April 22, 1952 C. F. LEFEVER 2,594,185

LOADING MECHANISM FOR PNEUMATIC GUNS

Filed July 19, 1948 2 SHEETS—SHEET 1

FIG. 1

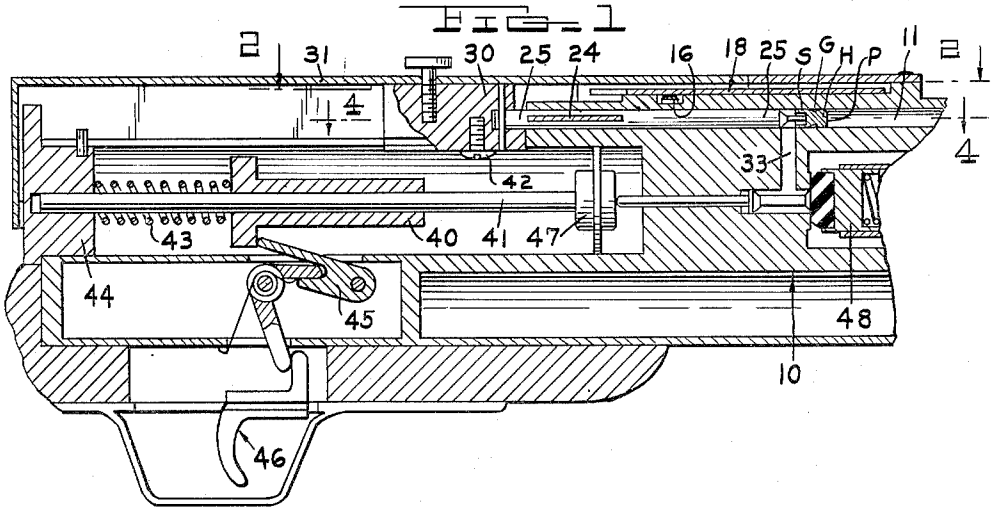


FIG. 6

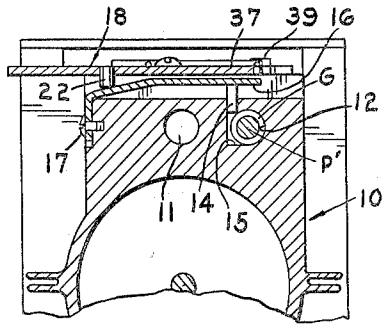
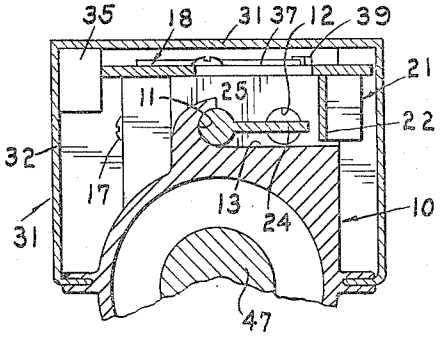


FIG. 7



INVENTOR.
CHARLES F. LEFEVER
BY
Whittemore, Hulbert & Belknap
ATTORNEYS

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FIG. 2

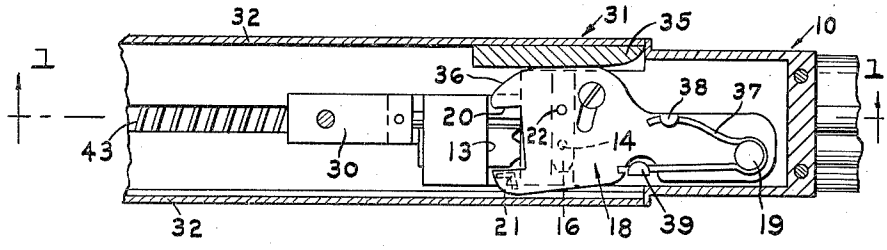


FIG. 3

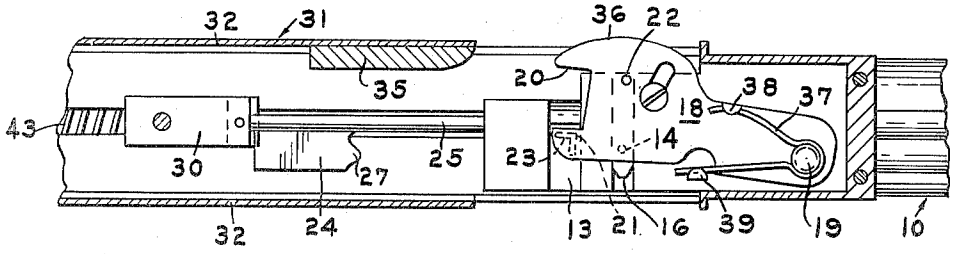


FIG. 4

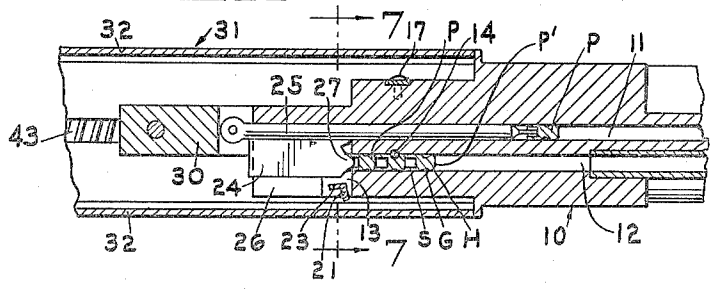
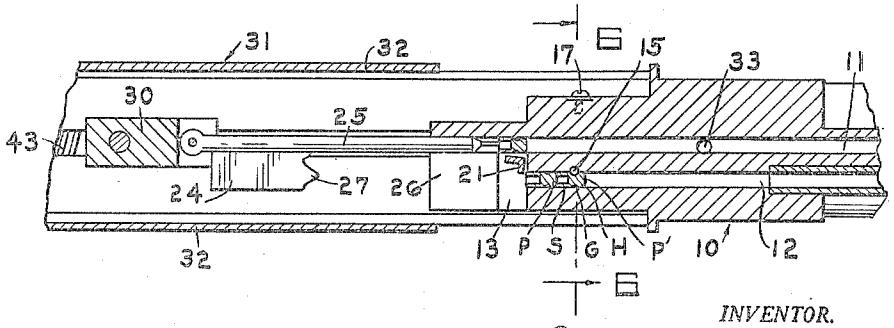


FIG. 5



INVENTOR.
CHARLES F. LEFEVER
BY

Whittemore, Hulbert & Belknap
ATTORNEYS

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LOADING MECHANISM FOR PNEUMATIC GUNS

Charles F. Lefever, Plymouth, Mich., assignor to Daisy Manufacturing Company, Plymouth, Mich., a corporation of Michigan

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3 Claims. (Cl. 124—51)

1

This invention relates to pneumatic guns and refers more particularly to improvements in the loading mechanism provided in repeating types of guns for transferring shot from the delivery end of a suitable shot retaining magazine to the breech end of the barrel.

The present invention is particularly advantageous when used in connection with pneumatic guns of the type adapted to shoot pellets having rounded head portions provided with an annular groove therein and having outwardly flared skirt portions. In repeating types of pneumatic guns the pellets are ordinarily stored in a magazine supported on the gun frame to one side of the barrel and the delivery end of the magazine is connected to the breech end of the barrel by a recess or pocket in the gun frame. A pellet from the delivery end of the magazine is disposed within the recess by tipping the muzzle end of the gun upwardly sufficiently to allow the rearwardmost pellet in the magazine to drop by gravity into the recess. In certain types of pneumatic guns the pellet deposited in the recess is subsequently transferred to the breech end of the barrel by an arm pivoted on the gun frame and operable in response to cocking of the gun.

The pellet transfer arm has a projection which extends into the recess or pocket and provision is made on a part of the cocking mechanism for holding the arm in a position where the projection lies in the recess at the outer side of the delivery end of the magazine so as not to obstruct the latter. However, upon manipulation of the cocking mechanism to cock the gun the arm is swung inwardly by suitable spring means to cause the projection to not only transfer the shot in the recess into the barrel but to also occupy a position in obstructing relation to the delivery end of the magazine.

In pneumatic guns of the type noted above difficulty has been experienced in repeatedly transferring shot from the magazine to the barrel without jamming a shot or pellet within the recess or within the delivery end of the magazine. Such jamming of pellets is usually caused by manufacturing inaccuracies in the length of the pellets and may also be caused by inaccuracies in the width of the transfer recess or pocket which enables the pellets to assume a cocked position within the recess.

With the above in view, it is one of the objects of this invention to overcome the foregoing objections by providing pellet retaining means whereby only one pellet at a time may enter the recess and any danger of a pellet's projecting beyond the delivery end of the magazine into the recess where it may obstruct normal operation of the transfer arm is eliminated, regardless of variations in length of the pellets.

2

Another feature of this invention is to provide pellet retaining means movable into engagement with the next to the last pellet in the delivery end of the magazine in response to movement of the transfer arm to its outermost position by return movement of the operator for the cocking mechanism and movable out of engagement with said pellet in response to inward movement of the transfer arm by actuation of the operator to cock the gun. Thus, the pellet is released for entry into the recess or pocket as soon as the projection on the swinging end of the transfer arm is returned to its outermost position with respect to the delivery end of the magazine.

The foregoing as well as other objects will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a fragmentary sectional view of the breech end of a pneumatically operated repeating gun;

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 2 showing the parts in a different position;

Figure 4 is a sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a sectional view similar to Figure 4 and showing the parts in a different position;

Figure 6 is a cross sectional view taken on the line 6—6 of Figure 5; and

Figure 7 is a cross sectional view taken on the line 7—7 of Figure 4.

For the purpose of illustrating the present invention, I have selected a pneumatically operated gun of the repeating type adapted to shoot shot in the form of pellets. The pellets employed are preferably of conventional design, and are indicated by the reference character P in Figures 1, 4 and 5. In general the pellets P comprise a rounded head portion H at one end, an outwardly flared tubular skirt S at the opposite end and an intermediate portion having an annular groove G therein.

The pneumatically operated repeating gun is not shown in its entirety in the drawings, nor is it described in detail below, because the present invention concerns itself primarily with the mechanism at the breech end of the gun. Briefly,

the gun comprises a frame 10 having a barrel 11 through which the pellets P are adapted to be propelled at a substantial rate by pneumatic pressure and having a magazine 12 within which a multiplicity of pellets P are stored in end to end relationship. As shown particularly in Figures 4 to 7 inclusive the barrel 11 and magazine 12 are spaced laterally from each other in a substantially common plane.

The rear end of the magazine 12 communicates with a pocket or recess 13 extending from one side of the gun frame 10 to the breech end of the barrel 11 and having a width slightly greater than the length of one of the pellets P. The breech end of the barrel 11 opposite the recess 13 is slotted to receive one of the pellets as clearly shown in Figures 5 and 7 of the drawings. The pellet P' next to the last pellet P in the delivery end of the magazine 12 is held within the magazine by a pin 14 slidably supported in a vertical bore 15 formed in the top of the gun frame and positioned to intersect the inner side of the delivery end portion of the magazine 12 at a point to engage in the groove G formed in the pellet P' in the magazine. As shown particularly in Figure 6 of the drawings, the upper end of the pin 14 is secured to a leaf spring 16 extending transversely of the gun frame and having one end secured to the gun frame by a fastener element 17. The pin 14 is secured to the free end of the leaf spring 16 and the latter is tensioned in a manner to normally hold the pin 14 in its raised position wherein the lower end thereof is released from engagement with the adjacent pellet P'.

The leaf spring 16 is actuated to operate the pin 14 by an arm 18 which has the additional function of transferring pellets from a position in the recess 13 at the delivery end of the magazine 12 to a position within the breech end of the barrel 11. The arm 18 is pivoted at its front end to the gun frame by means of a pin 19 and the rear end of the arm projects over the top of the recess or pocket 13. A slot 20 is formed in the rear end of the arm 18 for clearance purposes and an angle-shaped projection 21 extends downwardly from the rear end of the arm at the outer side thereof.

The projection extends downwardly into the recess or pocket 13 and assumes a position laterally outwardly beyond the delivery end of the magazine 12 when the arm 18 is in its normal position shown in Figure 2 of the drawings. In other words, when the arm 18 is in its normal position shown in Figure 2 of the drawings, the projection 21 assumes the position illustrated in Figure 4 where it is out of interference with the delivery end of the magazine.

Referring to Figure 6 of the drawings, it will be noted that the rear or swinging end of the arm 18 passes over the leaf spring 16 and has a depending projection 22 engageable with the leaf spring. The construction is such that when the arm 18 is in its normal position shown in Figure 2 of the drawings, the projection 22 engages the free end portion of the spring 16 and holds the pin 14 in its lowermost position wherein the lower end of the pin 14 engages the pellet P' in the magazine. In this normal position of the arm 18 the projection 21 at the swinging end of the arm 18 assumes a position in the recess 13 laterally outwardly beyond the delivery end of the magazine 12 where it is out of obstructing relationship with the delivery end of the magazine. However, as shown in Figure 4 of the drawings the rearwardmost pellet P in the magazine 12 is prevented from dropping into the recess 13 by a part 24 in the form of a blade supported for sliding movement fore and aft of the gun frame. As will be presently described the blade 24 is operated in timed relation to swinging movement of the arm 18 and is withdrawn from the recess 13 just prior to swinging the arm 18 to the position thereof shown in Figure 3 of the drawings. Assuming that the gun is tilted so that the barrel is inclined upwardly at the time the blade 24 is retracted it will be noted that during the initial rearward movement of the blade 24 and before the arm 18 is swung to the position shown in Figure 3, the rearwardmost pellet P in the magazine is free to drop into the recess 13 at the inner side of the flange 23 on the projection 21. The next adjacent pellet P', however, is held against downward movement by the pin 14.

At about the time the blade 24 is completely withdrawn from the recess 13, the arm 18 is swung inwardly to the position shown in Figure 3 and the pellet P in the recess is transferred by the projection 21 into the breech end of the barrel. Also, the projection 22 on the swinging end of the arm 18 releases the free end of the spring 16 and enables the latter to withdraw the pin 14 from the pellet P'. This pellet P', however, is prevented from entering the recess 13 by the projection 21 on the arm 18. The parts remain in this position until the arm 18 is again swung back to its normal position shown in Figure 2 of the drawings whereupon the blade 24 is advanced into blocking position with respect to the delivery end of the magazine and the second to the last pellet P' in the magazine is engaged by the retaining pin 14.

The blade 24 projects laterally outwardly from a pellet positioning pin 25 adjacent the rear end of the latter and is movable into the recess 13 through a slot 26 formed in the rear wall of the recess 13. The front end of the blade 24 is contoured to provide a projection 27 shaped to fit within the skirt S of the rearwardmost pellet in the delivery end of the magazine 12 and to guide the pellet into the recess 13 when the blade or pin 25 is retracted or moved rearwardly.

The positioning pin 25 is slidably supported in the breech end of the barrel and the purpose of this pin is to move a pellet P to its firing position within the barrel, shown in Figure 4 of the drawings. The rear end of the pin 25 beyond the blade 24 is connected to a block 30, and this block is suitably supported on a gun frame for sliding movement fore and aft of the gun. The block 30 is in turn connected to a slide 31 in the form of a housing having the opposite side walls 32 thereof slidably engaging the breech end of the gun frame. The construction is such that when the slide 31 is moved in a forward direction relative to the gun frame, the pin 25 is moved in a corresponding direction along the barrel 11 and advances a pellet P from a position adjacent the recess 13 to a position forwardly beyond the air discharge port 33 to be presently described. As the pin 25 reaches its forwardmost position in the barrel 11 the blade advances into the recess 13 and the projection 27 engages the skirt end of the pellet at the delivery end of the magazine. On the other hand when the slide 31 is moved to its rearwardmost position shown in Figure 5 of the drawings, the forward end of the pin 25 is located rearwardly beyond the recess 13 to enable transferring a pellet into the barrel and the blade is retracted from the recess 13.

In the present instance the slide 31 also operates the transfer arm 18, and for this purpose, a cam 35 is secured to the slide 31 in a position to engage the side edge 36 of the arm 18 opposite the side thereof on which the projection 21 is secured. The side edge 36 of the arm 18 is arcuate for engagement by the cam 35 as the slide 31 is moved to its forwardmost position.

The cam 35 cooperates with the side edge 36 of the arm 18 to retain the arm 18 in its normal position shown in Figure 2 of the drawings when the slide 31 is in its forwardmost position. The edge 36 on the arm is yieldably urged into engagement with the cam 35 by a spring 37 having a portion intermediate the ends anchored on the pivot pin 19 and having the free ends respectively engaging a lug 38 on the arm 18 and a lug 39 on the gun frame.

It will be noted from Figures 2 and 3 of the drawings that the length of the cam 35 is such that the arm 18 is maintained in its normal position shown in Figure 2 until the forward end of the blade 24 is retracted from the recess 13 in order to enable the rearwardmost pellet P in the magazine 12 to drop into the recess 13 at the inner side of the projection 21 on the arm 18. As soon as the blade 24 is withdrawn from the recess 13, the cam 35 releases the arm 18 and the latter is swung to the position shown in Figure 3 of the drawings by the spring 37. As the arm swings to the position shown in Figure 3, the projection 21 transfers the pellet in the recess 13 into the barrel 11 in advance of the pin 25. Return movement of the slide 31 to its forwardmost position advances the pellet in the barrel to its firing position by the pin 25 and returns the arm 18 to its normal position shown in Figure 2 of the drawings. At the same time the blade 24 is moved into the recess 13 and the projection 27 on the blade is engaged with the last pellet in the magazine 12 which was previously released by the retaining means 14.

It will also be noted from Figure 1 of the drawings that rearward movement of the slide 31 performs the additional function of cocking the gun. Briefly a hammer 40 is slidably supported on a rod 41 in a position to be engaged by the projection 42 on the bottom of the block 30 as the slide 31 is moved rearwardly. A coil spring 43 is supported on the rod in a position between the rear end of the hammer and the breech end 44 of the gun frame so as to be compressed upon rearward movement of the hammer. The hammer is held in its rearward position by an arm 45 pivoted at one end on the gun frame and having the other end engageable with the hammer 40. The arm is released from the hammer 40 by suitable trigger mechanism indicated generally by the reference numeral 46 and supported on the gun frame.

Movement of the arm 45 out of engagement with the hammer 40 enables the spring 43 to throw the hammer forwardly against an anvil 47, and the impact of the hammer on the anvil opens a valve 48 to enable air under substantial pressure to enter the barrel 11 of the gun through the port 33. When this condition prevails a pellet has previously been advanced by the pin 25 to a position in advance of the port 33 so that the force of the air acts on the pellet and propels the same through the barrel at considerable velocity.

The above arrangement is such that each time the gun is cocked by manipulation of the slide 31, the pin 25 is retracted and the arm 18 is operated to transfer a pellet from the delivery end of the magazine 12 into the barrel 11 of the gun in advance of the positioning pin 25.

What I claim as my invention is:

1. A pneumatic gun comprising a frame, a barrel supported on the frame and having provision at the breech end for receiving shot, a shot retaining magazine supported on the frame in lateral spaced relation to the barrel, a shot receiving pocket connecting the delivery end of the magazine to the breech end of the barrel, a member pivotally supported at one end on the frame and having shot transferring means at the swinging end movable through the pocket from a normal position laterally outwardly beyond the delivery end of the magazine to a position adjacent the breech end of the barrel, means engageable with the next to the last shot in the magazine in response to swinging movement of the member and its shot transferring means in a direction toward the normal position aforesaid thereof and releasable from the shot in response to swinging movement of the member and its shot transferring means in a shot transferring direction, means disposed in an obstructing relationship to the delivery end of said magazine when said member and its shot transferring means are in the aforesaid normal position, cocking mechanism supported on the gun frame, and operating means for the cocking mechanism operatively connected to said obstructing means and said member so as to operate said member and move said obstructing means away from said magazine prior to movement of said member and its shot transferring means through said pocket from said normal position to the position adjacent the breech end of the barrel.

2. A pneumatic gun comprising a frame, a barrel supported on the frame and having provision at the breech end for receiving shot, a shot retaining magazine supported on the frame in lateral spaced relation to the barrel, a shot receiving pocket connecting the delivery end of the magazine to the breech end of the barrel, a member pivotally supported at one end on the frame and having shot transferring means at the swinging end movable through the pocket from a normal position laterally outwardly beyond the delivery end of the magazine to a position adjacent the breech end of the barrel, retaining means for holding the next to the last shot in the delivery end of the magazine including a stop movable into engagement with said shot in response to swinging movement of the member and its shot transferring means toward its normal position aforesaid and releasable from the shot in response to movement of the member and its shot transferring means in a shot transferring direction, a pin movable into and out of the breech end of the barrel for advancing shot forwardly in the barrel to a firing position, an extension on said pin normally disposed in an obstructing relationship to the delivery end of the magazine when said member and its shot transferring means are in the aforesaid normal position and movable away from said magazine when said pin is moved toward the breech end of the barrel, a slide for operating said pin and having means for moving the member to the normal position as said pin is advanced in the barrel, and means for moving said member in the shot transferring direction thereof as said pin is retracted from the barrel.

3. A pneumatic gun comprising a frame, a barrel supported on the frame and having pro-

vision at the breech end for receiving shot, a shot retaining magazine supported on the frame in lateral spaced relation to the barrel, a shot receiving pocket connecting the delivery end of the magazine to the breech end of the barrel, a member supported on the frame for movement in opposite directions and having shot transferring means movable through the pocket from a normal position laterally outwardly beyond the delivery end of the magazine to a position adjacent the breech end of the barrel, a portion of said shot transferring means being disposed in blocking relationship to the delivery end of the magazine when said shot transferring means is in its position adjacent the breech end of the barrel, retaining means for holding the next to the last shot in the delivery end of the magazine including a stop movable into engagement with said shot in response to movement of the member and its shot transferring means toward its normal position aforesaid and releasable from the shot in response to movement of the member and its shot transferring means in a shot transferring direction, an element operatively connected with said member and movable into obstructing relationship to the delivery end of the magazine as said member is moved to its normal position laterally outwardly beyond the delivery end of the magazine and movable out of said obstructing relationship when said member moves toward the position adjacent the breech end of the barrel.

CHARLES F. LEFEVER.

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