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GAS POWERED GUN

3,119,384

Filed Feb. 16, 1959

2 Sheets-Sheet 1

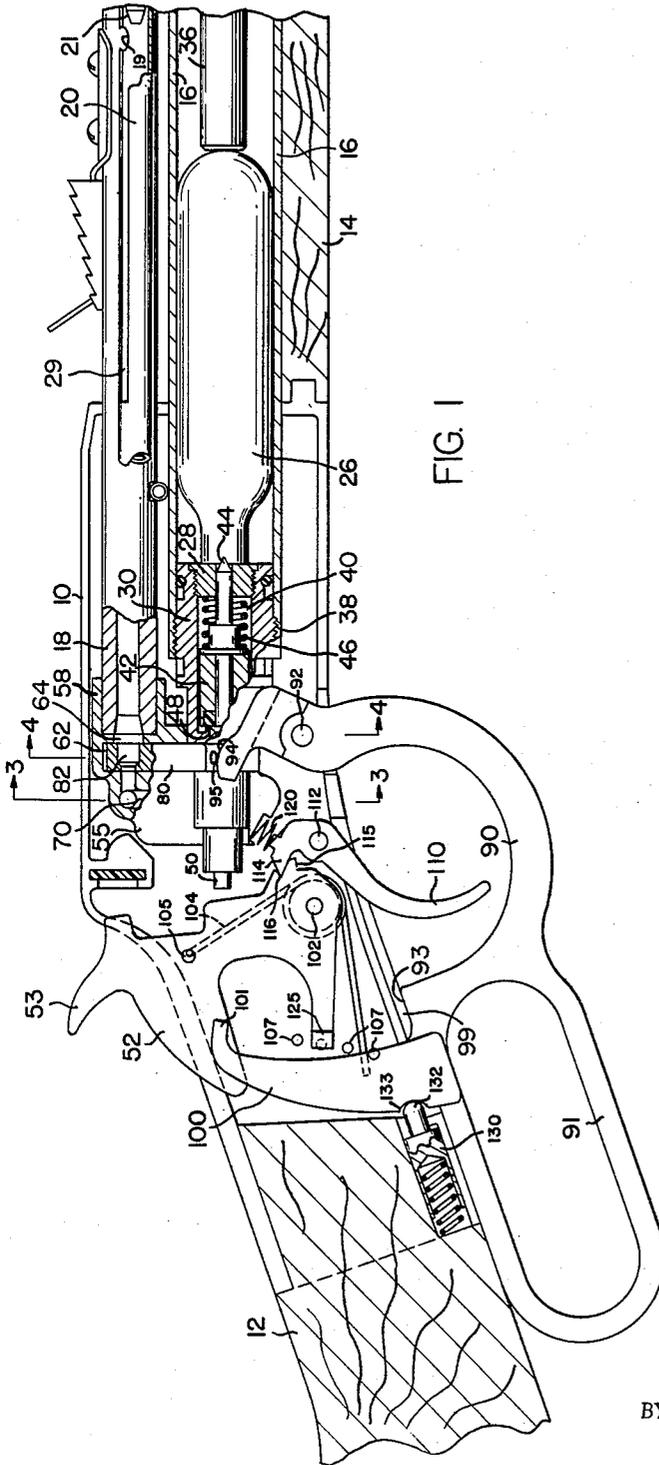


FIG. 1

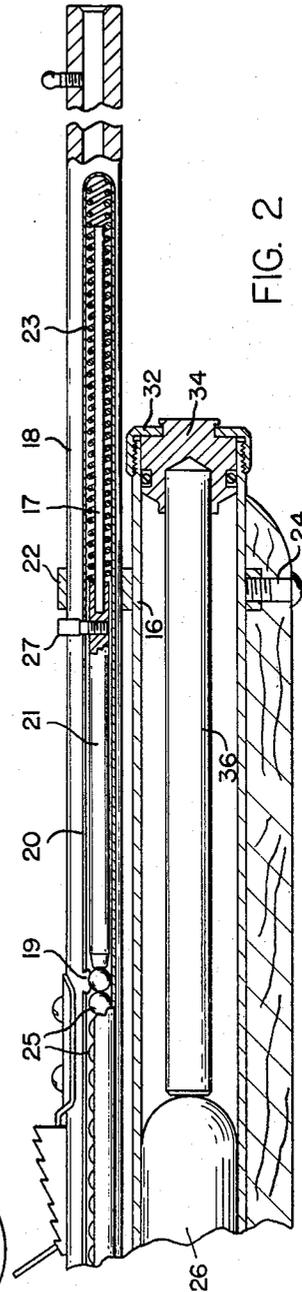


FIG. 2

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FIG. 3

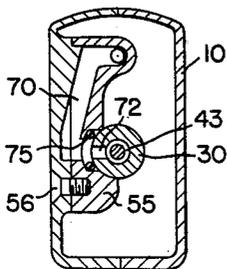


FIG. 4

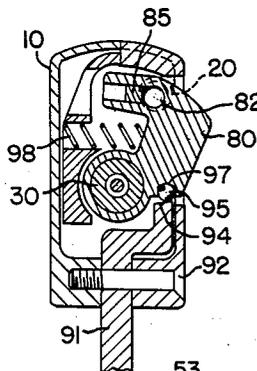
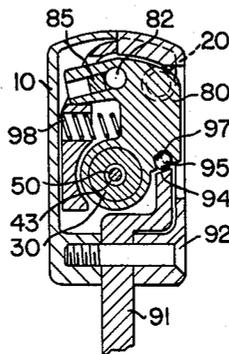


FIG. 5

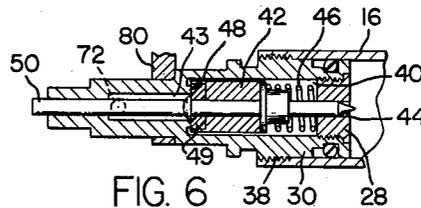


FIG. 6

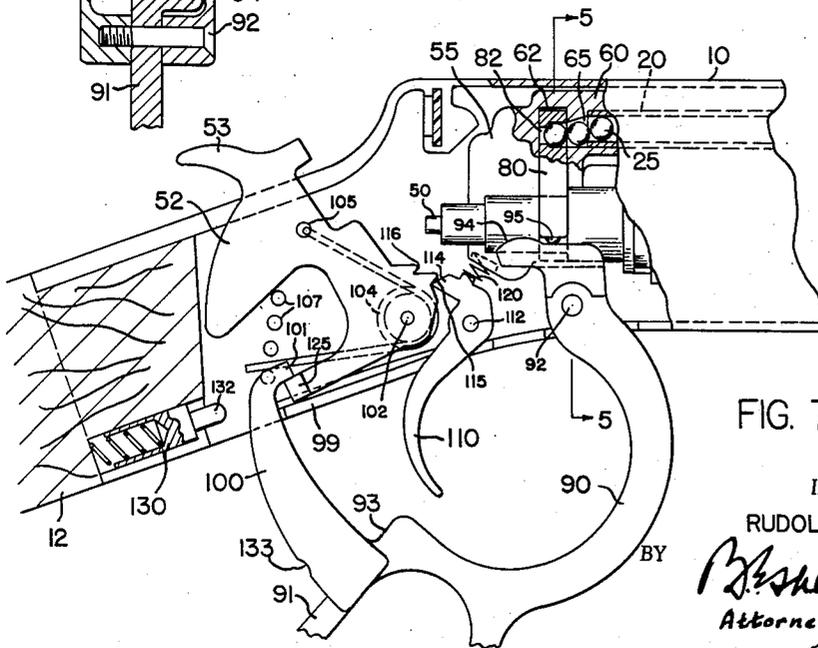


FIG. 7

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**GAS POWERED GUN**

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7 Claims. (Cl. 124-11)

This invention relates to gas powered guns, and more particularly to an improved gas powered repeating gun of the type using a replaceable cartridge for supplying the gas which propels the projectile from the gun. Specifically, this invention relates to a lever action repeating gun for shooting round projectiles, such as BB shot.

Heretofore, guns of the repeater type which were adapted to propel BB shot were relatively difficult to cock, and the mechanism for loading the shot from a magazine into firing position was deficient in many respects. For example, many times more than one projectile would be inadvertently transferred into firing position, and at other times the loading mechanism would fail to load a projectile into firing position. Furthermore, after each firing of the gun, it was necessary to tilt the muzzle end of the gun upwards to insure that the gun was properly loaded for the next shot, and if the gun were tilted downward, after the shot had been loaded into firing position, it might inadvertently roll out the end of the barrel. Moreover, each time the gun was cocked to fire another projectile, the gun had to be removed from the shoulder, which made rapid repeat firing of the gun practically impossible; and because of recoil and spring jump when firing the gun, it was difficult to fire the round projectile or BB shot with any fine degree of accuracy.

One of the objects of this invention is to provide an improved gas powered repeating gun.

Another object of this invention is to provide an improved gas powered gun which will load projectiles one at a time into firing position smoothly and positively.

Another object of this invention is to provide an improved gas powered gun of the repeating type which permits the operator to easily cock and load the gun with the stock positioned against his shoulder in firing position.

Another object of this invention is to provide an improved gas powered gun having an improved loading mechanism for retaining a single projectile in firing position.

A further object of this invention is to provide an improved lever action type repeating gun of the character described which requires very little effort to cock and load the gun.

A further object of this invention is to provide an improved gas powered gun which has a lever action cocking and loading mechanism for cocking the hammer and loading successive pellets from a magazine into firing position.

A further object of this invention is to provide an improved gas powered repeating rifle for shooting round shot which eliminates recoil and spring jump when firing the gun.

A still further object of this invention is to provide an improved gas powered gun of the character described which will not jam or double load.

A still further object of the invention is to provide an improved gas powered gun which will feed shot from its magazine into loading position while the gun is held in any position.

A still further object of this invention is to provide an improved gas powered gun of the character described which is efficient and fool-proof in its operation, and has no complicated or delicate parts to break down.

Other objects of this invention will be apparent from

the accompanying drawings, the specification, and the appended claims.

In the drawings:

FIG. 1 is a fragmentary side elevation of one embodiment of the invention, with parts broken away to show the interior mechanism;

FIG. 2 is a fragmentary side elevation of the front portion of the gun of FIG. 1 with parts broken away to show the interior;

FIG. 3 is a fragmentary sectional view taken at line 3-3 of FIG. 1 and looking in the direction of the arrows;

FIG. 4 is a fragmentary sectional view taken at line 4-4 of FIG. 1, looking in the direction of the arrows and showing the feed arm in firing position;

FIG. 5 is a sectional view similar to FIG. 4, but taken at the line 5-5 of FIG. 7 and showing the feed arm in the position it assumes when the arm is in a position for receiving a projectile from the magazine.

FIG. 6 is a sectional view of the valve mechanism; and

FIG. 7 is a fragmentary side elevation similar to FIG. 1 but showing the hammer cocked, the transfer arm in position to receive a projectile from the magazine, and parts being broken away.

The embodiment of the invention shown in the drawings is a gas operated lever action repeating gun for shooting round projectiles. This gun has a reservoir for containing a conventional carbon dioxide cartridge. A feed arm is mounted on the gun to pivot between the barrel and a magazine. The magazine is adapted to hold a plurality of projectiles. This feed arm has an opening therein for holding a projectile. A pivotally mounted lever is manually operable in one direction to cock the hammer of the gun and to move the feed arm so that its opening aligns with the delivery end of the magazine to receive a projectile therefrom and is operable in the other direction to align the opening in the feed arm with the barrel. A permanent magnet is positioned in the feed arm to hold the projectile in the opening until the gun is fired. The hammer is positioned to open a poppet valve when the gun is fired to admit gas under pressure behind the projectile to force the projectile out of the opening and through the gun barrel.

Referring in detail to the drawings, the gun comprises a hollow frame 10 to which is attached a hand grip stock 12 and a forearm stock 14. Mounted on the forearm portion 14 and extending into the forward portion of the frame is a tube 16. A barrel 18 is mounted in the frame 10 and projects forwardly above the tube 16. An elongated tubular magazine 20 is mounted alongside the barrel 18 and extends into the frame 10. The forearm stock 14, the tube 16, the barrel 18, and the magazine 20 are secured together by a band 22 (FIG. 2) which is fastened to the portion 14 by a threaded stud 24.

The magazine 20 is closed at one end, and has a rod 21 slidably mounted therein which is constantly urged towards the delivery end of the magazine by a coil spring 23 that is positioned between the closed end of the magazine and a shoulder of the rod 21. The spring surrounds a rod 17 that is of reduced diameter and which is fixed to rod 21. To load the projectiles 25 into the magazine the rod 21 is pulled forward against the force of the spring 23 by a knob 27 which is attached to the rod and which projects outwardly through a slot 29 in the magazine. The projectiles are fed into the magazine through the opening 19 which is intermediate the ends of the slot 29.

The tube 16 is adapted to contain a conventional replaceable, carbon dioxide cartridge 26 which is inserted through the forward or muzzle end of the tube so that its narrow neck portion extends rearwardly and engages the plane front surface of a nut 28 which is threaded into

a valve block 30 which will be described in detail hereinafter. The forward end of the tube 16 is closed by a cap 32 (see FIG. 2) which carries a plug 34. The plug 34 has an elongated rod 36 attached thereto which extends into the tube 16 to bear against the forward end of the cartridge 26 when the cartridge is in position.

The valve block 30 is threaded into the rear end of the tube 16 at 38. It has a chamber 40 in which is mounted a poppet valve 42. This poppet valve is of such a diameter that there is a slight clearance between the inside wall of the chamber 40 and the peripheral surface of the valve. The poppet valve has a gasket 49 attached to its rear face which is adapted to seat against the surface 48 of the valve block 30. Extending from the valve 42 and attached thereto is a valve stem 50 which has a piercing projection 44 integral therewith that extends forwardly through a hole in the nut 28 to pierce the cartridge 26 initially when the poppet valve is opened. A coil spring 46 is mounted in the chamber 40 between the nut 28 and a shoulder on the stem 50 to urge the poppet valve closed against the valve seat 48 formed in the body (see FIG. 3).

The valve stem 50 extends through a chamber 43 in the valve block 30 and projects at its rear end slightly beyond the rear face of the valve block 30 in position to be struck by the hammer 52 of the gun. When the valve is closed it shuts off communication between the chambers 40 and 43.

A member 55, which has integrally formed sockets 58 (see FIG. 1) and 60 (see FIG. 7), is attached to one side of the frame 10 by a screw 56 (see FIG. 3). The breech end of the barrel 18 is secured in the socket 58 by threading, press fitting, or otherwise; and the delivery end of the magazine 20 is mounted in the socket 60 in a similar manner. A transverse slot 62 is formed in the part 55.

A feed arm 80 is pivotally journaled on the exterior cylindrical surface of the valve body 30 and is mounted to pivot in the slot 62. The feed arm 80 has an opening 82 therethrough which is adapted to hold a projectile 25. The opening 82 is adapted to register with a duct 64 and with a passage 70, when the feed arm is in one position. The opening 82 is adapted to register with the duct 65, when the feed arm is in its other position. The duct 64 communicates with the barrel 18. The duct 65 communicates with the open rear end of the magazine 20.

The passage 70 (FIG. 3) extends through part 55 and communicates with a radial opening 72 in the valve body 30. The opening 72 connects with the chamber 43 formed in the valve body 30. A sealing ring 75 provides a sealed joint between the member 55 and the valve body 30 around the openings of the passage 70 and the opening 72. A magnet 85 (FIGS. 4 and 5) is mounted in the feed arm 80 adjacent the opening 82 to hold the projectiles 25 in the feed arm when the opening 82 is aligned with the barrel.

A manually operable lever 90 which has a handle 91, is pivotally mounted on the frame 10 at 92. This lever has a cam surface 94 which engages a ball bearing 95 that is positioned in a recess 97 of the feed arm 80. A coil spring 98 is positioned between one side of the frame 10 and the opposed surface of the feed arm 80 to constantly urge the feed arm clockwise as viewed in FIGS. 4 and 5 to hold the ball bearing 95 in engagement with cam surface 94.

The contour of the cam surface 94 is such that the opening 82 of the feed arm 80 is aligned with the barrel 18 when the lever 90 is in its closed position, that is, when surface 93 of the lever 90 abuts the lower surface 99 of the frame 10. The cam surface 94 also permits the spring 98 to urge the feed arm 80 so that its opening 82 is in registry with the delivery end of the magazine 20 when the lever 90 is at the limit of its downwardly or open position as shown in FIG. 7.

The hammer 52, which has a shoulder 115 and a notch

116, is operable to assume either a cocked position, a safety position, or a fired position. The hammer 52 is pivotally mounted at 102 in the frame 10 and is constantly urged toward its fired position by a coil spring 104.

One end of this spring is secured in an opening 105 of the hammer, and the other end is adapted to bear against one of the plurality of pegs 107 mounted in the frame. The positioning of the spring 104 on a respective one of the pegs 107 determines the force of the hammer. The hammer 52 has a lug 125 extending normal to the plane of the hammer which lug is adapted to be engaged by a projection 101 of a tang or arm 100 of the lever 90 to cock the hammer when the lever is operated downwardly or counterclockwise as viewed in the drawings. When the lever 90 is at the limit of its downward or open position, the bottom surface of the projection 101 is in engagement with the upper surface of the lug 125, and the lower surface of the lug 125 engages the upper surface of plate 99 of the frame 10.

A trigger 110, which is pivotally mounted in the frame 10 at 112, releasably holds the hammer in its cocked position when a sear 114 integral with the trigger engages the shoulder 115 of the hammer as shown in FIG. 7. A spring 120, which is positioned between the sear 114 and the body member 55, constantly urges the trigger in a counterclockwise direction as viewed in the drawings. When the sear 114 engages the notch 116 of the hammer, the hammer is held in its safety position, which position is shown in FIG. 1.

A spring loaded detent 130 is mounted in the grip stock 12 and has a projection 132 adapted to resiliently engage a recess 133 of the member 100 to hold the lever 90 in its closed position as shown in FIG. 1. However, a flat spring having a portion which is resiliently urged into the recess 133 may be mounted on the stock 12 to keep the lever closed.

To charge the gun, the gas-filled cartridge 26 is dropped into the tube 16, and the cap 32 is threaded thereon so that the rod 36 pushes the cartridge firmly against the nut 28. The hammer is then cocked by means of thumb pressure against a tang 53 of the hammer to rotate the hammer counterclockwise, as viewed in the drawings, until the trigger sear 114 engages the shoulder 115 of the hammer. The trigger is then pulled which releases the hammer 52 to hit the valve stem 50 pushing the piercing pin 44 into the gas cartridge. This releases the gas from the cartridge allowing it to fill the chamber 40 and the interior of the tube 16.

To load the projectiles 25 in the magazine, the rod 21 is pulled forwardly by its handle 27 until it reaches the position as shown in FIG. 2. The projectiles are then dropped through the opening 19 in the magazine until the magazine fills up, and then the rod 27 is released. This causes the spring 23 to urge the rod 21 against the column of projectiles. The blank surface of the feed arm 80 which covers the opening 65 retains the projectiles in the magazine.

To operate the gun, the lever 90 is grasped by its handle 91 and swung downwardly in a counterclockwise direction until it reaches the position as shown in FIG. 7. The downward swinging of the lever causes the bearing 95 to ride down onto the low portion of the cam surface 94, thus permitting spring 98 to pivot the feed arm in a clockwise direction as viewed in FIG. 5 until its opening 82 is in registry with the opening 65 and the delivery end of the magazine. This permits the first of the column of pellets to enter the opening 82. The downward swinging of the lever 90 also causes its projection 101 to engage the lug 125 on the hammer thus rotating the hammer counterclockwise to its cocked position. The lever 90 is then swung upwardly or clockwise which causes its cam surface to pivot the feed arm counterclockwise as viewed in FIG. 5 against the pressure of the spring 98 to align its opening 82, which now contains a projectile 25, with the barrel when the sur-

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face 93 of the lever engages the lower surface 99 of the frame 10. The projectile is held in the opening 82 by the permanent magnet 35, thus preventing it from rolling out of the barrel. The spring-loaded detent 130 now engages in the recess 133 to hold the lever 90 in position against the stock 12.

To fire the gun, the trigger is pulled, which releases the hammer to open the poppet valve 42 to release gas from the chamber 40 into the chamber 43 and through the passage 70. The gas pressure hitting the projectile 25 in the opening 82 overcomes the force of the magnet and propels the projectile from the opening 82 through the barrel.

The gun is reloaded and cocked by merely swinging the lever 90 downwardly, which pivots the feed arm to receive another projectile from the magazine and simultaneously cocks the hammer. The lever 90 is then swung upwardly to its closed position to place the projectile in firing position.

In actual practice the supply of gas from one cartridge 26 is sufficient to fire approximately one hundred projectiles from the gun.

When the gun is being carried or stored, the hammer is put in its safety position by exerting thumb pressure on the tang 53 and rotating it sufficiently to permit the sear 114 to engage the notch 116 thereby preventing the inadvertent firing of the gun or the inadvertent opening of the poppet valve.

Thus, I have provided an improved gas powered gun wherein just one short easy stroke of a lever feeds, loads, and cocks the gun. It is apparent therefore, that the gun can be cocked, and fired in rapid succession without removing the stock from the operator's shoulder. Also the gun can be effectively fired or carried safely, with the barrel pointed downwardly towards the ground without fear of the projectile rolling out of the barrel. Furthermore, it is apparent that the gun herein will not jam and will not load more than one projectile at a time.

While the invention has been described in connection with a specific embodiment thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention, what I claim is:

1. A gas powered gun, comprising a frame having a barrel, a magazine adapted to contain a plurality of projectiles, a valve block in said frame including a chamber for containing gas under pressure, a hammer pivotally mounted in said frame and operable to move in opposite directions to assume a cocked and a fired position respectively, a valve normally closing said chamber and actuatable by said hammer to open said chamber, a feed member having a projectile receiving pocket therein, said feed member being pivotally mounted on said block for movement about an axis parallel to the axis of said barrel to move said pocket in a plane extending transverse to said barrel from a position of registry with said magazine to a position of registry with said barrel and vice versa, a manually operable lever pivotally mounted in said frame and extending exteriorly thereof, means connecting said hammer to said lever to cock said hammer upon operation of said lever in one direction, and means operatively connecting said feed member to said lever to cause said pocket to move from a position of registry with said barrel to a position of registry with said magazine upon movement of said lever in said one direction, and to move from a position of registry with said magazine to a position of registry with said barrel upon operation of said lever in the other direction.

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2. A gas powered gun, comprising a frame having a barrel, a magazine adapted to contain a plurality of projectiles, a cylindrical valve block in said frame including a chamber for containing gas under pressure, a feed arm mounted about one end of said cylindrical block to pivot in said frame transversely of the barrel and having at its opposite end a projectile receiving pocket therein, a permanent magnet attached to said feed arm adjacent said pocket, a manually operable lever pivotally mounted in said frame, means connecting said lever to said feed arm and operative to cause said feed arm to be pivoted to move said pocket from a position of alignment with the barrel to a position of alignment with the magazine upon operation of the lever in one direction and to cause said feed arm to be pivoted to move said pocket from a position of alignment with the magazine to a position of alignment with the barrel upon operation of the lever in the other direction, said permanent magnet holding said projectile in said pocket when said pocket is aligned with the barrel, and valve means extending through said chamber and said one end of said block and operable to admit gas under pressure behind said projectile to overcome the force of said permanent magnet to propel said projectile out of said pocket and through said barrel.

3. A gas powered gun, comprising a frame, a barrel secured to said frame, a magazine mounted on said frame and adapted to contain a plurality of projectiles, said frame having a valve block including a chamber therein adapted to contain gas under pressure, a valve extending through said valve block and normally closing said chamber, a transfer member oscillatably mounted on said valve block and having a pocket therein adapted to hold a single projectile, said pocket being spaced from and extending parallel to the axis about which said member oscillates, a manually operable lever pivotal on said frame, means operatively connecting said lever to said transfer member so that said transfer member is moved from a position in which said pocket aligns with the barrel to a position in which said pocket aligns with said magazine on movement of said lever in one direction and vice versa on movement of said lever in the opposite direction, a hammer, means connecting said lever to said hammer to cock said hammer on movement of said lever in said one direction, trigger means releasably holding said hammer in cocked position, and means on said hammer engageable with said valve to open said chamber on release of said hammer to admit gas from said chamber behind said projectile to force said projectile out of said pocket and through said barrel.

4. A gas powered gun according to claim 3 wherein said transfer member has a permanent magnet attached thereto for holding a single projectile in said pocket when said pocket is aligned with said barrel.

5. A gas powered gun, comprising a frame having a barrel, a valve block in said frame including a chamber for containing gas under pressure, a valve normally closing said chamber, a hammer movable in opposite directions to assume respectively a cocked position and a fired position wherein said valve is actuated by said hammer to permit gas to flow from said chamber to fire said gun, a feed arm mounted on said block for oscillation thereabout, said feed arm having a pocket therein for holding a projectile, said pocket being spaced from and extending parallel to the axis about which said member oscillates, a manually operable lever pivotally mounted in said frame, and means attached to said lever and engageable with said hammer and arm, respectively to simultaneously move said hammer to cocked position and said pocket to a projectile receiving position upon operation of said lever in one direction, and spring means between said frame and said feed arm and operative to cause the transfer of a projectile in said pocket into alignment with the barrel upon operation of said lever in the other direction.

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6. A gas powered gun, comprising a frame, a barrel secured to said frame, a magazine mounted on said frame and adapted to contain a plurality of projectiles, said frame having a valve block including a chamber therein adapted to contain gas under pressure, a valve normally closing said chamber, a transfer member pivotally mounted on said block and having a pocket therein adapted to hold a single projectile, a manually operable lever pivotally mounted on said frame, means operatively connecting said lever to said transfer member so that said transfer member is pivoted transversely of said barrel from a position in which said pocket aligns with said magazine to a position in which said pocket aligns with said barrel on movement of said lever in one direction and vice versa on movement of said lever in the opposite direction, a hammer, means connecting said lever to said hammer to cock said hammer on movement of said lever in said opposite direction, trigger means releasably holding said hammer in cocked position, and means on said hammer and engageable with said valve to actuate said valve on release of said hammer to admit gas from said chamber behind said projectile to force said projectile out of said pocket and through said barrel.

7. A gas-powered gun, comprising a frame, a barrel secured to said frame, a magazine adapted to contain a plurality of projectiles, a valve block in said frame having therein a chamber for holding gas under pressure, a valve normally closing said chamber, a hammer movable in one direction to open said valve and movable in the opposite direction to assume a cocked position, a feed member reciprocally supported by said frame and having a projectile-receiving pocket therein, a manu-

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ally operable lever pivotally mounted on said frame, means operatively connecting said feed member and said lever so that movement of said lever in one direction causes movement of said feed member to a position to register said pocket with said magazine and movement of said lever in the opposite direction causes movement of said feed member to a position to register said pocket with said barrel, means attached to said lever to move said hammer to cocked position upon movement of said lever in its said one direction, a duct for conducting gas from said chamber to the rear of said pocket when said pocket is in registry with said barrel and said valve is opened, thereby to fire a projectile from said pocket through said barrel, and manually-releasable trigger means for holding said hammer in cocked position when it is moved thereto by said lever.

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