June 3, 1952 H. H. HOLROYD 2,599,177

TEAR GAS GUN

Filed May 19, 1950

FIG. 1

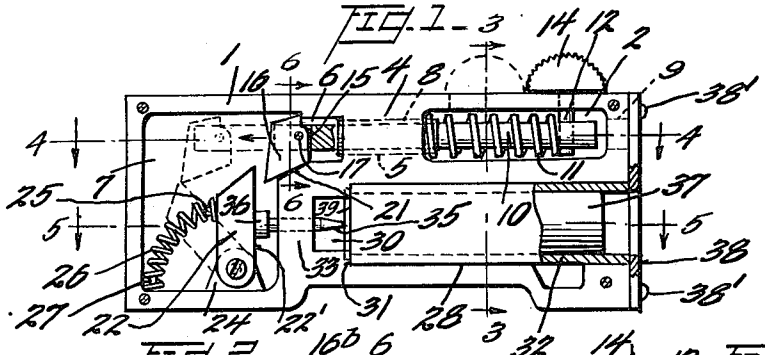


FIG. 2

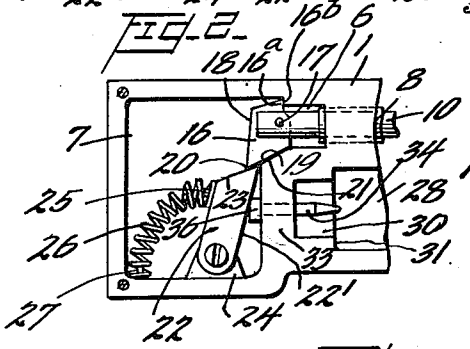


FIG. 3

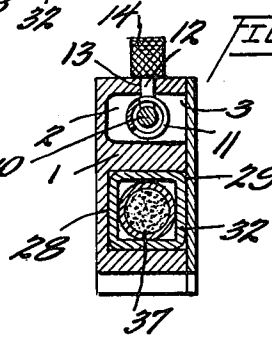


FIG. 4

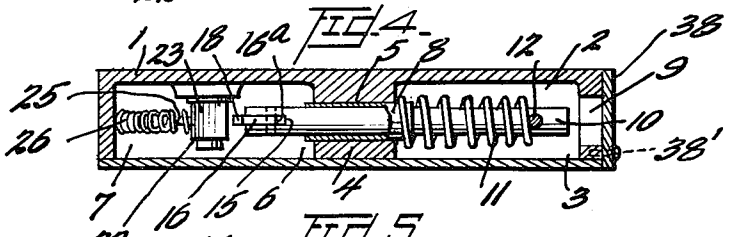


FIG. 5

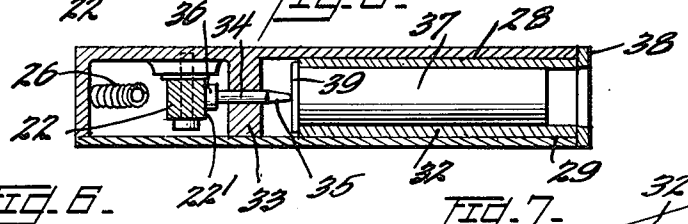


FIG. 6

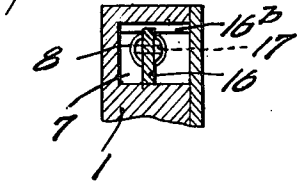
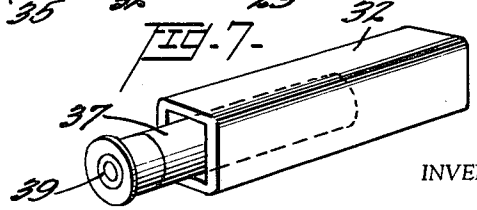


FIG. 7



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Patented June 3, 1952

2,599,177

UNITED STATES PATENT OFFICE

2,599,177

TEAR GAS GUN

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Application May 19, 1950, Serial No. 162,875

1 Claim. (Cl. 42—1)

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My invention relates to new and useful improvements in tear gas hand projectors, or as they are often called, tear gas guns.

One of the objects of the present invention is to provide a tear gas gun which is substantially rectangular in shape and relatively small in size, so that the same may easily be carried in a coat or trousers pocket, or in a woman's handbag or pocketbook.

Still another object of the invention is to provide a tear gas gun or tear gas hand projector that is provided with a removable square barrel, in which is to be placed a tear gas shell, the purpose of having a square barrel being that should an ordinary cartridge, that is, a cartridge having a bullet therein or a shot gun shell, otherwise known as live ammunition, be fired in this gun, the casing of the cartridge or the paper shell not being tightly confined laterally will split and the bullet or pellets will fall from the muzzle rather than be projected with the ordinary muzzle velocity.

Still another object of the invention is to provide a relatively light and relatively small tear gas gun that is operated by a thumb piece on the top surface of the gun, and wherein the cocking of the hammer and the firing are practically simultaneous, so that the hammer can not be left cocked in the ordinary sense of the word, and thus not likely to be fired accidentally.

Still another object of the invention is to provide a tear gas gun wherein the casing may be molded or die-cast with one side face open and then a small side plate fitted to the casing. Furthermore, there are simply two springs and relatively few parts, thus making it a relatively inexpensive article to manufacture.

Still another object of the invention is to provide a relatively small tear gas gun that is easily held in the palm of the hand and can be fired by simply pulling back the thumb-piece.

With these and other objects in view, the invention consists in certain new and novel structures and combination of parts, as will be hereinafter more fully described and pointed out in the claim.

Referring now to the drawings, showing a preferred embodiment,

Fig. 1 is a side elevation with the side plate removed, the dotted lines showing the rearward movement of the hammer and its associate parts,

Fig. 2 is a fragmentary view similar to Fig. 1, but showing the gun before loading,

Fig. 3 is a vertical, sectional view taken on line 3—3 of Fig. 1,

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Fig. 4 is a horizontal, sectional view taken on line 4—4 of Fig. 1,

Fig. 5 is a horizontal, sectional view taken on line 5—5 of Fig. 1,

Fig. 6 is a vertical, sectional view taken on line 6—6 of Fig. 1, and

Fig. 7 is a perspective of the removable square barrel and the shell or cartridge partly inserted.

Referring now more particularly to the several views, and to Fig. 1 for the moment, there is shown the casing 1 which in the size of gun illustrated is substantially three-quarters of an inch in thickness and substantially four inches in length.

In the upper forward part of the casing 1 there is cast the longitudinally extending chamber 2 and the open face 3. The wall 4, forming the rear of the chamber 2, has the bore 5 registering with the chamber 2 and registering with a small extension chamber 6 formed in the front of a large rear chamber 7 which extends substantially the height of the casing 1, as viewed in Fig. 1.

In this bore 5 may be seen fitted a bronze bushing 8 which extends from the chamber 2 and into the extension chamber 6 of the chamber 7 just mentioned.

The chamber 2 is open at its forward end as at 9 so that the cocking bolt 10 may be inserted through the forward end of the chamber 2 and extend rearwardly through the bushing 8 into the chamber 7, as will be described shortly.

Also, about this bolt 10 may be seen the helical spring 11 which bears at its rear against the aforementioned wall 4 of the chamber 2 and against a vertically extending pin 12 that extends through the bolt 10 and upwardly through a slot 13 in the upper surface of the casing 1. On the top of this pin 12 is a small knurl thumb-piece 14 which is semi-circular in cross-section.

Thus, the bolt 10 due to the action of the spring 11 will normally be held in its advanced or full line position, as shown in Fig. 1. The rear end of the bolt 10 is bifurcated or slotted as shown at 15 and in the slot 15 is mounted a small pivotal dog 16, held in position by the cross-pin 17. (See Fig. 2.)

The dog 16 tapers along its rear face and tapers upwardly along its bottom edge to form the rather sharp point 20, where the rear wall 18 and under-wall 19 meet. The dog 16 is pinned as at 17 near the rear end of the slot 15 so that it can not swing forwardly farther than the position shown in Fig. 1; but can tip upwardly and rearwardly, as considered from the point 20, so that when riding back over the hammer 22 (as will

be mentioned shortly) it can clear the same, and also pivot upwardly when the hammer 22 is forced rearwardly for its cocking position.

Now, still glancing at Figs. 1 and 2, it is to be noticed that the dog or latch 16 has an upper extending front face 16a that is positioned directly above the pin 17, and this forward edge or front face 16a impinges against a wall 16b in the front of the chamber 7 when the bolt 10 is in its forwardmost position. Also, it will be noticed in Fig. 1 that there is a tapered wall 21 directly beneath the dog 16. Thus, the pull forward on the bolt 10 by the spring 11 will cause the dog 16 with its upper face 16a to impinge against the wall 16b and force the lower end 20 of the dog 16 to be in its normal, operative position, as shown in Fig. 1, so that it will always be in position to impinge against the forward face 22' of the hammer 22 after the hammer 22 is forced rearwardly to a cocking position by the insertion of a shell 37. In other words, it will be seen that as the under-surface 19 of the dog 16 is about to ride up on the tapered wall 21, the forward edge 16a of the dog 16 will impinge against the wall 16b of the dog 16 and force the top 16a of the dog 16 rearwardly and the lower end 20 of the dog 16 forwardly.

It also might be mentioned here that when the hammer 22 is forced rearwardly by the insertion of the shell 37, the hammer 22 will slightly raise the rear end 20 of the dog 16, and the upper edge 16a of the dog 16 will fulcrum against the wall 16b and pull the bolt 10 slightly rearwardly until the hammer 22 clears the lower point 20 of the dog 16, and the bolt 10 then being pulled forwardly by the spring 11 will cause the upper edge 16a of the dog 16 to be forced rearwardly, and the lower end 20 forwardly to thus put the hammer 22 in a cocking or operable position.

Referring to the hammer 22, for the moment, it will be seen that it is mounted on the boss 24 and is tapered on its upper face as at 23, and its front face 22' is located directly in the rear of the aforementioned dog. In the rear of the hammer 22 there is a small pin 25 over which fits the helical spring 26 which has its lower end fit over another small pin 27 in the casing 1, and this spring 26 is mounted in an arcuate manner so that when the hammer 22 is forced rearwardly, the spring 26 is compressed in the arc of travel of the hammer 22.

Referring now to one of the principal features of the invention, there is also formed in the casing 1 a lower chamber 28, which is rectangular in cross-section and has the open side face 29; while behind the chamber 28 is a smaller, reduced chamber 30, so that there is a resultant rim or ledge 31 which acts as a stop for the removable square-in-cross-section barrel 32.

To the rear of the extension chamber 30 is the rear wall 33, which is bored for the reception of the firing pin 34, having a forward point 35 and a head 36 which latter bears against the front face 22' of the hammer 22.

Now, the length of the removable square barrel 32 and the length of the chamber 28 are critical, as the hammer 22 must be forced rearwardly by the shell 37 contacting with the firing pin 34, so that the hammer 22 will be in a cocked position; or, in other words, ready to be acted upon by the dog 16 when the bolt 10 is forced rearwardly. In other words, when the tear gas shell 37 is inserted in the rear of the square removable barrel 32, and this barrel 32 is placed in the chamber 28 and the front plate 38 on the casing 1 held in place by screws 38', the percussion cap 39 bearing against the firing pin 34 will force the hammer 22 to its cocked position, that is, directly in back of the pivotal dog 16, so that when the bolt 10 is pulled rearwardly, it will force the hammer 22 back to the dotted line position in Fig. 1, preliminarily to being released to strike the firing pin 34 and explode the shell 37.

Of course, the length of the firing pin 34 is critical, as the assembly must be such that when the gun is loaded, that is, there is a shell 37 in the removable barrel 32 and the front plate 38 in position, the hammer 22 is in an operable position.

As I have shown in Figs. 1 and 2, the rectangular casing 1 may be undercut as at 40 if desired, so that it may be gripped better when the gun is held in the palm of the hand.

Operation of the tear gas gun

Briefly, the operation of the gun is as follows:

Supposing that the gun is not loaded. The first step is to loosen one of the screws 38' in the front plate 38, pivot the plate 38 and remove the square, removable barrel 32. Then a tear gas shell 37 is inserted from the breech or rear of the barrel 32. Then the barrel 32 and shell 37 are inserted in the lower chamber 28. Then the front plate 38 is swung back and fastened in place by the formerly loosened screw 38'. The shell 37 pushing against the firing pin 34, as seen in Fig. 2, will in turn force the hammer 22 rearwardly and will also pull the bolt 10 slightly rearwardly and tilt the dog 16, causing its upper end 16a to fulcrum on the wall 16b until the upper end 22' of the hammer 22 slips from under the dog 16 and extends substantially vertically and to the rear of the dog 16, as seen in full lines in Fig. 1.

To fire the gun, the thumb-piece 14 is pulled back by the thumb to move the bolt 10, and the dog 16 impinging against the front face 22' of the hammer 22 will force the hammer 22 rearwardly in an arcuate manner, as shown in dotted lines, in Fig. 1, until the hammer 22 slips from beneath the dog 16; and under the action of the spring 26 will force the hammer 22 rapidly forward to strike the firing pin 34 to in turn explode the shell 37.

To fire the succeeding shell the action is, of course, repeated.

The gun illustrated takes a tear gas shell comparable to a .410 shot gun shell, and it is understood that these guns may be made in different sizes to fire different-size shells.

It has also been proved by numerous tests that if live ammunition is placed in this square barrel 32, the casing of the shell will split; and the bullet or shot will just drop out of the muzzle of the gun. The tear gas gun therefore can not be used as a lethal weapon.

It will also be understood that tear gas guns are not frequently used, so the moving parts do not have to be case-hardened, or made of tooled steel, as is found necessary in regular lethal weapons.

There is no danger, when loading the gun, of having the shell 37 explode, as it takes but little pressure to force back the hammer 22 through the firing pin 34; and the impact ordinarily used to explode a percussion cap 39 and shell 37 is substantially ninety pounds.

From the foregoing, it will be seen that I have produced a tear gas gun that is light in weight, inexpensive to manufacture, has relatively few

parts and is quickly assembled; and the one cocking bolt cocks the hammer and also permits the same to be fired on the one rearward movement of the cocking bolt.

Lastly, it is impossible to use the gun as a lethal weapon, as any live ammunition fired in this gun will, due to the square chamber, cause the casing of the live ammunition to split and thus render the live ammunition ineffective.

Many slight changes might be made without departing from the spirit and scope of the invention.

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

In a tear gas gun, a relatively small casing, a firing pin and spring-actuated hammer cooperating therewith, a removable barrel having a square bore, fitting wholly within the casing, the said barrel adapted to have a tear gas shell inserted in its breech when said barrel is without said casing; means for holding the barrel in position; a spring-pressed, thumb-operated bolt, having a pivotal latch at its rear, the latch normally overlying the upper edge of the hammer; the insertion of the barrel and its tear gas shell within the casing forcing the hammer from beneath the latch; a stop in the casing cooperating with the upper end of the pivotal latch, so that the spring-pressed bolt pulling the latch against the stop will cause said latch to extend below the upper edge of the hammer when the hammer is forced from beneath the latch, whereby a rearward movement of the thumb-operated bolt will cock and release the hammer to actuate the firing pin.

HARRY H. HOLROYD.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
455,279	Cunningham	June 30, 1891
788,866	Webber	May 2, 1905
1,826,562	Minto	Oct. 6, 1931
1,878,492	Goss	Sept. 20, 1932
2,418,906	Sampson et al.	Apr. 15, 1947
2,423,448	Haight	July 8, 1947

FOREIGN PATENTS

Number	Country	Date
418	Great Britain	1718
4,192	Great Britain	1891