June 14, 1932. F. MIHALYI 1,862,698

AIR RIFLE

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Fig. 1.

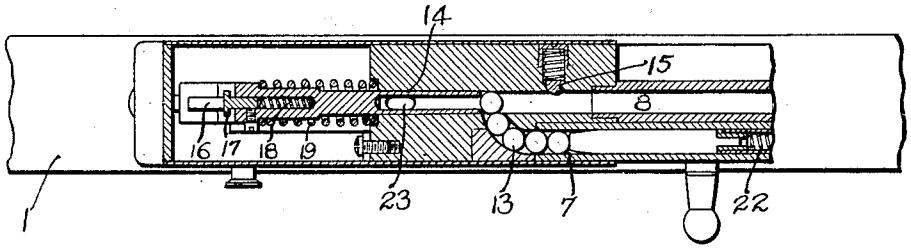
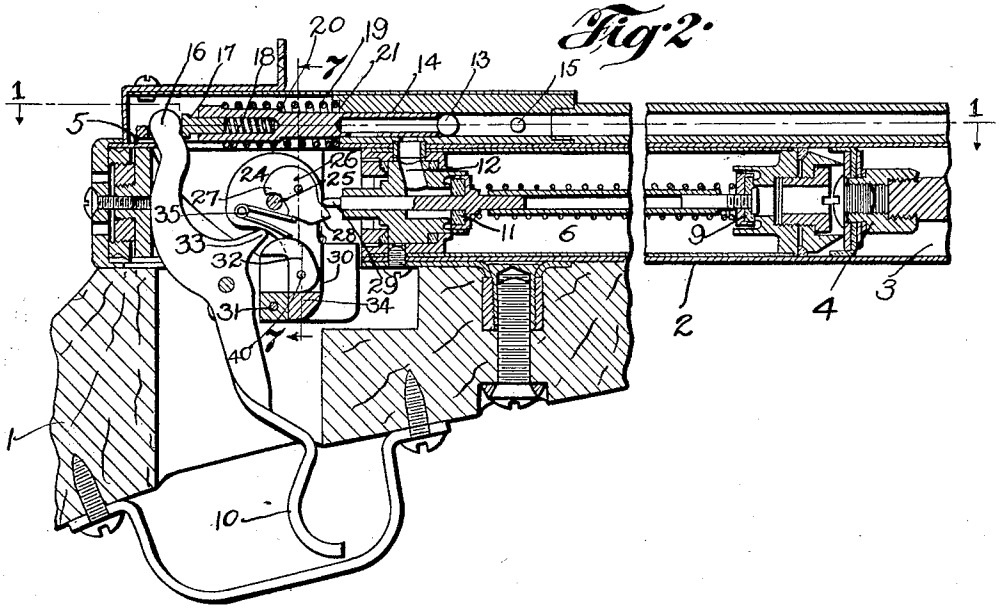


Fig. 2.



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Fig. 3.

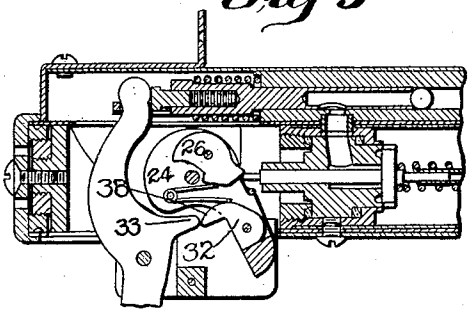


Fig. 4.

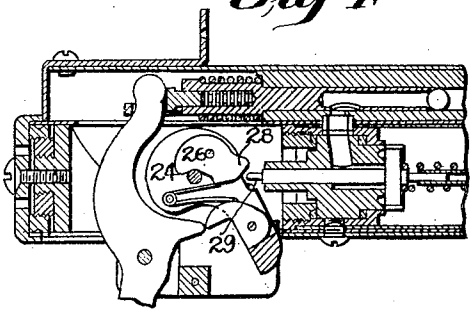


Fig. 5.

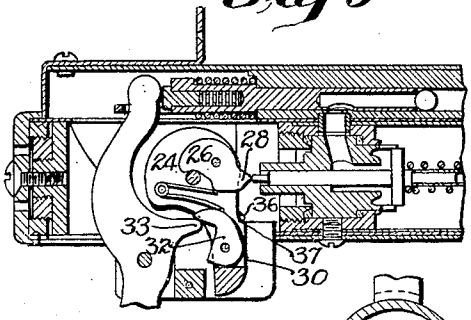


Fig. 6.

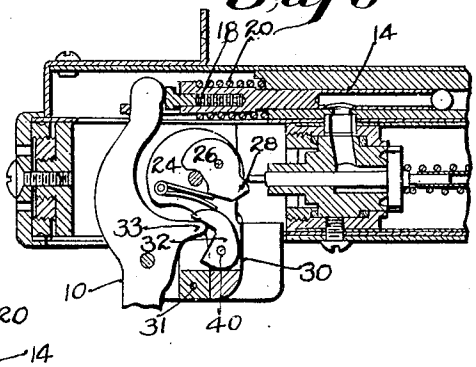
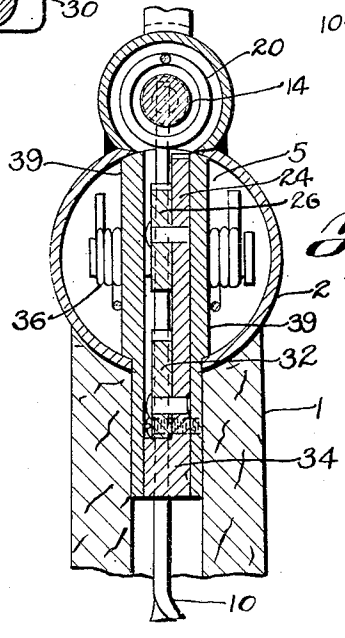


Fig. 7.



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UNITED STATES PATENT OFFICE

FRANK MIHALYI, OF UNIVERSITY CITY, MISSOURI, ASSIGNOR TO BENJAMIN AIR RIFLE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI

AIR RIFLE

Application filed January 19, 1931. Serial No. 509,829.

My invention relates to air guns and consists in a novel bullet discharging mechanism for use particularly in a full automatic gun.

In my co-pending application Serial No. 445,728, filed April 19, 1930, I show trigger controlled means for repeated temporary opening of a passage from an air reservoir to the discharge chamber and for automatically inserting a bullet into the discharge barrel after each firing operation. The quantity of air released at each firing and the rapidity of the discharge are, however, partly dependent upon the speed with which the trigger is pulled and, as the speed can not be exactly the same each time the gun is fired, the intensity of the discharges necessarily varies. This results in irregular bullet speed and force, and in unnecessary loss of compressed air, thereby limiting the number of shots which can be had with one charging of the reservoir.

The main object of my present invention is to provide an automatic firing mechanism which will operate the discharge valve uniformly each time the gun is fired irrespective of force applied to the trigger, or of its limits of movement after a certain critical point has been reached. I attain this general object, and others hereafter appearing, in the device illustrated in the accompanying drawings in which:

Figure 1 is a horizontal section through the firing mechanism of an air gun taken on the line 1—1 of Figure 2.

Figure 2 is a vertical longitudinal section through the same structure, parts being shown in elevation to clarify the disclosure.

Figures 3, 4, 5, and 6 are detail vertical longitudinal sections corresponding with Figure 2 and show successive positions of firing mechanism while the trigger is being pulled.

Figure 7 is a vertical transverse section taken on line 7—7 of Figure 2.

The gun stock 1 mounts the tubular gun body 2 including a cylinder 3 in which the piston 4 operates, a housing 5 for the breech block and firing mechanism, and an intermediate compressed air chamber 6. Adjacent the body are a magazine 7 and a firing chamber 8. Air is drawn into the gun by the piston 4 in the usual manner and enters the compression chamber 6 through a check valve 9 and, in firing, passes through valve 11, operated indirectly by the trigger 10, through passage 12 into the firing chamber.

Bullets 13 enter the discharge barrel one at a time under the influence of spring 22 and are pushed forward by a sleeve 14 to a position in contact with a spring pressed plunger 15 where the bullet is held until forced out by the discharged air. The sleeve 14 is slidable within the chamber 8 and is operated by extension 16 of the trigger 10 through a plunger 17 and springs 18 and 19, the latter being weaker than the former so that when shoulder 20 on the sleeve engages shoulder 21 and the bullet is lodged against plunger 15, the plunger 17 and sleeve 14 will telescope, permitting the continued movement of the trigger until the critical firing point has been passed.

The sleeve 14, advancing under the influence of the trigger, closes the passage between the magazine and the firing chamber and, in the most forward position of the sleeve, a hole 23, therein, is in alignment with passage 12 and permits the entrance of compressed air into the firing chamber. All of the above described structure is illustrated and fully described in my copending application and in itself constitutes no part of my present invention.

My improved firing mechanism includes a plate 24 pivoted on a pin 25 extending between the vertical walls 39 (Fig. 7) comprising the forward portion of the breech block. A pawl 26 is pivotally mounted on plate 24 and has a lip 27, for engaging the pin 25 as a stop, and a toe 28 adapted to engage the firing pin 29 as the plate 24 is rotated. The plate 24 has a depending arm 30 which, in the normal position of the mechanism, rests against stop 31 on the side wall 39. A latch element 32 is pivoted to this arm at 40 and has an upper cam surface 38 adapted to engage trigger finger 33. An enlargement 34 on the lower end of arm 30 limits the counter clock-

wise rotation of the latch 32. A U-shaped spring element 35 engages pawl 26 and latch 32 and normally holds them in their normal positions against pin 25 and enlargement 34, respectively, as shown in Fig. 2. A resilient wire 36 is coiled around the pin 25 outside walls 39 (Figure 7) and has a U-shaped intermediate portion extending in front of the breech block and engaging a shoulder 34 on plate 24. The ends of wire 36 engage the solid rear portion of the breech block preventing rotation of the coils about pin 25 so that the intermediate portion bears against plate 24 and tends to hold arm 30 in contact with stop 31.

In firing the gun, trigger 10 is pulled rearwardly in the usual manner. Trigger finger 33 bears against the upper cam surface 38 of latch element 32 causing plate 24 to rotate counter clockwise against the force of spring 36 (see Figure 3). As toe 28 on pawl 26 engages the firing pin 29, the pawl turns in a clockwise direction against the force of spring 35 sufficiently to pass the firing pin without opening valve 11. When trigger finger 33 reaches the end of cam surface 38, toe 28 has cleared the firing pin, as shown in Figure 4. Any further movement of the trigger (Fig. 5) will cause finger 33 to slip into the notched side of latch 32, thus permitting plate 24 to return to its starting position under the influence of spring 36 and to draw pawl 26 downwardly. Pivot pin 25 serves as a stop to prevent the counter clockwise rotation of pawl 26 and consequently toe 28 forces the firing pin inwardly, momentarily opening valve 11 during the return of plate 24 to its position at rest against stop 31. This permits the escape of a blast of compressed air to discharge the bullet.

In Figure 6, plate 24 has again reached its normal position and when the trigger is released, it will be brought back automatically to its starting position by springs 18 and 20, latch 32 turning on its pivot 40 to permit the passage of finger 33 without moving plate 24. Sleeve 14 will be drawn away from passage 12 at the same time to permit the entry of another bullet into the firing chamber. The gun may be repeatedly fired in this manner by merely pulling the trigger until the supply of compressed air is exhausted.

It will be readily seen that the gun is actually fired during the return movement of plate 24 under the influence of spring 36 and independently of the speed at which the trigger is moved. The quantity of air released at each firing is substantially uniform and undue escape of air due to faulty operation of the trigger is obviated.

Obviously, the structure disclosed may be varied as to the shape and size of the various parts and to their relative positions, and as to various other details without departing from the spirit of my invention and I contemplate the exclusive use of all such variations as come within the scope of my claims.

I claim:

1. In an air gun, a breech block, a compressed air chamber, a discharge valve, a valve opening mechanism, a trigger pivoted to said block and arranged to move said mechanism to a given position during the rearward movement of the trigger, said mechanism being disengaged from said trigger at a pre-determined point, and means for returning said mechanism from said position to its starting point independently of said trigger, said mechanism being arranged to momentarily open said valve during the return movement.

2. In an air gun, a compressed air chamber, a discharge valve, a trigger, mechanism for opening said valve, said mechanism being set in motion from the cocked position by said trigger and thereafter momentarily opening said valve independently of said trigger and means for automatically returning said mechanism to said cocked position.

3. In an air gun, a compressed air chamber, a discharge valve, a breech block, a trigger pivoted to said block, and means actuated by said trigger for opening said valve, said means comprising a plate pivoted to said block, and a pawl and a latch element pivoted to said plate, said element being adapted to be engaged by said trigger to rotate said plate in one direction, and said pawl being adapted to momentarily open said valve during the rotation of said plate in the opposite direction.

4. In an air gun, a breech block, a compressed air chamber, a discharge valve, and means for actuating said valve including a plate pivoted to said block, a pawl pivoted to said plate and adapted to momentarily open said valve as said plate is rotated in one direction, a latch element pivoted to said plate, and a trigger pivoted to said block and adapted to operatively engage said element to rotate said plate in the other direction and to disengage said element at a predetermined point.

5. In an air gun, a compressed air chamber, a discharge valve, a breech block, a plate having a pivotal connection with said block, a spring adapted to resist the movement of said plate in one direction and effect its movement in the other direction, a valve opening member pivoted to said plate, a trigger pivoted to said block, and means whereby said plate is rotated during a part of the movement of said trigger, said means being adapted to disengage said trigger at a pre-determined point to permit said plate to return to its starting point under the influence of said spring and at the same time to momentarily open said valve.

6. In an air gun, a body portion including a compressed air chamber, a discharge cham-

ber, a passage between said chambers, a valve controlling said passage, a breech block, and means for opening said valve including a plate pivoted to said block, a spring adapted to effect the rotation of said plate in one direction, a pawl pivoted to plate and adapted to momentarily open said valve as said plate is rotated under the influence of said spring, a latch element pivoted to said plate, and a trigger pivoted to said block and adapted to engage said element to rotate said plate against said spring.

7. In an air gun, a compressed air chamber, a discharge valve having a pin projecting therefrom, a breech block, a trigger pivoted to said block, and means for opening said valve including a plate pivoted to said block, a spring arranged to effect the movement of said plate in one direction, a pawl pivoted to said plate and adapted to engage said valve stem as said plate is rotated in said direction, and a latch element pivoted to said plate and arranged to be engaged by said trigger during part of its rearward movement to rotate said plate against said spring, said pawl being free to turn as it engages said pin under the influence of said trigger and being held against rotation in the opposite direction as said plate turns under the influence of said spring.

8. In an air gun, a compressed air chamber, a discharge valve including a valve stem, a breech block, a trigger, a plate pivoted to said block, a latch element pivoted to said plate and adapted to engage said trigger during a part of the movement thereof to rotate said plate in one direction, a pawl pivoted to said plate and adapted to momentarily depress said valve stem as said plate is rotated in the opposite direction, stops for preventing the rotation of said element and said pawl each in a certain direction, and a spring member for holding said element and said pawl respectively against said stops.

9. In an air gun, a compressed air chamber, a discharge valve including a valve stem, a breech block, a trigger, a plate pivoted to said block, a latch element pivoted to said plate and adapted to be engaged by said trigger to rotate said plate in one direction, means for rotating said plate in the other direction independently of said trigger, a pawl on said plate adapted to rotate as it engages said valve stem under the influence of said trigger, a stop for preventing the rotation of said pawl as it engages said stem under the influence of said means, and a spring for returning said trigger to its rest position, said latch element being adapted to rotate to permit the return of the trigger.

10. In an air gun, a compression chamber, a discharge chamber, a passage therebetween, a discharge valve in said passage, a trigger, mechanism for momentarily opening said valve to discharge a bullet from said discharge chamber, said mechanism being set in motion by said trigger and thereafter opening said valve independently of said trigger, and means for automatically returning said mechanism and trigger to the firing position.

11. In an air gun, a magazine, a discharge chamber, means for automatically feeding bullets into said chamber from said magazine, a compression chamber, a passage between said discharge and compression chambers, a valve controlling said passage, a trigger, means operated by said trigger for placing a bullet in firing position and at the same time closing said magazine and opening said passage, and a discharge mechanism arranged to be set in motion by said trigger and to momentarily open said valve thereafter independently of said trigger.

In testimony whereof I hereunto affix my signature this 16th day of January, 1931.

FRANK MIHALYI.