

Aug. 11, 1931.

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1,818,810

AUTOMATIC AIR RIFLE

Filed June 27, 1930

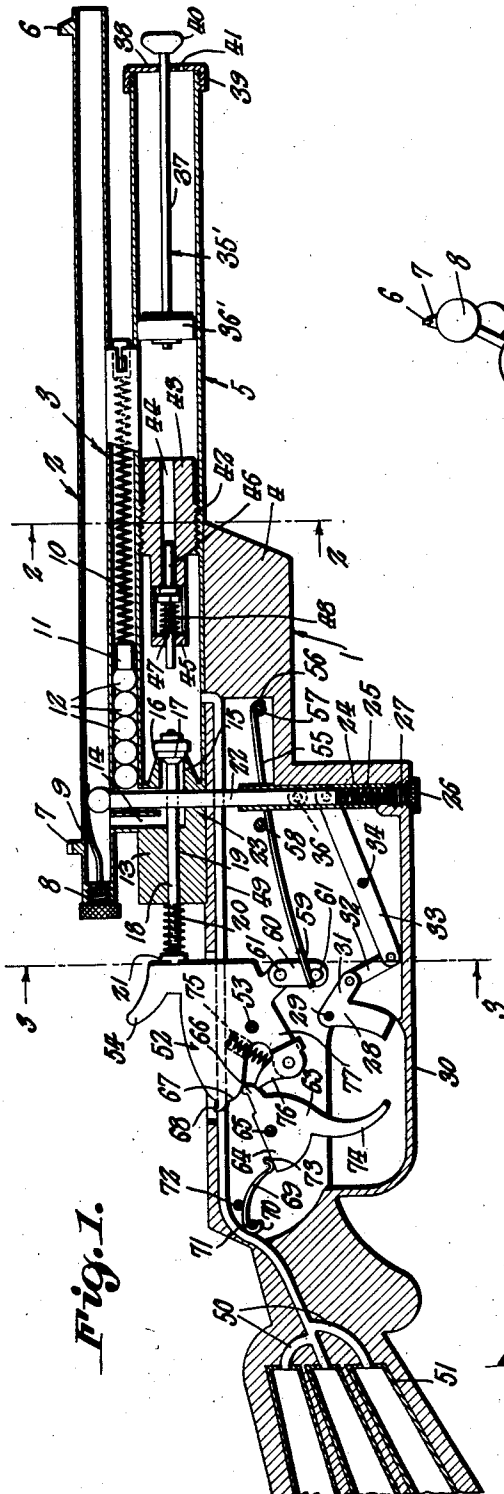


Fig. 1.

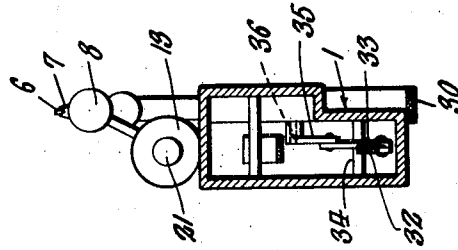


Fig. 3.

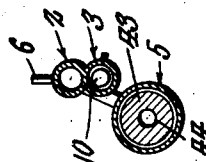


Fig. 2.

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## AUTOMATIC AIR RIFLE

Application filed June 27, 1930. Serial No. 464,352.

This invention relates to improvements in magazine air rifles and has as its primary object to provide a rifle of this type so constructed as to be adapted for the firing of a relatively large number of shots without the necessity of lowering the rifle from one's shoulder as is required to be done in the use of magazine air rifles as ordinarily constructed.

Another object of the invention is to provide a magazine air rifle so constructed that it will not be necessary to replenish the supply of compressed air for ejecting shot from the rifle as is the case in air rifles of this type heretofore devised, the invention contemplating the construction and arrangement of parts such that a sufficient volume of compressed air may be stored for the discharge of a comparatively great number of shots.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings, and specifically pointed out in the appended claims, it being understood of course that minor changes may be made so long as they fall within the scope of the claims.

In describing my invention in detail, reference will be had to the accompanying drawings, wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a vertical longitudinal sectional view through the rifle embodying the invention.

Figure 2 is a vertical transverse sectional view taken substantially on the line 2—2 of Figure 1, looking in the direction indicated by the arrows.

Figure 3 is a similar view on the line 3—3 of Figure 1, looking in the direction indicated by the arrows.

The rifle, embodying the invention comprises a stock which is indicated in general by the numeral 1 and which may be made of wood or of metal, either as found desirable, and the rifle includes a barrel which is indicated in general by the numeral 2

and this barrel is associated with a tubular shot container indicated in general by the numeral 3, and a compressed air chamber 4 and pump 5, all of which parts are compactly assembled and, so far as practicable, are formed integral with one another. The barrel 2 is located above the shot container 3 and is of the usual tubular form and provided at its forward end with the usual front side indicated by the numeral 6 and, near its rear end with the usual rear side, indicated by the numeral 7. The barrel is of course open at its forward end, and a screw plug 8 is fitted into and closes its rear end and from this plug there extends a small leaf spring indicated by the numeral 9 which serves a purpose to be presently pointed out. The shot container 3 is likewise of tubular form and is closed at its forward end and this container is located, as best shown in Figure 2, immediately below and preferably formed integral with the barrel 2. A compression spring 10 is arranged within the tubular shot container 3 and bears at one end against the closed end of said container, and at its other end against a follower 11 which engages the forward one of a series of shot 12 which are fed into the container through an opening formed in the side thereof. The rear end of the shot container 3 is either connected with or formed integral with a head 13 which is mounted upon the upper side of the stock 1, and a passageway 14, for air under pressure, extends upwardly through this head and at right angles to a passageway 15 which extends horizontally in the head and preferably axially with respect thereto. The upper end of the passageway 14 communicates with the barrel 2 near the rear end thereof and the wall of the passageway 15 is beveled to provide a valve seat 16, to seat a valve 17, the stem 18 of which valve is fitted slidably through a bore 19 formed axially in the head 13, and therefore in alignment with the passageway 15. A compression spring 20 is arranged upon the portion of the stem 18 which extends rearwardly beyond the head 13 and this spring bears against the rear end of the said head

and against a head 21 which is provided upon the rear end of the stem. The portion of the head 13 in which the valve seat is formed, extends into the compressed air chamber 4, and at this point it will be evident that when the head 21 of the valve stem is impacted by the hammer of the rifle, to be presently described, the valve will be instantly opened so as to permit of immediate passage of compressed air through the passageways 15 and 14 and into the barrel 2 behind one of the shot 12 which has been positioned automatically in the valve, by a means which will be presently described. The means referred to comprises a shot feeding rod 22 which rod is slidably mounted in an opening 23 formed in the lower side of the head 13 and extends upwardly through the rear end of the shot container 3 and is normally held in an elevated position with its upper end extended vertically in rear of the rear end of the bore of the container, as shown in Figure 1, by a compression spring 24 which engages the lower end of the rod 22 and is fitted, as is also the said lower end of the rod, in a tube 25 mounted in the stock 1 to constitute a part of said stock.

The lower end of the tube is closed by a plug 26 fitted into a threaded opening 27 in the lower side of the stock. Means is provided for effecting vertical reciprocation of the rod 22 and the downward movement of the rod is limited to the extent, that, when in its lowered position, its upper end will be opposite the lower side of the rear end of the bore of the shot container so that, one shot having been driven from the barrel 2 by compressed air, and the rod 22 having been lowered to clear the rear end of the shot container, another shot will be brought into position above the upper end of the rod 22 through the medium of the spring 10 and follower 11. Referring again to the spring 9, it will be observed, by reference to Figure 1, that this spring is so positioned that its free end will extend above the upper end of the rod 22 so that when the rod is elevated by its return movement, under the influence of the spring 24 and the shot engaged by its upper end is brought into position with the barrel the shot will be held between the upper end of the rod 22 and the free end of the spring 9 and immediately in advance of the delivery end of the passageway 14.

The invention contemplates means for retracting the rod 22, against the tension of the spring 24, when the shot confined between the upper end of the rod and the spring 9 has been delivered from the barrel 2 by the compressed air delivered into the barrel, and this means comprises a pivoted finger piece 28 suspended from a pivot 29 mounted above the guard of the stock 1,

which guard is indicated by the numeral 30 and the finger piece is provided with a forwardly extending arm 31 to which is pivotally connected the upper end of a link 32.

The lower end of this link is pivotally connected with the rear end of a rock arm 33 pivotally mounted as at 34 within the stock. A link 35 connects the forward end of the arm 33 with a pin 36 which projects laterally from the rod 33 and works through a slot (not shown) formed in one side of the tube 25, and at this point it will be evident that the one using the rifle may, in order to effect the delivery of a shot to the inner end of the barrel 2, press forwardly against the finger 28, with the fore-finger or trigger finger, thereby effecting swinging of this member and a rocking of the arm 33 to lower the rod 22 against the tension of the spring 24. In order that air may be compressed by a compact and conveniently operable means, associated directly with the other parts of the rifle, a piston indicated in general by the numeral 35', comprises a head 36' which is mounted for reciprocation in the pump cylinder 5, and a stem 37 which extends from the head and through an opening 38 formed in a cap 39 which closes the forward end of the cylinder, a finger knob 40 being provided upon the outer end of the stem so that it may be readily reciprocated. The cylinder is vented by an opening 41 formed in the cap 39. Mounted within the barrel 5 between the barrel proper and the compressed air chamber 4, preferably by a threaded connection as indicated at 42, is a bushing 43 having a bore 44 formed axially therein. A yoke including a head member 45 is mounted upon and extends rearwardly from the rear end of the bushing 43 and a valve stem 46 is slidably mounted in the bore 44 and a valve head 47 is mounted upon this stem and is held by a spring 48, also mounted upon the stem, against the rear end of the bushing 43 so as to close the rear end of the bore 44, the spring bearing between the valve head 47 and the head 45 and the rear end of the stem being slidably fitted through an opening in the said head 45.

At this point it will be evident that, by reciprocating the piston 35', air may be compressed by the pump 5 and delivered into the compressed air chamber 4, under pressure. In order that a surplus quantity of compressed air may be stored, a small pipe 49 is placed in connection at its forward end with the compressed air chamber 4 and is led rearwardly through the upper portion of the stock 1 and its rear end and the rear ends of branches 50 which lead therefrom, are placed in communication with sheet metal air chambers 51 which are mounted in the rear portion of the stock 1.

The hammer of the rifle is indicated in general by the numeral 52 and is mounted

for rocking movement upon a pivot pin 53 and the hammer is provided at its upper side with a thumb piece 54 by means of which it may be thrown back or caught. The hammer is designed to abut against or impact the head 21 at its forward side and directly in front of the thumb piece. A leaf spring 55 is provided with an overturned forward end 56 which fits over a cross pin 58. The rear end of the spring is preferably notched or forked, as indicated by the numeral 59 so as to straddle a link 60 which is pivotally suspended as at 61 from the forward lower corner of the hammer 52, the side member of the yoke 59 bearing downwardly against the upper side of a pin 62 which is fitted transversely through an opening in the lower end of the link 60, it being understood that before the spring is arranged in place and assembled with the parts with which it is engaged, it is bowed to quite an extent so that some little force is required to cause it to assume the gradually curved form shown in Figure 1 of the drawings.

It will be understood from the foregoing that the spring 55 normally holds the hammer 52 in a position to engage the head 21 of the valve stem 18, and in order that such movement of the hammer may be normally resisted, and yet to provide for tripping of the hammer so that it may impact the head 21 of the valve stem 18, a trigger is provided, which trigger is indicated in general by the numeral 63 and this trigger comprises a head 64 pivotally mounted upon a pin 65 within the stock 1, and is provided with a nose 66 which engaged beneath a nose 67 provided at the rear side of the hammer 52 and at the upper portion of said hammer. A lug 68 is, for a purpose to be presently explained, formed at the rear side of the nose 67. A leaf spring 69 is overturned at one end as at 70 to engage over a cross pin 71 within the stock 1 and the upper side of this spring engages against the under side of a cross pin 72 which extends transversely of the recess in which the trigger and spring are arranged, the free end of the spring being preferably turned upwardly as indicated by the numeral 73 and resting against the flat upper side of the trigger 63. In addition to the head 64, the trigger 63 includes a finger piece 74 and this finger piece depends within the trigger guard 30 in rear of the finger piece 28 previously described. A compression spring 75 is seated in a socket in the under side of the nose 67 of the hammer 52 and at its lower end bears against a pivoted detent 76 which is pivotally mounted upon an extension 77 projecting rearwardly from the lower side of the hammer 52.

The end of the detent 76 engages beneath the nose 66 of the trigger in turn, as previously stated, braced beneath the nose

67 of the hammer. It will now be evident that when the trigger is pulled the nose 66 will be swung downwardly thus correspondingly swinging the detent 76 and, as the detent is, as before stated, pivotally mounted upon the hammer, rearward swinging movement will of course be imparted to the hammer 52, and, when the trigger has been pulled to the limit of its rearward movement by manipulating the finger piece 74, the hammer will be released and impact the head 21 of the valve stem 18 so as to open the valve 17 and admit air under pressure from the air chamber 4 into the rear end of the barrel 2.

What I claim is:

1. A magazine air rifle comprising a stock, a barrel extending forwardly from the stock, a compressed air chamber located below the rear portion of the barrel, air cells in the stock, an air conducting tube leading from the air chamber to the said cells, an air pump including a cylinder extending forwardly from the air chamber, a piston working in said cylinder, a check valve between the pump cylinder, and air chamber, a valve casing having a passageway in communication with the inner end of the air chamber and the inner end of the barrel, a tubular shot container between the barrel and the air chamber, a shot feeding rod movable, at its upper end past the inner end of the shot container, a spring for moving the rod to effect delivery of one shot from the shot container to the inner end of the barrel, a valve for controlling the passage of compressed air from the air chamber to the said passageway, a hammer pivotally mounted for impact with the stem of the said valve to open the same and admit compressed air behind the shot delivered to the barrel, and a trigger for tripping said hammer.

2. A magazine air rifle comprising a stock, a barrel extending forwardly from the stock, a compressed air chamber located below the rear portion of the barrel, air cells in the stock, an air conducting tube leading from the air chamber to the said cells, an air pump including a cylinder extending forwardly from the air chamber, a piston working in said cylinder, a check valve between the pump cylinder and air chamber, a valve casing having a passageway in communication with the inner end of the air chamber and the inner end of the barrel, a tubular shot container between the barrel and the air chamber, a shot feeding rod movable, at its upper end past the inner end of the shot container, a spring for moving the rod to effect delivery of one shot from the shot container to the inner end of the barrel, a valve for controlling the passage of compressed air from the air chamber to the said passageway, a hammer pivotally mounted for impact with the stem of the said valve

to open the same and admit compressed air behind the shot delivered to the barrel, manually operable means for retracting the shot feeding rod, and a trigger for tripping said hammer.

3. A magazine air rifle comprising a stock, a barrel extending forwardly from the stock, a compressed air chamber located below the rear portion of the barrel, air cells in the stock, an air conducting tube leading from the air chamber to the said cells, an air pump including a cylinder extending forwardly from the air chamber, a piston working in said cylinder, a check valve between the pump cylinder and air chamber, a valve casing having a passageway in communication with the inner end of the air chamber and the inner end of the barrel, a tubular shot container between the barrel and the air chamber, a shot feeding rod movable, at its upper end past the inner end of the shot container, a spring for moving the rod to effect delivery of one shot from the shot container to the inner end of the barrel, a valve for controlling the passage of compressed air from the air chamber to the said passageway, a hammer pivotally mounted for impact with the stem of the said valve to open the same and admit compressed air behind the shot delivered to the barrel, manually operable means for retracting the shot feeding rod, and a trigger for tripping said hammer, the said rod retracting means comprising a pivoted finger piece, a rocking arm, a link connecting the finger piece and one end of the said arm, and a link connecting the other end of the arm and the said rod.

4. A magazine air rifle comprising a stock, a barrel extending forwardly from the stock, a compressed air chamber located below the rear portion of the barrel, air cells in the stock, an air conducting tube leading from the air chamber to the said cells, an air pump including a cylinder extending forwardly from the air chamber, a piston working in said cylinder, a check valve between the pump cylinder and air chamber, a valve casing having a passageway in communication with the inner end of the air chamber and the inner end of the barrel, a tubular shot container between the barrel and the air chamber, a rod movable, at its upper end past the inner end of the shot container, a spring for moving the rod to effect delivery of one shot from the shot container to the inner end of the barrel, means within the barrel, for engaging the delivered shot to hold the same against displacement, a valve for controlling the passage of compressed air from the air chamber to the said passageway, a hammer pivotally mounted for impact with the stem of the said valve to open the same and admit compressed air be-

hind the shot delivered to the barrel, and a trigger for tripping said hammer.

5. A magazine air rifle comprising a stock, a barrel extending forwardly from the stock, a compressed air chamber located below the rear portion of the barrel, air cells in the stock, an air conducting tube leading from the air chamber to the said cells, an air pump including a cylinder extending forwardly from the air chamber, a piston working in said cylinder, a check valve between the pump cylinder and air chamber, a valve casing having a passageway in communication with the inner end of the air chamber and the inner end of the barrel, a tubular shot container between the barrel and the air chamber, a rod movable at its upper end past the inner end of the shot container, a spring for moving the rod to effect delivery of one shot from the shot container to the inner end of the barrel, a leaf spring within the barrel, for engaging the delivered shot to hold the same against displacement, a valve for controlling the passage of compressed air from the air chamber to the said passageway, a hammer pivotally mounted for impact with the stem of the said valve to open the same and admit compressed air behind the shot delivered to the barrel, and a trigger for tripping said hammer.

6. A magazine air rifle comprising a stock, a barrel extending forwardly from the stock, a compressed air chamber, located below the rear portion of the barrel, air cells in the stock, an air conducting tube leading from the air chamber to the said cells, an air pump including a cylinder extending forwardly from the air chamber, a piston working in said cylinder, a check valve between the pump cylinder and air chamber, a valve casing having a passageway in communication with the inner end of the air chamber and the inner end of the barrel, a tubular shot container between the barrel and the air chamber, means for moving the shot, in said container, toward the inner end thereof, a shot feeding rod movable, at its upper end past the inner end of the shot container, a valve for controlling the passage of compressed air from the air chamber to the said passageway, a hammer pivotally mounted for impact with the stem of the said valve to open the same and admit compressed air behind the shot delivered to the barrel, and a trigger for tripping said hammer.

7. A magazine air rifle comprising a stock, a barrel extending forwardly from the stock, a compressed air chamber located below the rear portion of the barrel, air cells in the stock, an air conducting tube leading from the air chamber to the said cells, an air pump including a cylinder extending forwardly from the air chamber,

a piston working in said cylinder, a check valve between the pump cylinder and air chamber, a valve casing having a passageway in communication with the inner end of the air chamber and the inner end of the barrel, a tubular shot container between the barrel and the air chamber, a shot feeding rod movable, at its upper end past the inner end of the shot container, a spring for moving the rod to effect the delivery of one shot from the shot container to the inner end of the barrel, a valve for controlling the passage of compressed air from the air chamber to the said passageway, a hammer pivotally mounted for impact with the stem of the said valve to open the same and admit compressed air behind the shot delivered to the barrel, a trigger for tripping said hammer, a compressed air chamber in the body of the stock, and a pipe establishing communication between the said chamber and the first mentioned compressed air chamber.

In testimony whereof I affix my signature.

EARL H. MILLER.

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