July 21, 1964 M. E. HIRSCH 3,141,450

TOY GUN

Filed June 19, 1961 3 Sheets-Sheet 1

FIG. 1

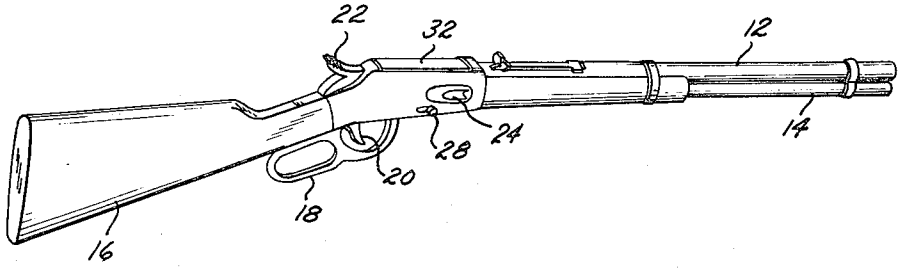
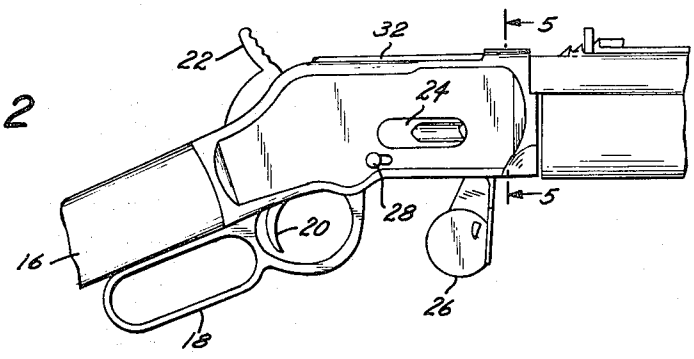


FIG. 2



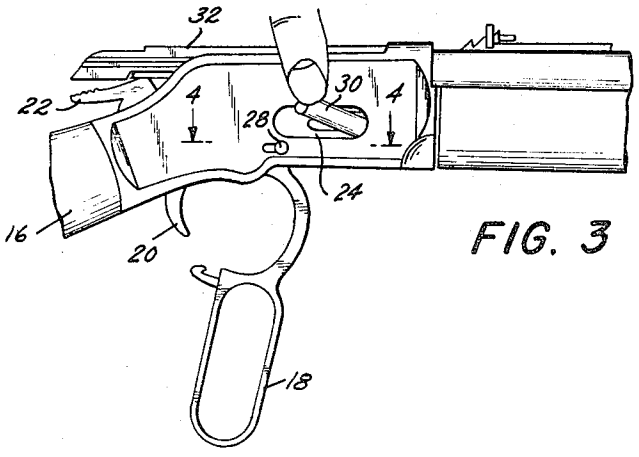


FIG. 3

INVENTOR.
MAHLON E. HIRSCH

BY James and Franklin
ATTORNEYS

July 21, 1964 M. E. HIRSCH 3,141,450

TOY GUN

Filed June 19, 1961 3 Sheets-Sheet 2

FIG. 4

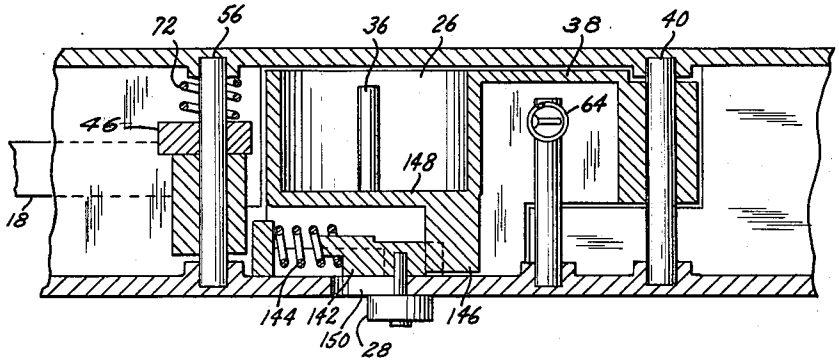


FIG. 5

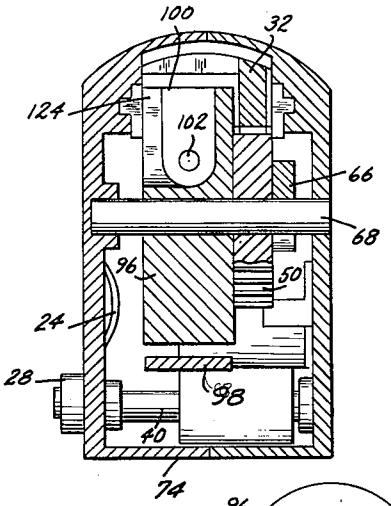


FIG. 6

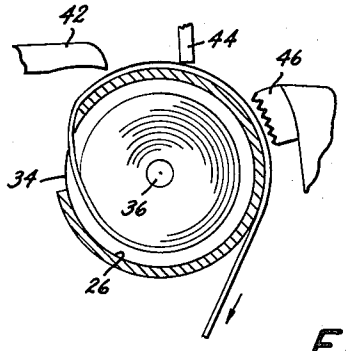


FIG. 12

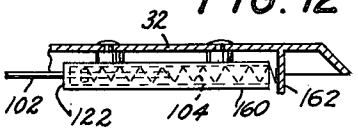
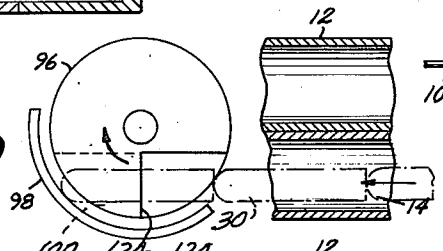


FIG. 10



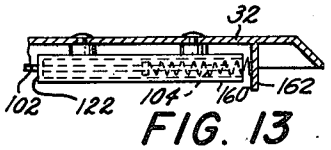
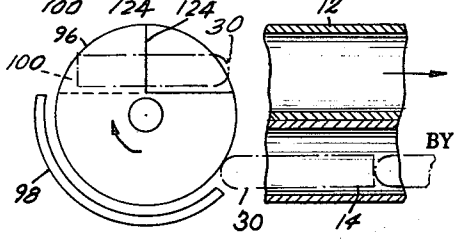


FIG. 13

FIG. 11



INVENTOR.
MAHLON E. HIRSCH
BY
James and Franklin
ATTORNEYS

July 21, 1964 M. E. HIRSCH 3,141,450

TOY GUN

Filed June 19, 1961 3 Sheets-Sheet 3

FIG. 7

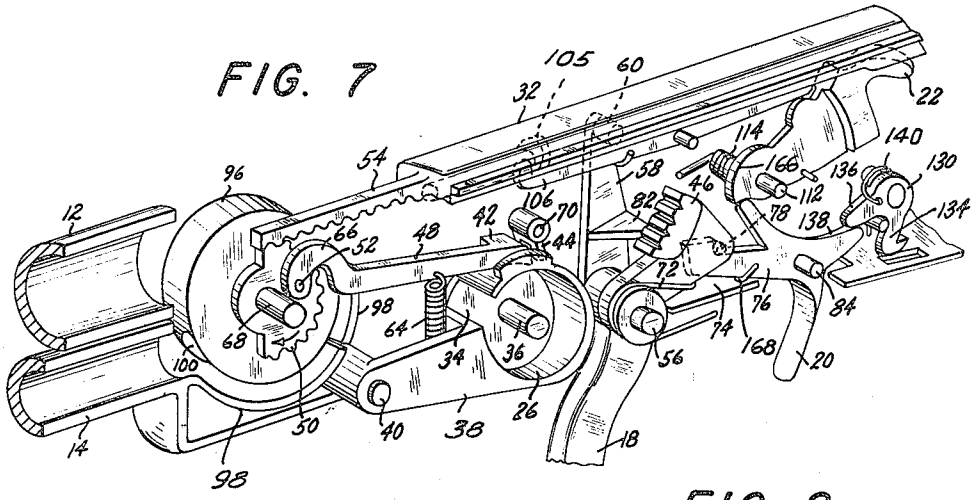


FIG. 8

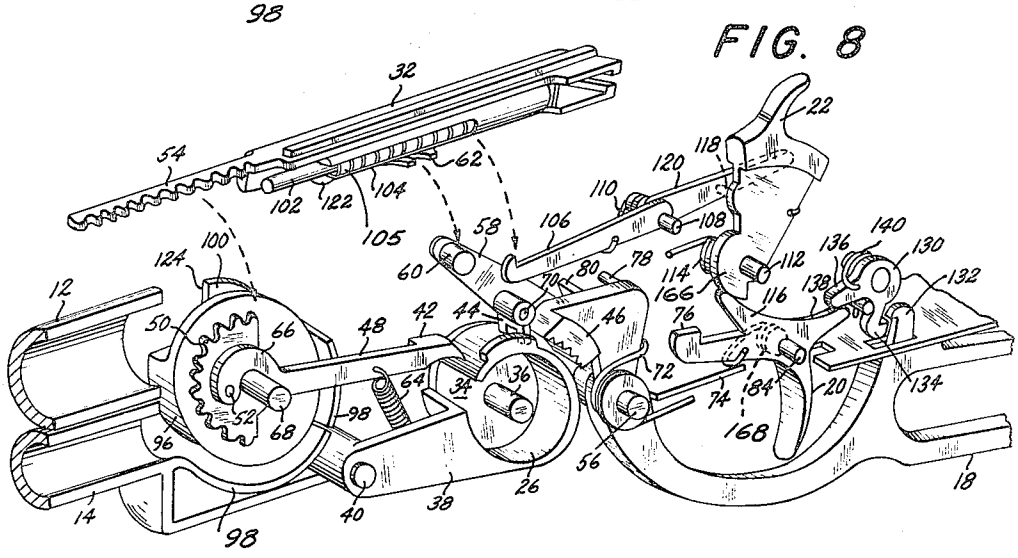
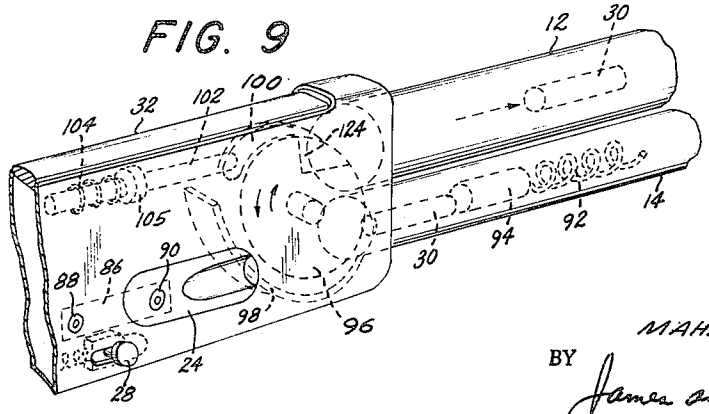


FIG. 9



INVENTOR.
MAHLON E. HIRSCH

BY James and Franklin
ATTORNEYS

United States Patent Office 3,141,450 Patented July 21, 1964

3,141,450

TOY GUN

Mahlon E. Hirsch, Fairview, Pa., assignor to Louis Marx & Company, Inc., New York, N.Y., a corporation of New York

Filed June 19, 1961, Ser. No. 118,085
11 Claims. (Cl. 124—2)

This invention relates to toy guns, and more particularly to a bullet shooting cap rifle.

The primary object of the present invention is to generally improve toy guns, and to increase the realism and play value of the same. A more particular object is to provide such a gun which is characterized by the noise and smoke of a cap gun, and yet which also discharges a light weight harmless simulation of a bullet. A further object is to provide a magazine of caps for repeat fire, and still another object is to provide a magazine of bullets for repeat fire.

In accordance with further features and objects of the invention, the bullet is propelled by a spring operated plunger or striker, and a cocking lever is provided which cocks the striker and also the cap hammer, and which serves further to feed a cap and a bullet from their respective magazines. A single trigger serves to release the cap hammer and the bullet striker, and also releases the cocking lever for another manipulation of the same.

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the bullet shooting cap rifle elements and their relation one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings in which:

FIG. 1 is a perspective view of a cap rifle embodying features of my invention;

FIG. 2 is a fragmentary side elevation drawn to larger scale, and showing the cap magazine in lowered or open position to receive a roll of caps;

FIG. 3 is a similar view, but showing the gun with the cocking lever pulled down, and also illustrating the method of loading the bullet magazine with bullets;

FIG. 4 is a fragmentary horizontal section drawn to enlarged scale, and taken approximately in the plane of the line 4—4 of FIG. 3;

FIG. 5 is a transverse section drawn to enlarged scale, and taken approximately in the plane of the line 5—5 of FIG. 2;

FIG. 6 is a schematic side elevation showing the path followed by the cap strip;

FIG. 7 is a perspective view looking toward the breech and showing the gun mechanism, with the cocking lever pulled down;

FIG. 8 is a perspective and somewhat exploded view after the cocking lever has been restored and the gun fired;

FIG. 9 is a fragmentary perspective view looking toward the muzzle and showing the mechanism for transferring a bullet from the magazine to the barrel;

FIGS. 10 and 11 are fragmentary elevations explanatory of the operation of the bullet carrier which transfers the bullet from the magazine to the barrel; and

FIGS. 12 and 13 are fragmentary vertical sections explanatory of the mounting and operation of the bullet striker.

Referring to the drawing, and more particularly to FIG. 1, the gun mechanism is here embodied in a rifle which in external appearance resembles a 30–30 "Winchester" rifle. The toy comprises a barrel 12 with a collateral subjacent bullet magazine 14. These are carried ahead of a stock 16, and the mechanism is energized by means of a cocking lever 18, the forward portion of which acts also as a trigger guard for a trigger 20. A

simulated hammer is provided at 22. Bullets may be loaded into the bullet magazine 14 through a yieldably mounted bullet gate 24.

Referring now to FIG. 2, the mechanism includes a cap magazine 26. This is pivotally mounted and may be turned down from a concealed position (FIGS. 1 and 3) to the exposed position shown in FIG. 2. When raised it is held in raised position by a suitable latch 28, which may be slid from the forward locking position shown in FIGS. 1 and 3 to the rearward position shown in FIG. 2 to release the magazine for reloading with a new roll of caps.

The loading of bullets into the gun is illustrated in FIG. 3. At this time the cocking lever 18 is in down position, and a quantity of cylindrical bullets 30 may be pushed one after the other into the gun through the yieldably depressible loading gate 24. The cocking lever 18 is pulled down during the loading operation for reasons explained later. The operation of the cocking lever moves a slide 32 rearward and turns the hammer 22 down, as shown by the change from FIG. 2 to FIG. 3.

It will be understood that once the gun magazines have been loaded, the gun may be fired repeatedly by simply pulling the cocking lever 18 down and back up, following which the gun is fired at will be pulling the trigger. The cocking lever and trigger are interlocked so that the lever cannot be pulled down a second time unless and until the gun has been fired.

FIG. 2 shows the closed side of the cap magazine. The open side is shown in FIGS. 7 and 8, the magazine 26 being generally cylindrical, with an opening at 34. The cap strip comes in the form of a roll which may be slid over the center pin 36. The strip is then threaded around the outside of the cap magazine in clockwise direction. At this time the magazine has been dropped bodily downward from the gun body, it being supported on a rigid arm 38 which is pivoted at 40. When the magazine is turned back up from the position shown in FIG. 2 to that shown in 7 and 8, the cap strip autmoatically comes into engagement with the cap feed and cap hammer mechanism.

Referring to FIG. 6, the cap strip runs beneath a feed pawl 42, a stop dog 44, and a cap hammer 46. It will also be seen in FIG. 6 that the outside of the magazine acts as an anvil against which the cap is detonated by the hammer 46.

Referring now to FIGS. 7 and 8, the cap feed pawl 42 is formed at the end of an arm 48 which is connected to a gear 50 by means of a crank pin 52. The gear 50 meshes with a rack 54 formed integrally with or fixedly secured to the slide 32 previously mentioned. The latter is moved back and forth by means of the cocking lever 18, the latter being pivoted at 56 and having an upward extension 58 carrying a roller pin 60. The latter is connected to the slide 32, and in the present case the slide has a downwardly open slot 62 (FIG. 8) which receives the pin 60. It will be evident that when the cocking lever 18 is in the upward position, the slide and rack are in their forward position and when the cocking lever is pulled down to the position shown in FIG. 7, the slide and rack are in their rearward position.

It will also be seen that the cocking action of FIG. 7 moves the cap feed pawl 42 toward the right, thereby moving the cap strip ahead a distance corresponding to the spacing between caps, and bringing a fresh cap to the anvil. The feed dog is urged downward by a pull spring 64. The pawl arm 48 is arched at 66 to clear the shaft or trunnion 68 of gear 50. Inasmuch as gear 50 is turned only a half revolution, it may be a half gear, as here illustrated.

The stop dog 44 is pivoted at 70, and it engages the cap strip between the feed dog and the anvil. It is urged

against the cap strip by a spring, not shown. It serves the usual purpose of preventing return movement of the cap strip when the feed dog is pulled back as shown by the change from FIG. 7 to FIG. 8 of the drawing.

The cocking action of lever 18 also cocks the cap firing hammer 46. In the particular mechanism here illustrated the hammer 46 is pivoted on the same axis 56 as the cocking lever, but of course the hammer is independently rotatable. It is urged toward the anvil by means of a spring 72 which may be coiled about the hub of the hammer. One end of the spring is hooked behind the hammer, and the other end bears against a part of the frame or mechanism of the housing, such as a plate corresponding to the plate 74, but on the opposite half of the gun (not shown in FIGS. 7 and 8). The spring 72 tends to unwind and thus actuate the hammer.

A part of the upward extension 58 of the cocking lever bears against a part of the hammer 46, thus moving the hammer back from the position shown in FIG. 8 to that shown in FIG. 7, at which time a sear 76 engages or hooks a part of the hammer, in this case a pin 78. The latter is shown held by sear 76 in FIG. 7, and released in FIG. 8. FIG. 8 also shows the part 80 of the hammer which is engaged by the cocking lever, and FIG. 7 shows the projection 82 of the cocking lever which engages the part 80 of the hammer. The sear 76 is formed integrally with trigger 20, the latter being pivoted at 84, and it will be evident that when the trigger is pulled, the sear releases the hammer to detonate a cap. The used cap strip extends downward out of the gun (see FIG. 6) ahead of the cocking lever.

It has already been mentioned in connection with FIG. 3 that the simulated bullets are loaded through a yieldably depressible bullet gate 24. Referring now to FIG. 9, the gate 24 is disposed in an elongated opening and is supported by a leaf spring 86 riveted at 88 to the side of the gun and at 90 to the gate 24, thus affording inward movement of the gate.

The gate is aligned with the magazine 14, the latter being disposed directly beneath the barrel 12. The magazine tube 14 is closed at its forward end, and contains a long but light compression spring 92 which acts as a feed spring to urge a plunger 94 rearwardly, and thus urge the simulated bullets 30 rearward. When bullets are inserted through the gate, one after another as shown in FIG. 3, they compress the spring as much as may be needed to hold a substantial supply of the simulated bullets.

The bullets are transferred one at a time upward from the magazine to the barrel. This is done by means of a rotatable bullet carrier 96. The carrier is a short cylinder mounted on the shaft 68 of gear 50, and it is rotated a half revolution by the gear. The carrier is housed by or turns within a shield 98 which extends around the bottom and rear of the carrier, but which stops short of the magazine 14 at its forward end, and it stops short of the barrel at its rear end.

The carrier is cut away to provide a chamber 100 dimensioned to receive a bullet. In FIGS. 7 and 10 the carrier has been turned to bring the chamber 100 to its bottom position, at which time the magazine feed spring readily slides another bullet into the chamber. In FIGS. 8 and 11 the carrier has been turned 180 degrees to bring the chamber 100 to its upper position, at which time the bullet is aligned with the barrel 12. Meanwhile the solid wall of the cylinder closes the rear end of the magazine 14, thus holding the remaining bullets in the magazine against movement.

Referring to FIG. 9, a bullet 30 is propelled through barrel 12 and out of the gun by means of a striker 102. This is a plunger disposed coaxially with barrel 12 and normally urged toward the muzzle of the gun by means of a compression spring 104. It also has a collar 105 which cooperates with the sear for holding the striker in retracted position.

The striker may be housed beneath the slide 32, as shown in FIG. 8 where the slide has been turned about ninety degrees to expose its lower parts. A part 122 of the slide is disposed in front of and engages the collar 105, so that the striker is pulled rearward with the slide when the gun is cocked as shown in FIG. 7. These parts are also shown schematically in FIGS. 12 and 13. The striker 102 and spring 104 are housed in a guide cylinder 160 which is fixedly secured beneath, and acts as a part of, the slide 32. This cylinder is open or slotted at the bottom as shown in FIG. 8 to expose the collar 105 to the sear or hook 106. The rear end of the compression spring 104 bears against a part 162 of the slide 32, and the parts all move back together with the slide. However, when the slide is restored to forward position the striker 102 remains in rearward position because of the sear 106, and thus the spring 104 is compressed, as is shown by the change from FIG. 12 to FIG. 13 of the drawing. In FIG. 12 and in FIG. 13 the slide 32 is in forward position, but in FIG. 12 the gun has been fired, whereas in FIG. 13 the gun has been cocked, but not yet fired.

The sear which engages the striker is a hook-shaped member, best shown at 106 in FIG. 8. It is pivoted at 108 and is resiliently urged upward by means of a spring 110. When trigger 20 is pulled it operates not only the sear 76 to fire the cap, but also the sear 106 to release the striker, which then hits the bullet resting in chamber 100, and propels it from the gun.

In the particular mechanism here shown the operation of sear 106 is not directly from trigger 20, but through the intermediate action of an outside hammer 22, previously referred to. Hammer 22 is pivoted at 112 and is normally urged forward by a spring 114. When hammer 22 is cocked it is held by a sear 116, which is formed integrally with trigger 20. It will be evident from comparison of FIGS. 7 and 8 that when the trigger is pulled the sear 116 releases the hammer 22, which then flies forward. (It should be kept in mind that at this time the slide 32 is in forward position, rather than the rearward position shown in FIG. 7, because the cocking lever 18 is returned upward to the stock of the gun before the trigger is pulled.)

During this forward movement a pin 118 (FIG. 8) projecting from the side of hammer 22 rides beneath the rear end 120 of sear 106, thus raising the part 120, which lowers the forward end or hook 106, thereby releasing the striker for abrupt forward movement. The parts 122 of the slide which pulled the striker 102 rearward were previously moved forward with the slide when the cocking lever was restored to upper position, and do not interfere with the desired forward movement of the striker.

As so far described the chamber 100 in the bullet carrier could be a channel with side walls. However, a part of one side wall is cut away, as indicated at 124 in FIGS. 8, 9, 10 and 11. The reason for this is to facilitate loading the bullets into the bullet magazine. From inspection of FIG. 9 it will be understood that this must be done while the chamber is at the bottom, because the bullets pass through the carrier on their way into the magazine. With the gate 24 located as close to the carrier as shown, it becomes desirable to cut away a part of the side wall to facilitate entry of the bullets. The bullets are held against rearward movement by the arcuate shield 98 previously referred to, and when the cocking lever is restored to upward position the rearmost bullet turns with the carrier from bottom to top position, and at the same time blocks the remaining bullets in the magazine from rearward movement.

The cocking lever and trigger are preferably interlocked, and this is done by means of a small angle detent shown at 130 in FIGS. 7 and 8. The cocking lever 18 has a hook 132 projecting upward, and this is engaged by the hook-shaped part 134 of the detent. The other arm 136 overlies a part 138 formed integrally with trigger 20. The detent is urged into locking position by means of a

spring **140**. On reflection it will be seen that when the trigger is pulled, the detent releases the cocking lever for cocking movement.

The trigger is not permitted to move forward immediately, and instead is held in rearward position by the action of a cam **166** on the hub of the outside hammer **22**, which cam bears against the part **116** of the trigger as shown in FIG. 8. Because the trigger is thus held rearward, the detent **134** is kept free of the part **132**, and the gun may be cocked. When the gun is cocked the slide **32** is moved rearward, which turns the outside hammer **22** back as shown in FIG. 7, thereby moving the cam **166** away from the trigger extension. This permits the trigger to move forward under the influence of its conventional trigger spring, which is shown in broken lines at **168** in FIG. 8.

The hammer **22** may be cocked by the slide **32**, so that the downward movement of the cocking lever causes the cap feed pawl to feed a cap from the magazine to the anvil, and it cocks the cap hammer **46**. It also moves the slide back, which through the gear rack **54** and gear **50**, turns the carrier down to receive a bullet from the magazine. The rearward movement of the slide also cocks the striker, and cocks the outside hammer **22**. When the cocking lever is restored to upper position, the slide moves forward and the bullet is transferred from the lower level of the magazine to the upper level of the barrel. The striker and cap hammer and outside hammer are all cleared for forward movement. Then when the trigger is pulled, the hammers are released, the cap is fired, and the bullet expelled.

It has already been mentioned that the cap magazine is held in position by a detent generally designated **28**. The detent is shown in greater detail in FIG. 4, in which it will be seen that the button **28** is connected to a slide **142** urged forward by a compression spring **144**. The forward end of the slide underlies a lug **146** projecting sideward from the closed wall **148** of the cap magazine. The shank of button **28** is movable in a horizontal slot **150**. When the slide is pulled back the cap magazine is released to turn around its pivot **40** from raised position to the exposed position shown in FIG. 2.

It is believed that the construction and method of operation of my improved bullet shooting cap rifle, as well as the advantages thereof, will be apparent from the foregoing detailed description. It will also be understood that while I have shown and described the gun in a preferred form, changes may be made without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A cap and bullet firing gun, said gun comprising a barrel, a stock behind said barrel, a bullet magazine collateral of the barrel and having its rear end near the breech end of the barrel, a bullet feed spring in said magazine for feeding bullets toward the rear end of the magazine, a cap magazine for receiving a roll of cap strip, a cap feed dog, an anvil, a cap firing hammer, said dog serving to feed said strip from said cap magazine to a position between said anvil and said hammer, a longitudinally reciprocable bullet striker behind said barrel, a spring urging said striker toward the muzzle, means to transfer a bullet from the rear end of the bullet magazine to the breech portion of the barrel ahead of the striker, a sear to hold the striker in retracted position, a sear to hold the cap hammer in retracted position, a trigger to release both sears in order to fire the cap and propel the bullet, and a pivoted lever having a handle portion exposed beneath the stock and its other end having a coupling pin and gear rack and gear operatively connected to the striker and dog and transfer means for cocking the bullet striker, for feeding a cap from the magazine to the anvil, and for transferring a bullet from the bullet magazine to the barrel, and said lever having a projection for cocking the cap hammer.

2. A bullet firing gun, said gun comprising a barrel, a stock behind said barrel, a bullet magazine collateral of the barrel and having its rear end near the breech end of the barrel, a bullet feed spring in said magazine for feeding bullets toward the rear end of the magazine, a longitudinally reciprocable bullet striker behind the barrel, a spring urging said striker toward the muzzle, means to transfer a bullet from the rear end of the bullet magazine to the breech portion of the barrel ahead of the striker, a sear to hold the striker in retracted position, a trigger to release the sear in order to propel the bullet, and a pivoted lever having a handle portion beneath the stock and having a coupling pin and gear rack and gear operatively connected to the striker and to the transfer means for cocking the bullet striker and for transferring a bullet from the bullet magazine to the barrel, said bullet transfer means being a rotatable carrier located at the breech portion and turning on an axis extending transversely of the gun, said carrier having a chamber to receive a bullet from the magazine in one position of the carrier, and to deliver it to the barrel in another position of the carrier, and said gear rack and gear serving to rotate the carrier between said positions.

3. A cap and bullet firing gun, said gun comprising a barrel, a stock behind said barrel, a bullet magazine collateral of the barrel and having its rear end near the breech end of the barrel, a bullet feed spring in said magazine for feeding bullets toward the rear end of the magazine, a cap magazine for receiving a roll of cap strip, a cap feed dog, an anvil, a cap firing hammer, said dog serving to feed said strip from said cap magazine to a position between said anvil and said hammer, a longitudinally reciprocable bullet striker behind said barrel, a spring urging said striker toward the muzzle, means to transfer a bullet from the rear end of the bullet magazine to the breech portion of the barrel ahead of the striker, a sear to hold the striker in retracted position, a sear to hold the cap hamme in retracted position, a trigger to release both sears in order to fire the cap and propel the bullet, and a pivoted lever having a handle portion exposed beneath the stock, and its other end having a coupling pin and gear rack and gear operatively connected to the striker and dog and transfer means for cocking the bullet striker, for feeding a cap from the magazine to the anvil, and for transferring a bullet from the bullet magazine to the barrel, and said lever having a projection for cocking the cap hammer, said bullet transfer means being a rotatable carrier located at the breech portion and turning on an axis extending transversely of the gun, said carrier having a chamber to receive a bullet from the magazine in one position of the carrier, and to deliver it to the barrel in another position of the carrier, and said gear rack and gear serving to rotate the carrier between said positions.

4. A cap and bullet firing gun as defined in claim 3 in which the cap firing hammer is concealed within the gun, and in which there is an external hammer visibly disposed at the breech of the gun, a hammer spring for operating the external hammer, a sear to hold the external hammer in retracted position, and in which the trigger operates both sears for releasing both hammers, and in which the external hammer has means to operate the striker sear to release the striker to propel a bullet as a cap is fired.

5. A cap and bullet firing gun as defined in claim 3 in which the said bullet carrier has a gear secured alongside the same, and in which the top of the breech portion of the gun has a longitudinally movable exposed slide, and in which the gear rack meshing with said gear forms a part of said slide, and in which the coupling pin of the cocking lever engages and so moves the slide that the bullet carrier is turned down to receive another bullet, and then up to disposed it ahead of the striker for discharge, and in which the cap firing hammer is concealed within the gun, and in which there is an external hammer

visibly disposed at the breech of the gun, said slide serving when retracted to bear against and to cock the external hammer, a hammer spring for operating the external hammer, a sear to hold the external hammer in retracted position, and in which the trigger operates both sears for releasing both hammers.

6. A bullet firing gun, said gun comprising a barrel, a stock behind said barrel, a bullet magazine having its rear end near the breech end of the barrel and extending longitudinally beneath the barrel, a bullet feed spring in said magazine for feeding bullets toward the rear end of the magazine, a longitudinally reciprocable bullet striker behind said barrel, a spring urging the same toward the muzzle, means to transfer a bullet from the rear end of the bullet magazine to the breech portion of the barrel ahead of the striker, a sear to hold the striker in retracted position, a trigger to release the sear in order to propel the bullet, a pivoted lever having a handle portion beneath the stock and having a coupling pin and gear rack and gear operatively connected to the striker and to the transfer means for cocking the bullet striker, and for transferring a bullet from the bullet magazine to the barrel, said bullet transfer means being a rotatable carrier located at the breech portion and turning on a horizontal axis extending transversely of the gun between the axis of the magazine therebeneath and the axis of the barrel thereabove, said gear rack and gear serving to rotate the carrier a half turn, said carrier having a chamber to receive a bullet from the magazine when in bottom position, and said carrier when turned a half turn to bring the chamber from bottom to top position serving to position the bullet ahead of the striker.

7. A bullet firing gun as defined in claim 6 in which there is a yieldable gate at the side of the gun at the rear of the magazine to facilitate insertion of bullets one after another into the magazine against the magazine spring.

8. A gun as defined in claim 6 in which the said bullet carrier has a gear secured alongside the same, and in which the top of the breech portion of the gun has a longitudinally movable exposed slide, and in which the gear rack meshing with said gear forms a part of said slide, and in which the coupling pin of the cocking lever engages and so moves the slide that the bullet carrier is turned down to receive another bullet, and then up to dispose it ahead of the striker for discharge.

9. A cap and bullet firing gun, said gun comprising a barrel, a stock behind said barrel, a bullet magazine having its rear end near the breech end of the barrel and extending longitudinally beneath the barrel, a bullet feed spring in said magazine for feeding bullets toward the rear end of the magazine, a cap magazine for receiving a roll of cap strip, a cap feed dog, an anvil, a cap firing hammer, said dog serving to feed said cap strip from said magazine to a position between said anvil and said hammer, a longitudinally reciprocable bullet striker behind said barrel, a spring urging said striker toward the muzzle, means to transfer a bullet from the rear end of the bullet magazine to the breech portion of the barrel ahead of the striker, a sear to hold the striker in retracted position, a sear to hold the cap hammer in retracted position, a trigger to release both sears in order to fire the cap and propel the bullet, a pivoted lever having a handle portion exposed beneath the stock and its other end having a coupling pin and gear rack and gear operatively connected to the striker and dog and transfer means for cocking the bullet striker, for feeding a cap from the magazine to the anvil, and for transferring a bullet from the bullet magazine to the barrel, and said lever having a projection for cocking the cap hammer, said bullet transfer means being a rotatable carrier turning on a horizontal axis extending transversely of the gun between the axis of the magazine therebeneath and the axis of the barrel thereabove, said gear and rack serving to rotate the carrier a half turn, said carrier having a chamber to receive a bullet from the magazine when in bottom position, and said carrier when turned a half turn to bring the chamber from bottom to top position serving to position the bullet ahead of the striker.

10. A bullet firing gun as defined in claim 9 in which there is a yieldable gate at the side of the gun at the rear of the magazine to facilitate insertion of bullets one after another into the magazine against the magazine spring.

11. A gun as defined in claim 9 in which the said bullet carrier has a gear secured alongside the same, and in which the top of the breech portion of the gun has a longitudinally movable exposed slide, and in which the gear rack meshing with said gear forms a part of said slide, and in which the coupling pin of the cocking lever engages and so moves the slide that the bullet carrier is turned down to receive another bullet, and then up to dispose it ahead of the striker for discharge.

References Cited in the file of this patent

UNITED STATES PATENTS

403,432	Knapp	May 14, 1889
461,257	Buchanan	Oct. 13, 1891
1,080,170	Roe	Dec. 2, 1913
2,037,313	Duncanson	Apr. 14, 1936
2,213,318	Lefever	Sept. 3, 1940
2,784,711	Vaughn	Mar. 12, 1957
3,075,511	Ryan	Jan. 29, 1963