

Feb. 11, 1930.

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1,747,057

## FIREARM

Filed Nov. 22, 1928

2 Sheets-Sheet 1

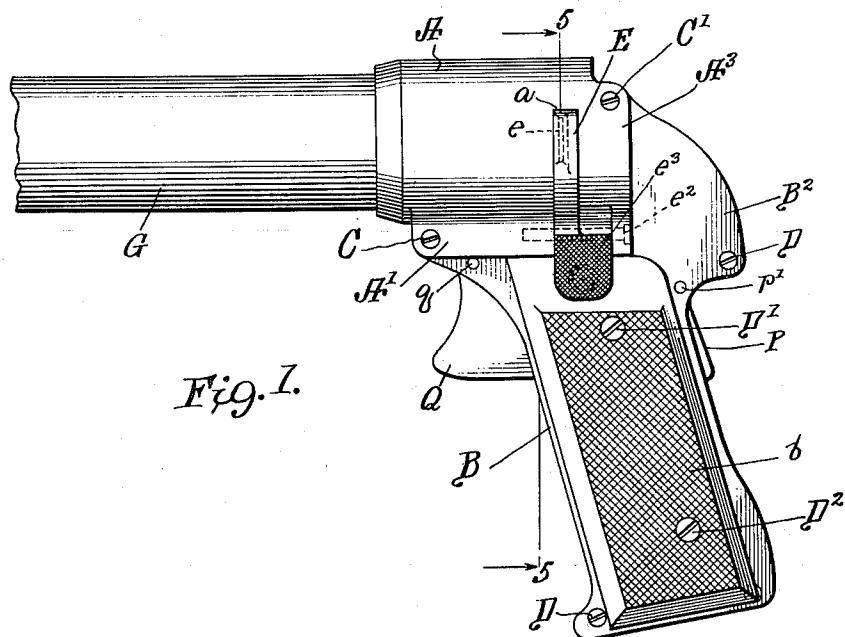


Fig. 1.

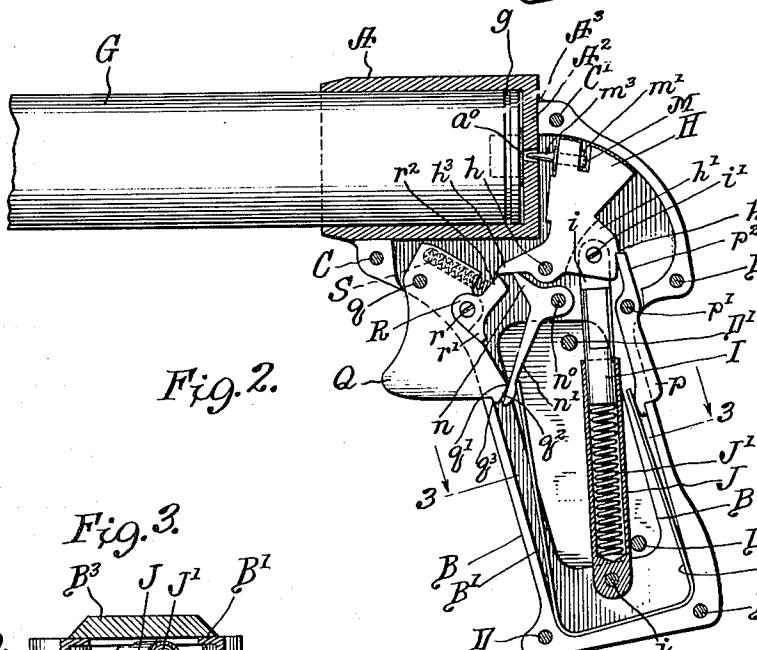
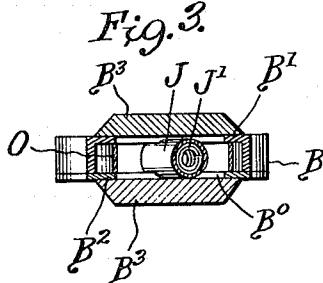


Fig. 2.



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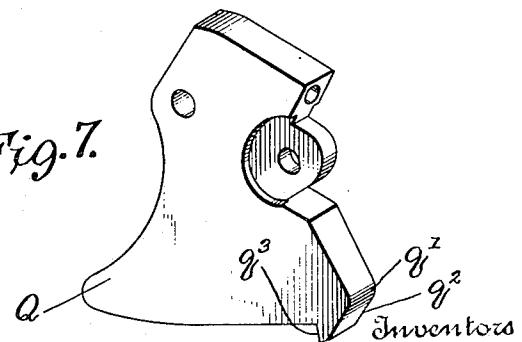
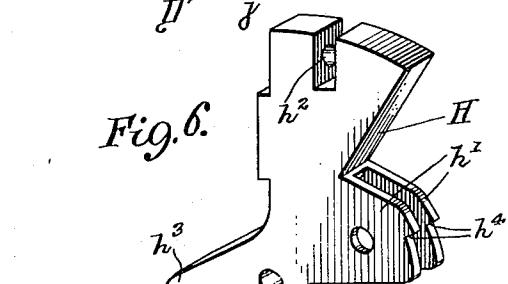
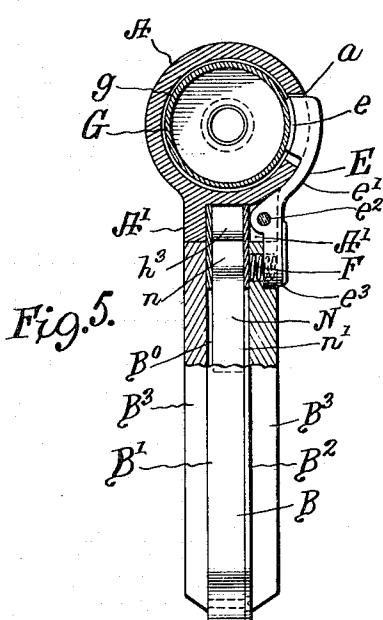
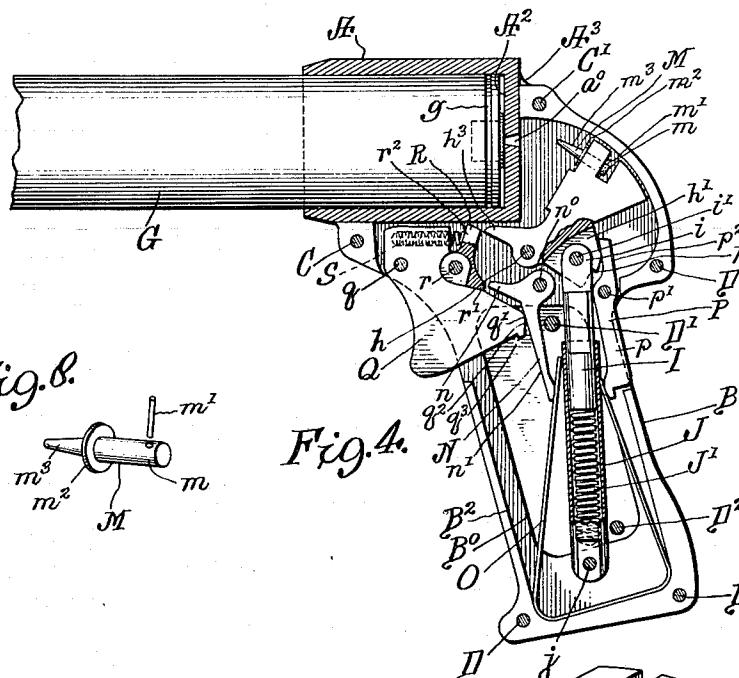
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## FIREARM

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## FIREARM

Application filed November 22, 1928. Serial No. 321,241.

This invention relates to an improved hand operated muzzle loading firearm adapted for use in firing comparatively heavy projectiles at a low initial velocity, and with a minimum 5 of recoil, and it is especially adapted for use in firing pyrotechnic signals from aircraft or from water borne vessels, or for firing night signals from any field or platform.

It may also be used to discharge flares for 10 illumination purposes, smoke signals, or the like, or it may be useful in distributing gases by police, or military or naval troops, and in a great variety of other ways, some of which will be hereinafter more fully described.

15 Our present invention is intended especially to provide for improvements over the construction shown in our application Ser. No. 263,024, filed March 20, 1928, and entitled Improvements in firearms. According to our 20 present invention, the piece is especially designed so as to be free from angular projections which tend to catch in the pocket or clothing of the operator, and tend to interfere with or retard the operation of the device. Our present invention is also intended 25 to provide certain improvements in the firing mechanism, by which the piece may be prevented from being fired prematurely and yet be quickly and successfully operated 30 when desired.

The invention is also intended to provide a piece provided with a comparatively light hollow stock in which nearly all of the firing mechanism is masked, leaving only those 35 parts protruding which must be gripped by the operator in firing the piece; and these protruding parts are provided with rounded surfaces free from angles which will not catch in the clothing or pockets of the wearer, or be apt to engage any obstruction in the 40 holder or other device in which the piece may be held when not carried by the operator.

Our invention will be more fully understood after reference to the accompanying drawings, in which like parts are indicated by similar reference symbols throughout the several views.

Figure 1 represents a side elevation of the 45 piece with the cartridge case inserted, the

outer end of the cartridge case being broken away,

Figure 2 shows a central longitudinal section through the stock and barrel, the parts being shown in elevation, and the firing mechanism being shown in the safety position, or in the position shown in Figure 1,

Figure 3 shows a section along the line 3—3 of Figure 2, and looking in the direction of the arrows,

Figure 4 is a similar view to Figure 2, except that the firing mechanism is in the cocked position, which is assumed for the moment only before firing,

Figure 5 shows a section along the broken line 5—5 of Figure 1, and looking in the direction of the arrows,

Figure 6 is a perspective view of the pivoted hammer forming part of the firing mechanism,

Figure 7 is a perspective view of the trigger used in the firing mechanism aforesaid, and

Figure 8 is a perspective view of a convenient form of removable firing pin, which may be used with the hammer aforesaid.

The body of the piece comprises a barrel A preferably of smooth bore construction, and with a short length comparative to its caliber. The gun barrel A is provided with two downwardly projecting ribs A', to which the metal housing B of the stock is connected as by means of the screw bolt C. The rear of the barrel is closed by the rear wall A'', and in rear of this wall, there are projecting ribs A''' integral with the barrel, between which the metal housing of the stock is secured as by means of the bolt C'.

This metal housing is preferably formed of the two parts, B' which is chambered to receive the firing mechanism, and B'' which serves as a removable cover for the said chamber, these two parts being held together by the screw bolts D. These two parts B' and B'' may be cut away at B' to lighten the housing, and over these cut away portions the grip pieces B''' are secured as by means of the screw bolts D' and D'', as shown in Figure 1.

The outer surface of these grip pieces is preferably knurled or roughed as at b, so as

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to facilitate the gripping firmly of the piece by the operator.

The rear of the barrel is provided with the opening  $a^0$  for the firing pin, as shown in Figures 1 and 4, and also with the segmental slot  $a$  for the segmental tooth  $e$  of the latch  $E$  for holding the cartridge case in place when in the gun. This latch  $E$  has a rounded outer contour  $e'$  projecting but slightly beyond the outer wall of the barrel, as shown in Figure 5, and it is also pivoted to one of the lugs  $A'$ , as at  $e^2$ ; and the downwardly projecting arm of the latch  $e^3$  is normally pressed outwards by the coil spring  $F$ , all as shown in Figure 5. Thus, this latch will normally hold the cartridge case in the piece, unless this arm  $e^3$  is pressed inwards, in which case, the segmental tooth  $e$  is withdrawn from the annular groove  $g$  in the cartridge case  $G$ , and the cartridge case may be either withdrawn by hand, or allowed to fall out of the piece when desired.

When the cartridge case is inserted, its rim will automatically spring back the tooth  $e$ , and this tooth will snap into engagement with the annular groove  $g$  as soon as the cartridge case has reached the loading position in the barrel. The firing mechanism which is masked in the hollow stock is shown most clearly in Figures 2 and 4, and details thereof in Figures 6, 7 and 8, and will now be described.

$H$  represents the hammer which is pivoted on the pin  $h$ , and is provided with rearward projecting arms  $h'$  which engage the head  $i$  of the plunger  $I$ , which head  $i$  is connected to the hammer as by means of the pin  $i'$ . This plunger projects downward into the open free end of the cylindrical casing  $J$ , which is pivoted in the stock as at  $j$ , and which contains a coil spring  $J'$  under compression in said casing, tending always to throw the hammer towards the firing position. The upper end or head of the hammer carries the firing pin  $M$  which may be conveniently formed with the stem  $m$  projecting into the opening  $h^2$  of the hammer and held in place therein by means of the pin  $m'$  which may be a split pin, or any other suitable device, for holding the firing pin against being thrown out of the head, so that the firing pin may be conveniently removed should it be injured in any way. The firing pin may be provided with a flange  $m^2$ , and in front of which there is the usual firing point  $m^3$  provided. Forward of its pivot the hammer is provided with the cocking toe  $h^3$  which engages the arm  $n$  of the hammer lifter  $N$ . This hammer lifter is in the form of a bell crank lever pivoted in the stock, as at  $n^0$ , and having the long arm  $n'$  engaging the spring  $O$ .

This spring may be of bent metal of the form shown in Figures 2 and 4, and one arm of the spring presses into the front of the

arm  $n'$  of the hammer lifter, and the other arm of the spring presses rearwardly on the lower arm  $p$  of the hammer lock  $P$ , which is pivoted, as at  $p'$ , in the stock and has its upper end  $p^2$  engaging the notch  $h^4$  on the rear of the hammer when the hammer is in the safety position, as shown in Figure 2; but this hammer lock is clear of this notch when the piece is cocked, as shown in Figure 4. Thus, this hammer lock  $P$  will prevent the hammer from moving back to the cocked position until it is pressed inward in the act of firing, as will be hereinafter explained. The trigger  $Q$  is pivoted, as at  $q$ , to the housing  $B$ , and it has a rounded outwardly projecting lug  $q'$ . The lower rear corner of the trigger is provided with the bearing surface  $q^2$  to engage the long arm of the hammer lifter, and also with the notch  $q^3$  to engage the housing, so that the trigger will not be thrown out too far under the action of the spring  $O$ . The trigger carries a sear  $R$ , pivoted thereto as at  $r$ . This sear is in the form of a bell crank lever, having one arm  $r'$  serving as a stop toe, and the other arm  $r^2$  is normally pressed rearward by the sear spring  $S$ ; and serves to cock and release the hammer, as will be herein-after described. The sear spring  $S$  is a coil spring under compression, slidably mounted in a socket in the trigger.

Assuming the parts to be in the position shown in Figure 2, it will be seen that when the operator grasps the hammer lock  $P$  and the trigger  $Q$ , as can be done with a single movement of the hand, the first result will be the releasing of the hammer lock and the swinging upwards of the sear, which will cause the head of the hammer to rock backwards until the hammer reaches the cocked position shown in Figure 4. Just before reaching this position, the sear will pass out of engagement with the head of the hammer, and the hammer will be free to fly forward under the action of the firing spring  $J'$ .

As the hammer flies forward, the firing pin will, of course, strike the primer and explode the cartridge.

When the pressure of the hand is released, the hammer lock  $P$  and the trigger  $Q$  and the hammer  $H$  and sear  $R$  will all be restored to the initial safety position, as shown in Figure 2.

To describe more fully the action just referred to; as the trigger is drawn rearward to cock the hammer, the sear will be drawn rearward engaging under the toe  $h^3$  of the hammer; and, at the same time, the arm  $n'$  of the hammer lifter will compress the spring  $O$ , and the sear will continue to push the toe  $h^3$  upwards until the inclined surface of the sear passes beyond and disengages from the end of the toe  $h^3$ . The sear having released the hammer, the hammer will fly forwards, as before stated. As it flies forward, the toe  $h^3$  of the hammer will bear down upon the arm

*n* of the hammer lifter, and the pressure of the spring *O* will cause this hammer lifter to move the head of the hammer slightly backward to the safety position shown in Figure 2, the action of this spring overcoming to this extent the tendency of the firing spring *J* to rock the hammer in the reverse direction. As the trigger is returned to the initial position by the pressure of the spring *O* on the arm *n* of the hammer lifter, the sear spring *S* will rest on the sear to the position shown in Figure 2.

Any tendency of the hammer to swing back too far is checked by the arm *p*<sup>2</sup> of the hammer lock engaging in the notch *h*<sup>4</sup>, and thus the hammer will be held in the safety position against going forward by the lifting effect of the arm *n* of the hammer lifter, and it will be held against backward movement by the engagement of the arm *p*<sup>2</sup> with the notch *h*<sup>4</sup>. It will be noted that the compression of the spring *O* by the hammer lifter will cause the other end of that spring to throw the hammer lock into more positive engagement with the hammer.

Thus, as soon as the grasp of the operator is removed from the trigger and hammer lock, the parts of the firing mechanism will return to the safety position shown in Figure 2, and will remain in that position until the operation of firing is resumed.

It will also be seen that it will be impossible to fire the piece by pulling on the trigger unless, at the same time, the hammer lock is also pressed upon in the opposite direction, but the rearward movement of the trigger and the reverse movement of the hammer lock can be readily effected at a single operation by merely gripping the upper part of the stock of the pistol with one hand.

The stock forms a convenient handle for manipulating the piece; and this can be safely done when the piece is loaded, so long as the operator does not press inward at the same time, both the trigger and the hammer lock.

In other words, the palm and fingers may be used to grip the stock, and at the moment of firing, press with the thumb on the hammer lock, firmly gripping both it and the trigger. After the piece has been fired, the empty cartridge case will be held in place in the barrel of the gun by means of the latch *E*; and by pressing inward on the lower arm *e*<sup>2</sup> on this latch, the engagement of the latch with the cartridge case may be released. The piece may then be tilted, allowing the cartridge case to fall out; or the released cartridge case may be grasped with the left hand of the operator and removed from the piece, and either thrown away or stored in any convenient receptacle.

It will thus be seen that while the operator holds the stock in his right hand, he may readily insert the cartridge case with the

left hand. Also, at any time after firing, he may very conveniently press on the latch with one hand, and pull out the cartridge case with the other.

The ammunition used in the improved gun may be of any suitable type, such, for instance, as that shown in our application filed March 20, 1928, Ser. No 263,026 and entitled Improvements in fixed ammunition for firearms.

In firearms, in which a firing pin is used to explode the primer for fixed ammunition, it has been found in practice that the firing pin is apt to break off or become injured, due to the fact that this is generally made of hard steel; and when used with small arms generally having such firing pins, it is desirable to have the firing pin so arranged that it may be quickly and conveniently replaced with another pin, and, for this purpose, I have shown and described a firing pin which may be quickly assembled in place, or which may be quickly removed, if desired.

It will be seen that in order to get access to the interior of the hollow stock for any reason, or to dismount the parts, it will be necessary to remove the screw *e*<sup>2</sup>, take off the latch with the cartridge case, and then remove the screws *C* and *C*', and the stock may be moved down clear of the barrel.

The two members *B*' and *B*<sup>2</sup> of the stock may be separated by releasing the several binding screws, and then the hollow chamber in the interior of the stock will be exposed, and the several parts of the firing mechanism, as shown in Figures 2 and 4, may be conveniently removed.

In reassembling, reverse the operation just described.

While we have described one embodiment of the invention in its preferred form, it will be obvious that various changes might be made in the construction, combination and arrangement of parts, which could be used without departing from the spirit of our invention, and we do not mean to limit the invention to such details, except as particularly pointed out in the claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent of the United States is:

1. In a firearm of the character described the combination with a short smooth bore barrel, provided with a slot through one side thereof, of a hollow stock connected to said barrel, a spring impressed latch pivoted in said stock and provided with an inwardly projecting tooth adapted to hold the cartridge case in the firing position in the barrel and to release same when desired, said latch being provided with a releasing arm protruding slightly beyond the adjacent surface of the stock, and firing mechanism mounted in said hollow stock comprising a hammer, a trigger and a hammer-lock, whereby said firing mech-

anism may be operated by simultaneously pressing on said trigger and said hammer lock for cocking and releasing said hammer, and thus firing the piece.

5 2. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring, a hammer lifter, a trigger, a hammer-lock, and a bent spring normally tending to throw said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other 10 said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing the piece.

3. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring casing, a plunger and spring mounted in said casing, said plunger engaging said hammer, a hammer lifter, a trigger, a hammer-lock and a bent spring engaging both said hammer lifter and said hammer-lock, and normally tending to throw said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may 20 be operated by simultaneously drawing towards each other said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing the piece.

4. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring casing, a plunger and spring mounted in said casing, said plunger engaging said hammer, a hammer lifter, a trigger, a hammer lock, a sear in the form of a bell crank lever pivotally mounted on said trigger, a spring also carried by said trigger, and engaging said sear, and a bent spring engaging both 25 said hammer lifter and said hammer-lock, and normally tending to throw said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing the piece.

5. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring, a trigger and a pivoted hammer-lock, a pivoted hammer lifter in the form of a bell crank lever having one arm engaging said hammer, and the other engaging said trigger, and a U shaped spring having one arm engaging said hammer lock and the other arm engaging said hammer lifter, and normally tending 30 to throw said trigger, hammer lock and ham-

mer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing 70 the piece.

6. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring, a trigger and a sear in the form of a bell crank lever pivotally mounted on said trigger, a spring also carried by said trigger, and engaging said sear, a pivoted hammer lifter in the form of a bell crank lever having one arm 75 engaging said hammer, and the other engaging said trigger, a hammer lock and a U shaped spring having one arm engaging said hammer lock and the other arm engaging said hammer lifter, and normally tending to throw 80 said trigger, hammer lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing the piece.

7. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring, a hammer lifter, a trigger projecting slightly forward of said stock, a hammer lock projecting slightly rearward of said stock, and a bent spring normally tending to throw 95 said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing the piece.

8. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring casing, a plunger and spring mounted in said casing, said plunger engaging said hammer, a hammer lifter, a trigger projecting slightly forward of said stock, a hammer-lock projecting slightly rearward of said stock, a bent spring engaging both said hammer lifter and said hammer-lock, and normally tending to throw said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing the piece.

9. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring casing, a plunger and spring mounted in said casing, said plunger engaging said hammer, 12

a hammer lifter, a trigger projecting slightly forward of said stock, a hammer lock projecting slightly rearward of said stock, a sear in the form of a bell crank lever pivotally mounted on said trigger, a spring also carried by said trigger, and engaging said sear, and a bent spring engaging both said hammer lifter and said hammer-lock, and normally tending to throw said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock, for cocking and releasing said hammer, and thus firing the piece.

10. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring, a trigger projecting slightly forward of said stock, a pivoted hammer lock having an arm projecting slightly in rear of said stock, a pivoted hammer lifter in the form of a bell crank lever having one arm engaging said hammer, and the other engaging said trigger, and a U shaped spring having one arm engaging said hammer lock and the other arm engaging said hammer lifter, and normally tending to throw said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock arm for cocking and releasing said hammer, and thus firing the piece.

11. In a firearm the combination with a barrel, of a hollow stock connected to said barrel, and firing mechanism mounted in said hollow stock comprising a hammer, a hammer spring, a trigger projecting slightly forward of said stock, a sear in the form of a bell crank lever pivotally mounted on said trigger, a spring also carried by said trigger, and engaging said sear, a pivoted hammer lifter in the form of a bell crank lever having one arm engaging said hammer, and the other engaging said trigger, a pivoted hammer lock having an arm projecting lightly in rear of said stock, and a U shaped spring having one arm engaging said hammer lock and the other arm engaging said hammer lifter, and normally tending to throw said trigger, hammer-lock and hammer lifter to the safety position, whereby said firing mechanism may be operated by simultaneously drawing towards each other said trigger and said hammer-lock arm, for cocking and releasing said hammer, and thus firing the piece.

12. In a firearm of the character described, the combination with a barrel, provided with a slot through one side thereof, of a stock connected to said barrel, and a spring impressed latch pivoted in said stock and provided with an inwardly projecting tooth adapted to hold the cartridge case in the fir-

ing position in the barrel and to release same when desired, said lever being provided with a releasing arm protruding slightly beyond the adjacent surface of the stock.

13. In a firearm of the character described, the combination with a barrel, provided with a slot through one side thereof, of a stock connected to said barrel, and a spring impressed latch pivoted in said stock and having one arm provided with an inwardly projecting tooth passing through said slot and adapted to hold the cartridge case in the firing position in the barrel and to release same when desired, said latch being provided with a releasing arm below said barrel and protruding slightly beyond the adjacent surface of the stock.

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