

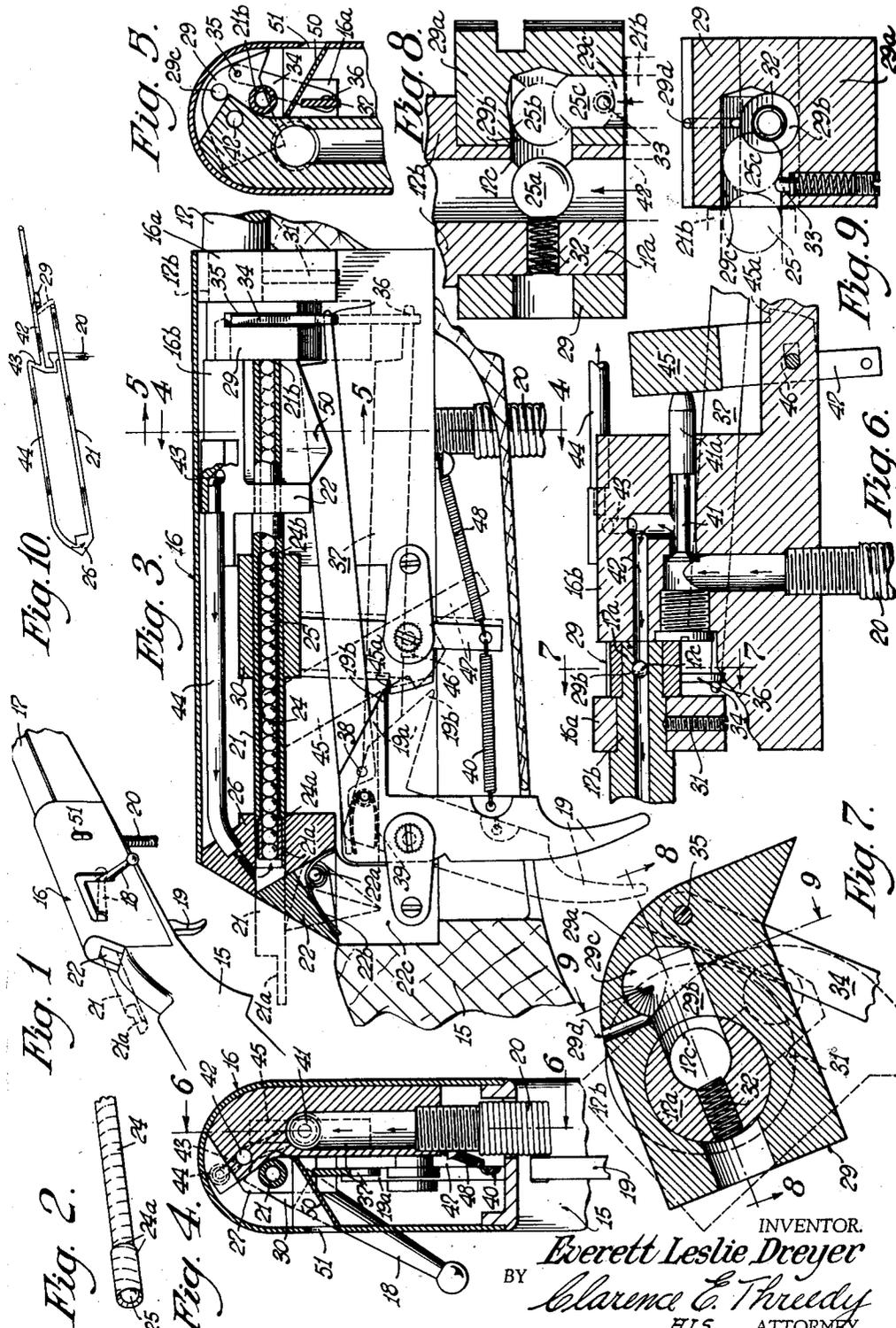
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E. L. DREYER

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AIR GUN

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INVENTOR.

Everett Leslie Dreyer
BY Clarence C. Thredy
ATTORNEY.

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AIR GUN

Everett Leslie Dreyer, Chicago, Ill., assignor to A. B. T. Manufacturing Corp., Chicago, Ill., a corporation of Illinois

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This invention relates to improvements in air guns and has as its principal object the provision in such a gun of trigger-controlled loading means employing a portion of the air pressure, used to project the shot, for cooperation with certain loading mechanism mechanically operated or controlled by the trigger.

Viewed from another aspect, it is an object of the invention to provide in an air gun a magazine of tubular form adapted to receive shot in serial alignment, with the end of the magazine out of axial alignment with the breech of the barrel, there being a loading member pivoted on the barrel and movable from a position of alignment with the end of the magazine into a position to deliver a shot into the breech or barrel chamber, operation of the loading member being effected by mechanical connections with a trigger mechanism.

A further object is the provision in the aforesaid loading arrangement of trigger-controlled valve means for injecting a blast of compressed air from an exterior source, preferably, into the shot chamber and further arranged to divert a portion of the main blast of air into the magazine for the purpose of causing the leading shot therein to be forcibly transferred into the loading member.

A further object is the provision of simplified valve means for controlling the air as aforesaid and including a valve member actuated by a form of hammer controlled by the trigger.

Still other objects relate to the improved breech block construction, loading bolt, and means for closing off the shot chamber by the loading member when the projecting blast is admitted to the shot chamber.

Other objects, advantages and novel aspects of the invention reside in certain details of construction as well as the cooperative relationship of the component parts of the illustrative embodiment described hereinafter in view of the annexed drawing, in which:

Fig. 1 is a fragmentary perspective of the breech portion of a gun in which the invention is incorporated;

Fig. 2 is a fragmentary perspective of a shot cartridge to be loaded into the magazine;

Fig. 3 is an enlarged vertical section through the breech block showing details of the invention;

Fig. 4 is a transverse vertical section along lines 4-4 of Fig. 3;

Fig. 5 is a fragmentary transverse section

along lines 5-5 of Fig. 3, looking in the opposite direction from Fig. 4;

Fig. 6 is a vertical sectional detail through the valve mechanism as seen along lines 6-6 of Fig. 4;

Fig. 7 is a transverse vertical sectional detail through the loading member, looking in the direction of line 7-7 in Fig. 6;

Fig. 8 is a cross sectional detail through the loading chamber and barrel or shot chamber, looking in the direction of lines 8-8 of Fig. 7;

Fig. 9 is a vertical sectional detail showing the entrance into the loading chamber or block at line 9-9 in Fig. 7;

Fig. 10 is a diagrammatic illustration of the distribution of the air pressure for "firing" and loading.

Referring to Fig. 1, the air gun there shown includes a stock 15, a breech block 16, a barrel portion 17, a loading bolt 18, a trigger 19, and a flexible air supply hose 20. In loading the gun, the bolt 18 is raised and retracted in the customary manner to project the rear end portion, as shown in dotted lines, of a magazine 21 through a blocking gate 22 (Fig. 3) so that a cartridge 24, preferably constructed of rolled paper and containing serially aligned shot such as B-B shot 25, may be inserted into the magazine with a collar portion 24a on the cartridge seated on a projection 21a at the outer end of the magazine, and the inner end (Fig. 3) 24b of the cartridge seated against a shoulder internally of the magazine. Having inserted the cartridge in the magazine, the bolt 18 is restored to its normally locked position shown in Fig. 1, and the weapon is ready for use, requiring only the depression of trigger 19 to actuate certain valve and loading mechanism to effect transfer of one of the shot from the cartridge and magazine into the bore of the barrel.

The automatic loading mechanism contained within the breech block 16 provides for the slidable mounting of the outer end portion of magazine 21 in a block 26 at one end of the breech block and in a member 27 at the opposite end thereof, the magazine being out of axial alignment with the bore of barrel 17, and the inner end 21b of the magazine terminating opposite a rocking loading block 29. The magazine 21 is secured near its mid portion in a block 30 (Figs. 3 and 4) to which the inner end of the loading bolt 18 is fixed so that when the bolt is raised from its normal position, magazine 21 rocks in its slidable seating and is slid rearward with a corresponding movement of the bolt so as to cause

the outer end part 21a of the magazine to bear against the gate member 22 (Fig. 3) and urge the latter about its pivot 22a against the tension of a spring 22b down into a recessed portion 22c adjacent the stock, in which condition the magazine may be loaded as aforesaid.

The loading member or block 29 is mounted for rocking movement on a reduced end portion 17a (Figs. 6 and 8) of the inner end of the barrel in the breech block, it being observed (Figs. 7 and 8) that the bore in the loading block is formed eccentrically so as to leave a projecting portion 29a in which is formed a loading chamber or passage for conducting shot from the magazine into the gun barrel or breech, it being understood in this description that reference to the bridge as it relates to the inner end of the gun barrel means a sidewise opening into the barrel, as distinguished from the usual opening in the axial end thereof to receive a cartridge, for example.

The block 29 is secured on the reduced end portion 17a between spaced parts 16a and 16b on the interior of the breech block casting, the inner axial end of the barrel, that is, the actual breech end, fitting tightly against the block portions 16b in alignment with an air injection passage, the barrel being secured in this condition by means of a set screw 31 threaded into the block portion 16a and set in the larger reduced end portion 17b of the barrel.

Referring to Fig. 7, the loading block portion 29a is provided with a lateral passage 29b which terminates opposite the breech opening 17c near the rear end of the barrel, this opening leading into what may be termed the shot chamber of the barrel and the opening being of a size to admit the shot 25, and the barrel being provided with a bore in which is disposed a spring 32 aligned with the breech opening 17c to maintain the loaded shot in proper position.

The loading block is further provided with a longitudinal passage section 29c (Figs. 7, 8 and 9) disposed at a slightly higher level than the lateral portion of the passage and terminating in a position for alignment with the inner end 21b of the magazine when the block 29 is rocked from the normal full line position shown in Figs. 3, 5, 7 and 8, for example. A spring-urged detent 33 is provided near the entrance of the loading passage portion 29c for the purpose of preventing escape of shot once the same is transferred into the loading block.

In its normally raised position, the loading block 29 opens into the bridge opening 17c so that any shot in the passage portions 29b or 29c (having passed the detent 33) will gravitate into the shot chamber or breech portion of the barrel and bear against the inner end of the shot positioning spring 32, the leading shot indicated at 25a in Fig. 8 being maintained in this position by the next succeeding shots 25b and 25c, there being room in the transfer passage in the loading block for the two shots 25b and 25c as a result of the offsetting of the two passage sections 29b and 29c in the manner shown particularly in Fig. 7.

The arrangement is such that air will be admitted into the shot chamber of the barrel when the trigger is pulled, and the breech opening 17c will be automatically closed by rocking of the loading block into shot receiving position prior to the admission of air into the barrel. This is accomplished by providing a mechanical connection including a link 34 (Figs. 3 and 7) pivoted

as at 35 to the offset portion 29a of the loading block and having pivotal connection as at 36 with one end of a trigger lever 37, the opposite end of which is pivoted as at 38 on an extended portion 19a of the trigger, there being a spring 39 arranged to provide a yieldable operating connection between the trigger and the end of the trigger lever such that when the trigger is depressed, lever 37 will pivot about the point 38 urging the connection 36 downwardly and thus rocking the block 29 from the normal full line position into the dotted line position shown in Fig. 7. When the trigger is released, a spring 40 attached thereto restores it to normal position, relieving tension upon the spring 39 and permitting the trigger lever 37 to restore the loading block to its normally raised position.

Positive transfer of shot from the magazine 21 into the loading block is accomplished by the simultaneous admission of compressed air into the shot chamber or barrel of the gun, as well as the far end of the magazine. To this end, the air duct 20 (Fig. 6) communicates into the breech block portion 16b and past a valve plunger 41 into a passage 42 which terminates opposite the innermost axial end of the barrel, the valve 41 being normally closed by action of the air pressure. When the valve is opened, a portion of the air jet or blast is diverted through a branch 43 from the main air passage 42 and is conducted through a tube 44 and the breech block portion 26 (Fig. 3) to discharge opposite the rear end portion 21a of the magazine, the gate member 22 normally sealing the passage for the magazine through the rear end of the block 26 so that the force of the blast urges the shot 25 forwardly toward the loading block 29.

The loading arrangement further provides for the timed movement of the loading block out of normal position to receive shot from the magazine and the admission of the loading blast into the outer end of the magazine. This is accomplished by the provision of a valve operating hammer 45 (Fig. 6 particularly) having a shiftable pivotal mounting 46 on the breech block casting and a tail portion 47 which is connected to one end of the trigger spring 40, there being a second trigger spring 48 anchored on the breech block and also connected to the tail 47 so as to urge the trigger 19, cooperably with the spring 40, and the hammer 45 into the normal positions shown in full lines in Figs. 3 and 6.

The end of the trigger extension 19a is constructed to provide a slip-catch 19b which is normally resting in a notch portion 45a near the bottom of the hammer and so disposed that when the trigger is depressed the hammer will be rocked back into the dotted line position shown in Fig. 3, tensioning spring 40 particularly so that when the slip-catch 19b slips out of engagement with the notch 45a, the hammer will be released and driven by spring 40 against the head 41a of the valve plunger, opening the latter momentarily to admit a blast of air into the passages 42 and 43. The plunger is immediately restored to closed position by back pressure from the supply line 20, which is sufficient to cause the plunger to pivot the hammer to permit complete closing of the plunger valve. When the trigger is released, the slip-catch 19b passes back into the notch 45a as a result of the shifting of the hammer on its axial support 46, spring 40 retaining sufficient tension to maintain the trigger in normal position and to shift the hammer so as to maintain

the slip-catch portion 19b positively in the notch 45a for the next trigger operation.

When the trigger is depressed as aforesaid and the hammer rocked approximately into firing position, the loading block 29 will have been pivoted into fully lowered position by action of the levers 36—37 and the mouth of the longitudinal passage section 29c in the block will be properly aligned with the inner end 21b of the magazine, the breech opening 17c into the barrel meanwhile having been closed by rocking of the loading block so that when the hammer is released by the final movement of the trigger, the air jet will divide as aforesaid and project the shot 25a from the barrel of the gun and also displace the entire series of shots in the magazine to cause the leading shot to pass the detent 23. It will be recalled that the breech opening 17c is closed at this time and in order to provide for escape of air from the loading chamber, there is a relief vent 29d leading from the lateral passage section 29b.

Release of the trigger restores the loading block to normal raised position by the time the shot 25a has been "fired," thus again aligning the mouth of the lateral passage section 29b with the breech opening 17c so that the leading shot 25b in the loading block may gravitate into the breech to assume the position of shot 25a, the gun now being ready for the next shot.

In the event that it is desired to unload the gun before the supply of shot has been exhausted, there is provided a discharge apron 50 (Figs. 4 and 5) within the breech block just below the juncture of the inner end 21b of the magazine with the loading block, this apron being inclined toward a discharge opening 51 (Fig. 1 also) in the side of the breech block. As the bolt 18 is withdrawn, any remaining shots in the magazine proper will roll onto the apron 50 and through the exit 51, the same being true of such shots as might be able to roll from the cartridge 24, the preferred arrangement, however, being such that the shot fit somewhat firmly in the cartridge jacket so that they will not roll out under action of gravity, but may nevertheless be easily displaced by the diverted or loading air jet in the manner aforesaid.

The various advantages and objects of the invention may be accomplished by modifications of the particular embodiment specifically described herein, and it is intended that the appended claims shall include all equivalent arrangements fairly coming within their call.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In an air gun, a breech block, a slot magazine mounted for axial sliding movement in the breech block, bolt means for sliding said magazine from a normal position within the breech block to a charging position with an end of the magazine projecting exteriorly of said block to receive shot, means providing an automatic gate in a wall portion of said breech block, said gate being normally closed by spring means, said gate disposed in the path of movement of said magazine and adapted to be moved into open position by the magazine when the latter is moved to the charging position aforesaid.

2. In an air gun having a breech having formed therein an air passage, a shot magazine, means for mounting the shot magazine in said breech for reciprocable movement, said magazine normally arranged within said breech as a part

of said air passage, a sealing gate pivotally mounted on said breech in the path of movement of said magazine, spring means normally urging said gate into closed condition, bolt means carried by said magazine and having a part thereof projecting exteriorly of said breech whereby to shift said magazine against said gate to open the latter and permit a portion of said magazine to extend exteriorly of said breech.

3. In an air gun of the type including a barrel having a shot chamber formed therein provided with an entrance, and a magazine provided with an exit and adapted to contain a supply of shot and arranged with its long axis offset with respect to the long axis of said barrel, the combination of loading means comprising a loading block mounted on said barrel for rotative movement, said loading block having a loading chamber formed therein provided with an entrance and an exit and adapted to be disposed with said exit normally in register with the entrance in the shot chamber with the loading chamber pitched in a direction of the latter, trigger means for operating said gun, means on said trigger having operative connection with said loading block and adapted when the trigger is operated for the purpose aforesaid to rotate said loading block to dispose the loading chamber with its entrance in register with the exit of said magazine, and means controlled by said trigger for effecting displacement of shot from said magazine into the loading chamber when the trigger is operated as aforesaid.

4. In an air gun of the type including a barrel having a shot chamber formed therein provided with an entrance, and a magazine provided with an exit and adapted to contain a supply of shot and arranged with its long axis offset with respect to the long axis of said barrel, the combination of loading means comprising a loading block mounted on said barrel for rotative movement, said loading block having a loading chamber formed therein provided with an entrance and an exit and adapted to be disposed with said exit normally in register with the entrance in the shot chamber with the loading chamber pitched in a direction of the latter, trigger means for operating said gun, means on said trigger having operative connection with said loading block and adapted when the trigger is operated for the purpose aforesaid to rotate said loading block to dispose the loading chamber with its entrance in register with the exit of said magazine, a source of supply of compressed air for said gun, conduit means connecting said source with said shot chamber and the entrance end of said magazine, valve means in said conductor and normally disposed in closed position, hammer means arranged in said gun and adapted to strike said valve means to momentarily open the latter, said trigger means operatively engageable with said hammer means to urge the latter in a direction away from said valve means, and spring means interconnecting said hammer and said trigger to urge the same toward normal position.

5. In an air gun having a barrel including a shot chamber communicating with an air supply line, with a valve means in said line and arranged to be opened upon engagement by a hammer controlled by a hand-operated trigger together with a shot magazine for said gun adapted to maintain shot in serial alignment, the combination of a loading device for transmitting said shot from the shot magazine to said barrel and including a loading block rotatably mounted

upon said barrel for pivotal movement relative to the long axis thereof, means connecting said trigger with said loading block to impart rotative movement to the latter, a loading chamber formed in said loading block and having an exit opening and an entrance opening, said exit opening normally communicating with said shot chamber and adapted when the block is rotated as aforesaid to cut off communication with said shot chamber, said last-mentioned rotatable movement effecting communication of said entrance opening with said shot magazine, and air duct means arranged between said valve means and an end of said shot magazine remote from said loading device to conduct a charge of air from said air supply line to said serially aligned shot to effect transfer of a shot into said entrance opening when the valve means is opened.

6. In an air gun having a shot magazine, a barrel including a shot chamber communicating with an air supply line for emitting a charge of air through said barrel when a valve means is opened upon operation of a trigger mechanism, the combination of a loading mechanism arranged on said barrel for rotative movement to transfer shot from said magazine to said shot chamber and including a shot passage normally aligned with said shot chamber, lever means on said trigger mechanism and engaging said loading mechanism to actuate the latter upon each operation of said trigger mechanism to position the shot passage out of alignment with said shot chamber and into alignment with said

shot magazine, air duct means between said valve means and said shot magazine for communicating a charge of air to said magazine to displace a shot therefrom into said shot passage when the valve means is opened as aforesaid.

7. In an air gun having a breech block, a barrel including a shot chamber, a shot magazine containing a supply of shot for said gun, air supply means connected to said breech and conducted through the latter to said barrel together with valve means in said breech for controlling the emission of air in charges responsive to the operation of trigger mechanism, the combination of means for transmitting shot from said magazine to said shot chamber and including a loading means including a shot passage normally aligned with said shot chamber, said loading means having operative connection with said trigger mechanism for movement by the latter to excommunicate said shot passage with respect to said shot chamber when the trigger is pulled to operate said valve means as aforesaid and to align the shot passage with said shot magazine, and an air by-pass between said valve means and an end of said shot magazine remote from said loading means and adapted to conduct a portion of said air charge to the magazine whereby the shot therein contained will be displaced to dispose a shot in said passage prior to its return to normal position.

EVERETT LESLIE DREYER.