thereof. As a result, a full retraction of the trigger member 32 will draw the valve stem 23 away from the constricted opening 18 until the above described camming action has taken place sufficiently to release the interengaging hooked portions 23a and 37a, at which time the spring 27 will force the valve stem 23 back to its normal closed position. The position of these members when the trigger is in its fully retracted position is clearly shown in Fig. 2.

A hollow tube or conduit 43 extends from the lower portion of the handle forwardly through the lower tube member 2 and connects with the nozzle 16 through the opening 44 therein. The conduit 43 is rigidly held between the sides of the gun by means of the member 45 which extends between the sides of the gun and is secured to the conduit. As in most devices of this character, a portion of the handle is removable but may be secured in place by means of the bracing members 46.

In the modification disclosed in Fig. 5 the construction of the nozzle is identical with that shown in Fig. 1, and the trigger guide member 28a is similar to the guide member 28 shown in Fig. 1 except that it is provided with an opening 50 in the front side thereof for a purpose which will be hereinafter more fully described.

A bar 51 is pivotally secured, one at each side, to the rear end of the rod 23a, as shown at 52, and extends rearwardly through the opening 50 in the guide member 28a. The rear end of the rod 23a being changed from that shown in Fig. 1 so that it is provided with a flat surface at each side thereof permitting the pivotal mounting of the bars 51. A second and shorter bar 53 is pivotally secured at its rear end to the rear end of the bars 51 at 54. A supporting member 55 extends downwardly from the under side of the lower tubular member 2 and has pivotally mounted thereon the trigger member 56, which is provided with a recess 57 and a ledge 57a extending rearwardly from the bottom thereof, which may either be at one side of the trigger or extend between the sides. The forward end of the bar 53 is then pivotally mounted on the trigger 56 as at 58.

A tension spring 59 is secured at one end in any suitable manner to the vertical portion of the guide member 28a, and at its rear end is secured to the trigger member 56 as at 60. The spring 59 obviously is to maintain the trigger 56 in a forward position, and its tension must be overcome when pulling the trigger to discharge the fluid within the gun. A second ten-

sion spring 61 is fastened at one end to the bars 51 and at its other end to the lower portion of the trigger member 56 so that the bars 51 will normally remain in such a position that the pivotal point 54 will be below a horizontal plane passing through the pivotal point 52.

In operation the seal nut 9 is removed from the rear end of the upper tubular member 1, together with the penetrating screw and parts associated therewith. The gas cartridge 8 is inserted and seated on the cartridge retainer 7. The fluid may then be poured through the open end of the member 1 to partially or substantially fill the space within the device. The seal nut 9 is then replaced after which the penetrating screw 11 is forced forwardly until the piercing point 12 pierces the end of the gas cartridge and releases the gas therein which builds up a sufficient pressure within the gun to project the liquid therefrom out of the nozzle when the valve is opened. Upon aiming the gun and retracting the trigger mechanism of Fig. 1, the valve stem will be retracted permitting a stream of fluid to be projected from the nozzle until the camming action between the surfaces 41 and 42 operates to release the valve stem 23 whereupon the valve is closed and the fluid stream is stopped. Upon release of the trigger member it is urged forwardly by means of the compression spring 40 and the hooks 23*a* and 37*a* are again engaged because of the pressure of the spring 38 on the latch 37, at which time the gun is in readiness for the projection of a second stream. It is obvious that this operation may be repeated as often and as fast as may be desired. In most instances with small animals a single projection may be sufficient, but with larger animals it may be necessary to project several streams, however, the operation may be repeated as long as sufficient pressure remains within the gun to force the liquid outwardly, which, with this type of cartridge, will be until the gun is fully discharged. The tension on the trigger may be regulated by means of the spring nut 36.

In utilizing the modification of the trigger mechanism shown in Fig. 5, the gun is filled and prepared for use in the same manner as described above with respect to Fig. 1. The operation of the modification in Fig. 5 is such that when the trigger 56 is pulled, the valve stem 23*a* will be moved rearwardly opening the nozzle for ejection of the fluid. As the trigger 56 is moved rearwardly the pivotal point 54 will also move rearwardly and upwardly describing an arc so that the pivotal points 54, 58 and 52 will be in direct alinement with each other. Immediately upon the pivotal point 54 moving above the plane wherein the three points are in alinment, which is the dead center point of the mechanism, the spring 27 will draw the valve stem forwardly and the pivotal point 54 will move forwardly sufficient to close the nozzle, resulting in a toggle action of the bars 51 and 53. The nozzle, then, will have been automatically closed even though the trigger remains in a rearward position. Upon releasing the trigger 56, the tension spring 61 will draw the bars 51 downwardly so that they, together with the bar 53, will assume their normal position once again as shown in Fig. 5 and the spring 59 will urge the trigger forwardly. It will therefore be seen that with this modified construction, a plurality of streams in rapid succession may also be projected from the gun in a manner similar to that described with respect to the mechanism shown in Fig. 1.

A particular advantage in using this type of cartridge is the fact that it contains liquid CO_2 which has the faculty of maintaining full pressure within the gun until the liquid therein has been fully discharged. By way of further explanation, assuming the space within the gun to be approximately 19½ cubic inches, one cubic inch of the liquefied gas in the cartridge would fill a space of 20 cubic inches while maintaining a pressure slightly less than 1200 pounds per square inch, which is the pressure necessary to liquefy the gas. From this example it will be obvious that there will be no loss of pressure within the gun until the liquid therein has been fully discharged. The full amount of pressure will be maintained for each operation and until the last of the liquid has been discharged.

The device above described has worked most satisfactorily in actual operation, is exceedingly efficient, and economical to manufacture.

Other modes of applying the principles of my invention may be used instead of the ones here explained, change being made as regards the mechanism herein disclosed provided, however, that the means stated by any of the following claims or the equivalent of such stated means be employed.

I, therefore, particularly point out and distinctly claim as my invention:

1. A device of the character described comprising adjacent communicating compartments adapted to be substantially filled with a liquid, pressure producing means located in one of said compartments, a nozzle, means for conveying liquid under pressure from one of said compartments to said nozzle, retractible valve means normally closing said nozzle, manually operable means for retracting said valve a predetermined distance, and means for automatically releasing said retracting means.

2. A device of the character described comprising a chamber for holding liquid under pressure, a nozzle through which said liquid is adapted to be projected, a conduit connecting said chamber with said nozzle, a valve normally closing said nozzle, manually operable means for opening said valve, and means for automatically closing said valve after said manually operable means has been moved a predetermined distance.

3. A fluid gas gun having a barrel, a trigger and a handle thereon comprising a chamber adapted to be substantially filled with a fluid, a nozzle through which said fluid is adapted to be projected under pressure, and means for building up pressure in said chamber including a gas cartridge, supporting means for said cartridge, an opening for receiving said fluid and said cartridge, closure means for said opening, and a piercing member extending through said closure means to pierce the cartridge, whereby the gas in said cartridge is released and the resulting pressure is exerted on the fluid.

4. The combination with a device for projecting a stream of fluid under pressure through a nozzle, of means for opening and closing said nozzle comprising a valve stem provided with a hook at one end thereof, a trigger, a latch on said trigger cooperatively associated with said hook, whereby a retraction of said trigger will cause a retraction of said valve stem and opening of said nozzle, and spring means to close said valve upon release of said valve stem.

5. The combination of elements defined in

claim 4, combined with means for automatically releasing said valve stem to close said nozzle after said trigger has been retracted a predetermined distance.

6. The combination of elements defined in claim 4, said latch being pivotally mounted, and means for causing a rotation of said latch about its pivotal point upon retraction of said trigger to release said valve stem thereby closing said nozzle.

7. The combination with a device for projecting a stream of fluid under pressure through a nozzle, of means for opening and closing said nozzle comprising a valve stem, a bar extending rearwardly of and pivotally mounted on said valve stem, a trigger, and a pivotally mounted link connecting said bar with said trigger to form a toggle, means urging said bar downwardly, and means urging said trigger forwardly, the parts being so arranged that a partial rearward movement of said trigger will open the nozzle and a continued rearward movement thereof will close said nozzle.

8. A fluid gas gun comprising, an elongated chamber having a lateral hollow extension thereon adapted to hold an amount of fluid for ejection, a second elongated chamber mounted adjacent the first chamber and substantially parallel thereto, means in one of said chambers for producing pressure, a nozzle on the other of said chambers, a conduit extending from said lateral projection to said nozzle, and means for opening and closing said nozzle whereby an amount of fluid under pressure is permitted to be ejected therefrom.

9. A fluid gas gun comprising, a chamber for holding a fluid under constant pressure, a nozzle, a valve normally closing said nozzle, a trigger to actuate said valve movable longitudinally of the gun, and means connecting said trigger with said valve to open and close said nozzle to thereby eject an amount of fluid therethrough upon continuous movement of said trigger in one direction.

10. A device of the character described comprising, a chamber adapted to be substantially filled with a fluid, a second communicating chamber provided with means for producing pressure in both chambers, a nozzle, means for conveying the liquid under pressure to said nozzle, an elongated retractable valve stem having a valve normally closing said nozzle, means for manually retracting said valve stem to permit flow of fluid through said nozzle, and means to automatically return said valve stem to normal closed position upon further movement of the retracting means, thereby stopping the flow of fluid.

11. A fluid gas gun comprising, a chamber for holding fluid under constant pressure, a nozzle through which said fluid is to be projected, a conduit connecting said chamber with said nozzle, a retractable valve stem having a valve normally closing said nozzle, means movable longitudinally of the gun to retract said valve stem to permit forced ejection of said fluid through said nozzle, and means to automatically close said nozzle upon further movement of the retracting means in the same direction.

12. The combination with a device for projecting a stream of fluid under constant pressure and an opening through which the stream is to be projected, of a valve slidably mounted for movement to open and close said opening, means for urging said valve to closed position, a trigger element, means on said trigger connecting same with said valve, whereby a retraction of the trigger moves said valve to open position, and means for automatically disconnecting said trigger and valve after said trigger has been retracted a predetermined distance, whereby said opening is closed.

13. The combination with a device for projecting a stream of fluid under constant pressure and an opening through which the stream is to be projected, of a valve slidably mounted for movement to open and close said opening, means for urging said valve to closed position, a trigger element, means on said trigger connecting same with said valve whereby a retraction of the trigger moves said valve to open position, said last named means including a pivotally mounted latch on said trigger element, means thereon for engagement with said valve, and means for releasing said latch.

14. The combination with a device for projecting a stream of fluid under constant pressure and an opening through which the stream is to be projected, of a valve slidably mounted for movement to open and close said opening, means for urging said valve to closed position, a trigger element, means on said trigger connecting same with said valve whereby a retraction of the trigger moves said valve to open position, said last named means including a pivotally mounted latch provided with a hook at one end thereof, a hook on said valve adapted to engage the hook on said latch, and means for automatically disengaging said hooks upon retraction of said trigger a predetermined distance to thereby close said opening.

15. The combination with a device for projecting a stream of fluid under constant pressure and an opening through which the stream is to be projected, of a valve slidably mounted for movement to open and close said opening, means for urging said valve to closed position, a trigger element, means on said trigger connecting same with said valve whereby a retraction of the trigger moves said valve to open position, said last named means including a pivotally mounted latch provided with a hook at one end thereof, a hook on said valve adapted to engage the hook on said latch, the opposite end of said latch having a beveled portion thereon and camming means adjacent said beveled portion against which said latch is adapted to come when the trigger is retracted, whereby the valve is released to close said opening.

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