

AIR RIFLE.

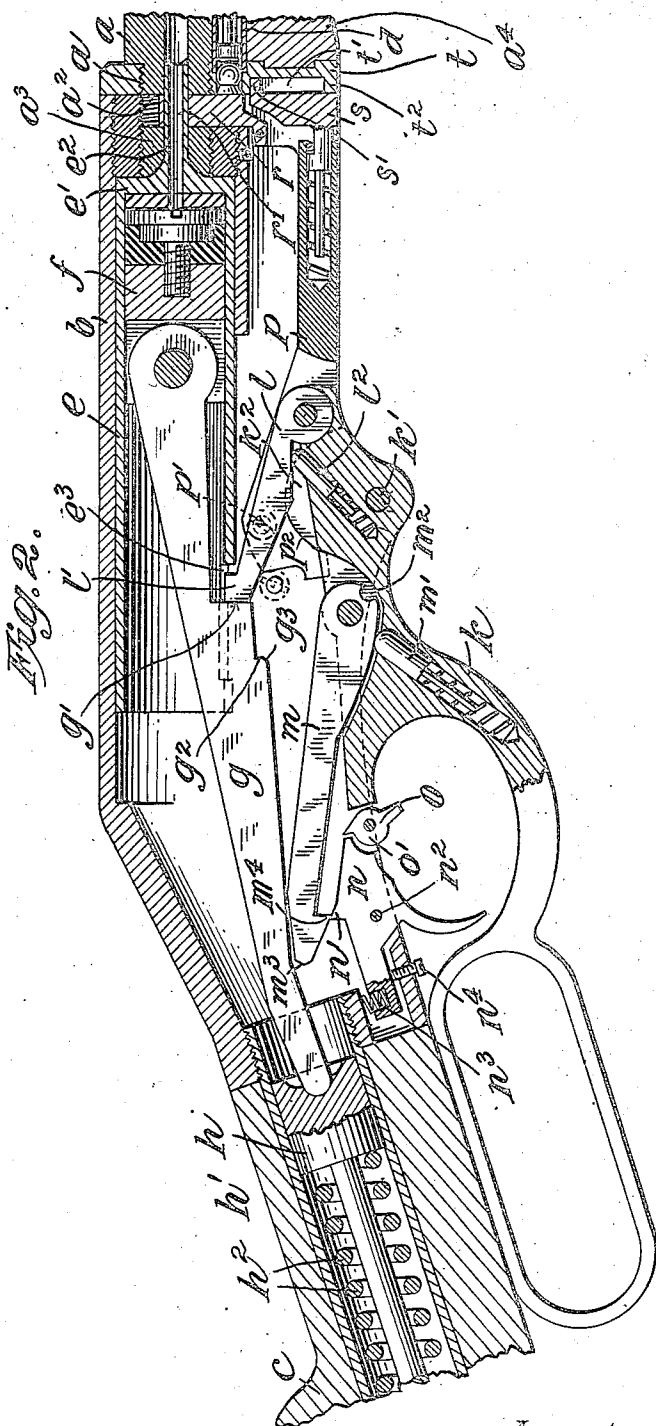
Patented Mar. 25, 1913.

3 SHEETS—SHEET 1.

Fig. 1.

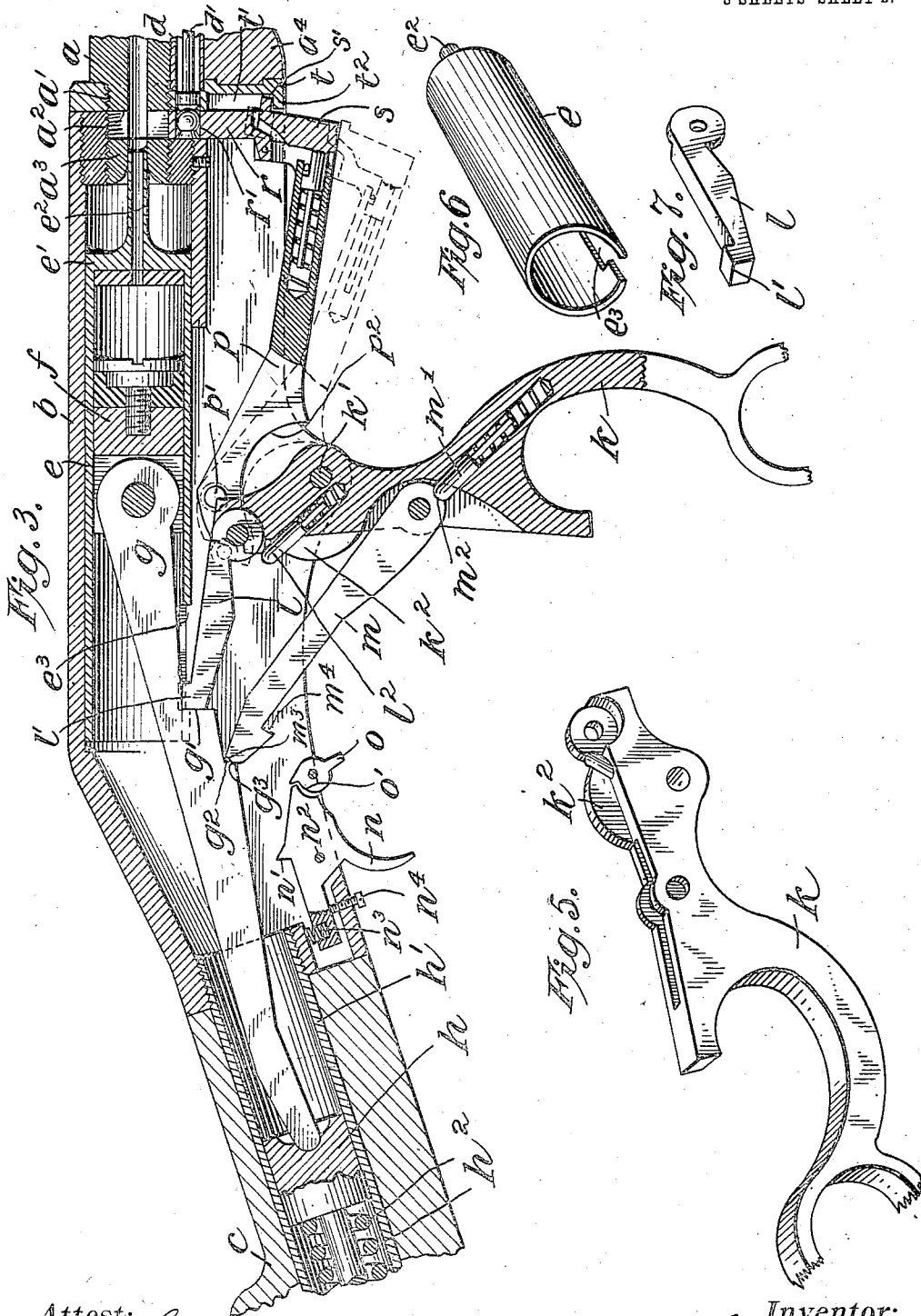
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by *Edward S. Redfield*
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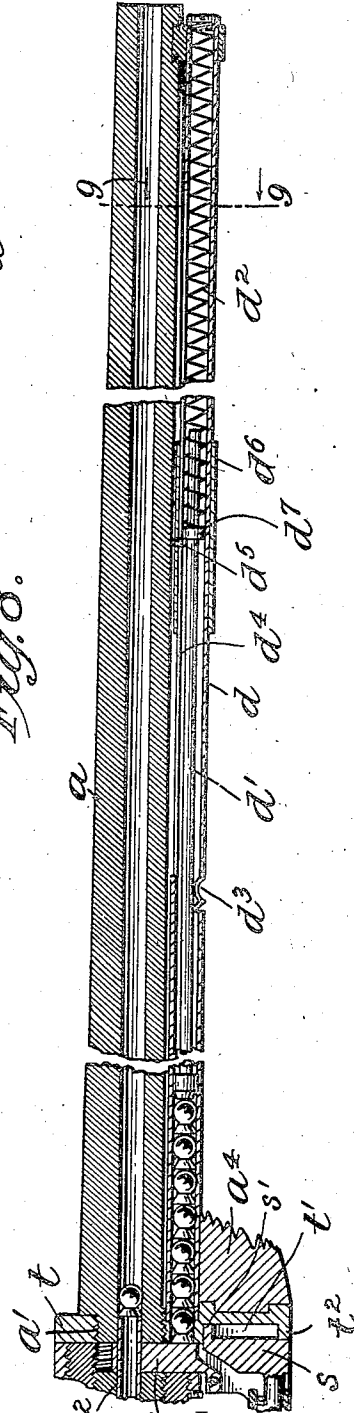
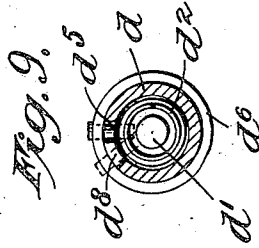
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UNITED STATES PATENT OFFICE.

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AIR-RIFLE.

1,057,171.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed July 17, 1912. Serial No. 709,868.

To all whom it may concern:

Be it known that I, EDWARD E. REDFIELD, a citizen of the United States, residing in Glendale, Douglas county, State of Oregon, have invented certain new and useful Improvements in Air-Rifles, of which the following is a specification, reference being had to the accompanying drawings, which form a part hereof.

This invention relates to air rifles in which energy is stored in a spring by the movement of a lever and acts, when released by the trigger, upon a plunger in an air chamber, the bullet being driven from the barrel by the air thus compressed in the air chamber. In air rifles of this character the spring in which energy is stored is usually located in the receiver together with the air chamber, so that even with a receiver of abnormal length, as compared with the receiver of an ordinary rifle, the spring is necessarily short. Furthermore, the spring is usually compressed by movement of the lever in one direction only, so that considerable strength is required to compress the spring. Again, there is usually opportunity for leakage of air behind the bullet so that there is corresponding waste of power.

It is the object of this invention to overcome all of these difficulties and to improve the construction of air rifles in various particulars, all as will be pointed out hereinafter.

In accordance with this invention the spring in which energy is stored is located in the stock of the rifle and is compressed in part by the downward and forward movement of the lever and in part by the upward and rearward movement thereof, so that only moderate strength is required to compress it. The air chamber occupies substantially the full length of the receiver and therefore can be larger than usual without requiring the receiver to be lengthened unduly. The air chamber itself is removable longitudinally and carries at its forward end a tube which is withdrawn so as to permit the bullet to be placed in position in rear of the bore of the barrel and is then moved forward to push the bullet into the rifling of the barrel and itself to enter the bore of the barrel so as to prevent the leakage of air behind the bullet. Furthermore, the air chamber and the tube receive their final for-

ward movement with the beginning of the movement of the piston in the chamber so that the inertia and sticking of the bullet in the barrel are overcome mechanically by direct contact with moving parts while practically the whole air pressure can be used for driving the bullet through the barrel. This and other features of improvement will be more fully explained with reference to the accompanying drawings in which the invention is illustrated and in which—

Figure 1 is a view in side elevation, with the stock in longitudinal section, of an air rifle constructed in accordance with the invention. Fig. 2 is a detail view in longitudinal section through the receiver and a portion of the stock and barrel, on a larger scale than that of Fig. 1, the parts being shown in the positions which they occupy after the trigger has been pulled and the plunger has reached its extreme forward position. Fig. 3 is a similar view showing the parts in the positions which they occupy when the lever has been moved to its extreme downward and forward position. Fig. 4 is a similar view showing the parts in the positions which they occupy when the lever has been moved back to its extreme upward and rearward position and before the trigger is pulled. Fig. 5 is a partial perspective view of the lever removed from the frame or receiver. Fig. 6 is a perspective view of the movable air chamber removed from the receiver. Fig. 7 is a perspective view of the forward thrust rod or link. Fig. 8 is a detail view in longitudinal section through the barrel, the magazine tube and the forward portion of the frame or receiver. Fig. 9 is a detail view in section, through the magazine tube, on the plane indicated by the line 9—9 of Fig. 8, but on a larger scale.

The rifle shown in the drawings comprises a barrel *a*, a frame or receiver *b* and a stock *c*. The reduced rear end of the barrel is threaded, as at *a'*, with interrupted threads and engages a correspondingly threaded portion of the receiver *b* so that the barrel can be engaged with the receiver by a quarter turn. The barrel is locked in position by means to be described hereinafter. Below the barrel is secured a magazine tube *d* which receives the plunger *d'* and spring *d''* by which the bullets, inserted through an

opening d^3 when the plunger is drawn forward, are pressed rearwardly, substantially as usual. The magazine tube d , however, is slotted longitudinally, as at d^4 , to permit the travel of a stud d^5 which is fixed to an external sleeve d^6 and stands behind a collar d^7 on the plunger d^1 . The forward extremity of the slot is cut at right angles, as shown at d^8 in Fig. 9, so that when the plunger d^1 is drawn forward by the application of the fingers to the sleeve d^6 , it can be held in its forward position by a partial rotation of the sleeve so as to cause the stud d^5 to enter the transverse portion d^8 of the slot. The sleeve and stud can be moved rearwardly independently of the plunger, so that the opening d^3 can be closed by the sleeve after the magazine has been filled with bullets, the plunger being then held in its forward position, against the pressure of the spring d^2 , by contact of its rear end with the column of bullets in the rear portion of the tube.

The frame or receiver b is chambered internally to receive with a close sliding fit the air chamber e . The air chamber is open at its rear end and is closed at its forward end by a cap or head e' which is bored centrally and also carries a tube e^2 through which the bore is continued, the forward extremity of the tube being adapted to enter the bore of the barrel a . The air chamber is also provided, near its rear end, with an elongated slot e^3 for engagement with the forward thrust rod as hereinafter described. In the air chamber e is fitted a piston f in which is pivoted a link g which bears at its rear end against a plunger h . The latter is mounted to move in a tube h' which extends rearwardly in the stock c and to compress therein the spring h^2 in which energy is stored and by which it is returned, through the link g , to drive the piston f forward and to compress the air in the air chamber e . It will be observed that as the spring is located in the stock, wholly in rear of the compressing mechanism to be described, it can have a much greater length than is usual in air guns of this description and can have correspondingly greater strength and driving power.

The trigger guard and lever k is pivoted in the underside of the frame or receiver b , as at k' and carries, forward of the pivot, a thrust rod l which has a head l' adapted to engage the elongated slot e^3 in the underside of the rear end of the air chamber e . A spring plunger l^2 , located in the lever k , presses the thrust rod l normally upward, when the parts are in the position shown in Fig. 2, so that it may engage the movable air chamber. In the first or forward and downward movement of the lever k , as shown in Fig. 3, the forward thrust rod l engages a shoulder g' of the link g and moves that link, together with the piston f ,

rearwardly against the pressure of the spring h^2 . At the same time the thrust rod l engages the rear end of the slot e^3 and moves the air chamber itself rearwardly, thus withdrawing the tube e^2 from the bore of the barrel, as shown in Fig. 3. In the lever k , in rear of the pivot k' , is pivoted the rear thrust rod m which, in the position of the parts shown in Fig. 2, is pressed upwardly by a spring plunger m' , and in the position of the parts shown in Fig. 3 is held in position by engagement of the end of the plunger with a rounded notch m^2 in the thrust rod. When the lever k is in its extreme downward and forward position, as shown in Fig. 3, the rear end of the thrust rod m engages a shoulder g^2 on the underside of the link g , and when the lever is moved back to its upper and rearward position the link g is moved rearwardly from the position shown in Fig. 3, in which it was placed by the forward thrust rod l , to its extreme rearward position as shown in Fig. 4, thus further compressing the spring h^2 and withdrawing the piston f to the rear end of the air chamber e . The shoulder g^2 is beveled or chamfered off as at g^3 and the rear end of the thrust rod m is also beveled or chamfered off as at m^3 , so that when the pressure of the lever, in its rearward movement, is relieved, the tendency of the forward pressure of the link g under the influence of the spring h^2 is to throw the thrust rod m downward out of engagement with the link g . This tendency, however, is resisted by the trigger n on the toe n' of which rests the toe m^4 on the underside of the thrust rod m . The trigger, pivoted at n^2 , is pressed downward at its rear end by a spring n^3 against an adjustable stop n^4 . When the trigger is pressed by the finger the toe n' moves forward under the toe m^4 of the thrust rod m and permits the thrust rod to be pushed down by the forward pressure of the link g so that the link and piston may then be driven forward by the spring h^2 . A safety o , having an eccentric o' , is pivoted in the frame forward of the trigger so as to hold the trigger in its locked position, as shown in Fig. 4, until the safety is turned so as to release the trigger.

In the lower part of the frame, at p' , is pivoted the lifter p , moving in the slot in the underside of the frame forward of the lever k . A cam k^2 on the forward end of the lever k cooperates with a similarly shaped recess p^2 in the underside of the lifter p , so that when the lever k is thrown down and forward, as in Fig. 3, the lifter is thrown down into the position shown by full lines in Fig. 3, and when the lever k is moved to its upper and rearward position the lifter is again thrown up into the position shown in Figs. 1 and 4 and is there

held. On the forward end of the lifter is loosely pivoted a block r which is adapted to slide vertically in a slot a^2 which is cut through the rearward extension a^3 of the barrel a . The block r has also formed through it an aperture r' which, when the block is in its lifted position, is in line with the bore of the barrel and permits the tube e^2 on the forward end of the movable air chamber to pass through it, as shown in Figs. 2 and 4. When the lifter is in the position indicated by full lines in Fig. 3 the aperture r' is then in line with the magazine tube d so that the rearmost bullet in the magazine tube may then be pushed into the aperture, as shown in Fig. 3, in readiness to be lifted, when the lever h is moved rearwardly and the lifter p is swung upwardly, into line with the bore of the barrel.

It will be observed that when the lifter p and block r are in the position shown by full lines in Fig. 3 the upper end of the block does not quite clear the aperture through the rearward extension of the barrel, so that the block, in this position, prevents the barrel from being turned and released from the frame. In order to permit the barrel to be released from the frame the block must be dropped further. It is normally prevented from being dropped further by a spring pressed latch s which is mounted in the forward end of the lifter p and has a lip s' arranged to slide in a groove t' in the rear face of the block t which receives the rear end of the barrel a and the rear end of the grip piece a^1 . A lip s normally engages the lip t^2 at the bottom of the groove t' when the parts are in the position shown in Fig. 3, and prevents the lifter from dropping further, but when the latch s is pressed rearwardly its lip s' clears the lip t^2 and permits the lifter and block to drop further so as to permit the barrel to be turned and disengaged from the frame or receiver.

It will be understood that various changes in details of construction and arrangement may be made without departing from the spirit of the invention, which is not limited to the precise construction shown and described herein.

I claim as my invention:—

1. In a gun, the combination with the receiver and the barrel having an interrupted screw thread engagement, a lifter mounted on the receiver, and a block carried by the lifter and adapted to engage the barrel to prevent rotation thereof relative to the receiver.

2. In a gun, the combination with the receiver and the barrel having an interrupted screw thread engagement, a lifter mounted on the receiver, a block carried by the lifter, and a latch carried by the receiver and adapted normally to permit normal move-

ment of the lifter, the latch being movable to permit further movement of the receiver to disengage the block from the barrel.

3. In an air gun, the combination of a barrel, a receiver, an air chamber movable in the receiver and having a forward extension to enter the barrel, means to move the air chamber forward nearly to its extreme forward position to push the bullet into the rifling of the barrel before the trigger is pulled, and independent means to complete the movement of the air chamber and start the bullet from its position of rest after the trigger is pulled.

4. In an air gun, the combination of a barrel, a receiver, an air chamber movable in the receiver and having a forward extension to enter the barrel, means to move the air chamber forward nearly to its extreme forward position to push the bullet into the rifling of the barrel before the trigger is pulled, a piston in said air chamber, and means to drive the piston forward, whereby the movement of the air chamber is completed and the bullet is started from its position of rest after the trigger is pulled.

5. In an air gun, the combination of a barrel, a receiver, an air chamber movable in the receiver and having a forward extension to enter the barrel, a lifter to place the bullet in front of said extension, and an operating lever and connections whereby the lifter is actuated and the air chamber is moved to push the bullet into the bore of the barrel.

6. In an air gun, the combination of a receiver having therein an air chamber, a piston, a spring plunger in operative relation with the piston, an operating lever, means whereby the spring of the plunger is partly compressed during the first or forward movement of the lever, and means whereby the spring is further compressed by the second or rearward movement of the lever.

7. In an air gun, the combination of a receiver having an air chamber, a piston movable therein, a spring plunger, an operating lever pivoted in the receiver, a thrust rod connected to the lever forward of its pivot, a second thrust rod connected to the lever in rear of its pivot, and operating connections whereby the forward thrust rod acts to compress the spring plunger during the first or forward movement of the lever and the rear thrust rod acts to compress the spring further during the second or rearward movement of the lever.

8. In an air gun, the combination of a receiver having an air chamber, a piston movable therein, a spring plunger in rear of the air chamber, a link connected to the piston and bearing against the spring plunger, said link having two shoulders, an operating lever, pivoted in the receiver, a thrust rod pivoted on the lever in front of its pivot and cooperating with one of the shoulders of the

link and a second thrust rod pivoted on the lever in rear of its pivot and cooperating with the other of said shoulders.

9. In an air gun, the combination of a receiver having an air chamber, a piston in the air chamber, a spring plunger in rear of the air chamber, a link between the piston and the air chamber and having a beveled shoulder, an operating lever, a thrust rod pivoted on the operating lever and having a beveled

extremity to engage said shoulder, and a trigger normally supporting said thrust rod in engagement with said shoulder.

This specification signed and witnessed this 10th day of July A. D. 1912.

EDWARD E. REDFIELD.

Signed in the presence of—
CLARA PAULINE MOHR,
FRED MOHR.