Aug. 4, 1931. V. H. FORSMAN ET AL 1,817,745

REPEATING AIR GUN

Filed Dec. 10, 1928 2 Sheets-Sheet 1

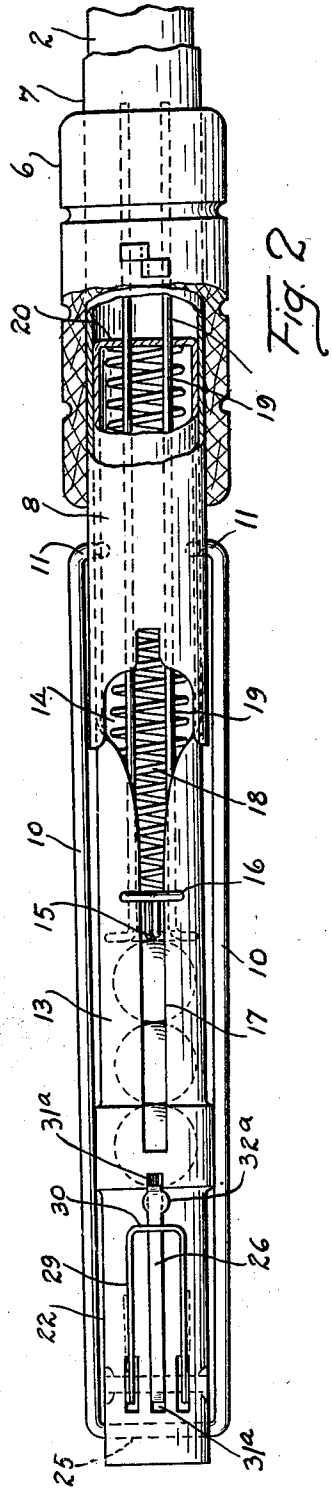


Fig. 2

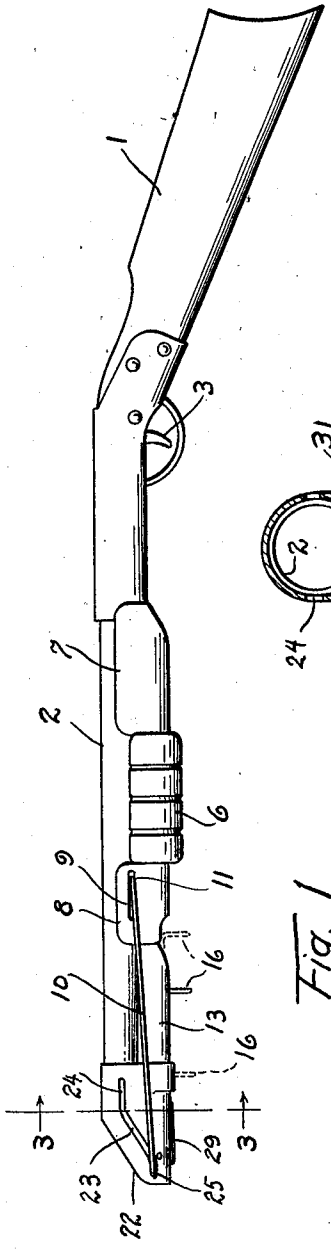


Fig. 1

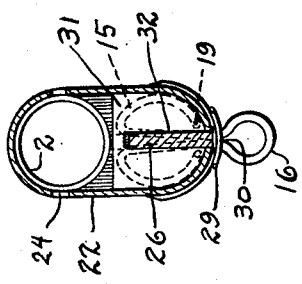


Fig. 3

INVENTORS
Victor H. Forsman, Arnold G. Decker
and Arthur W. Edwards
BY
Stuart C Barnes
ATTORNEY.

Aug. 4, 1931. V. H. FORSMAN ET AL 1,817,745

REPEATING AIR GUN

Filed Dec. 10, 1928 2 Sheets-Sheet 2

Fig. 4

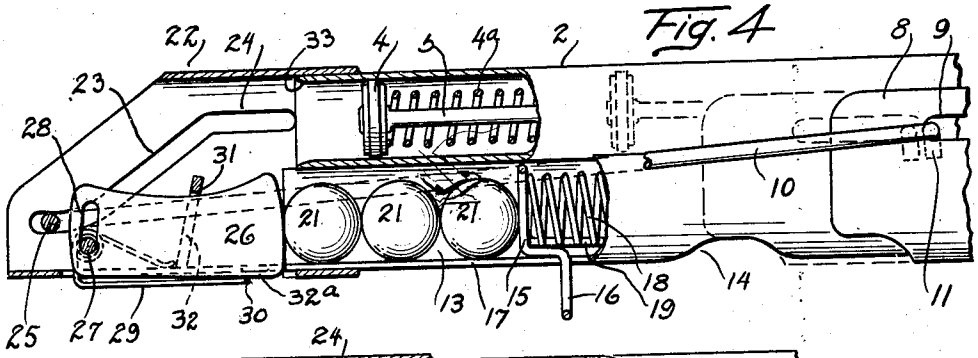


Fig. 5

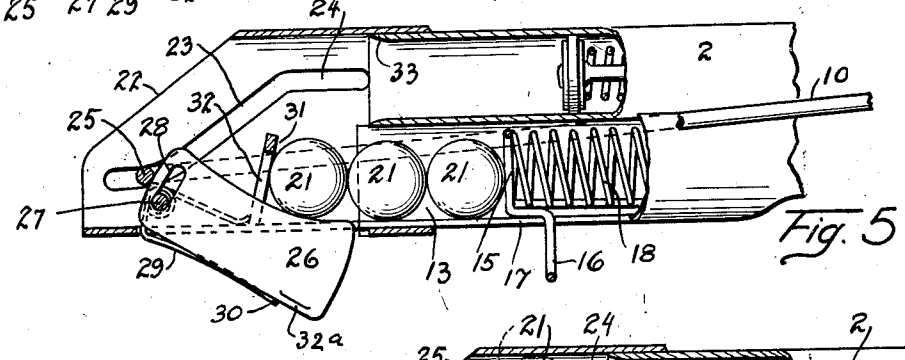


Fig. 6

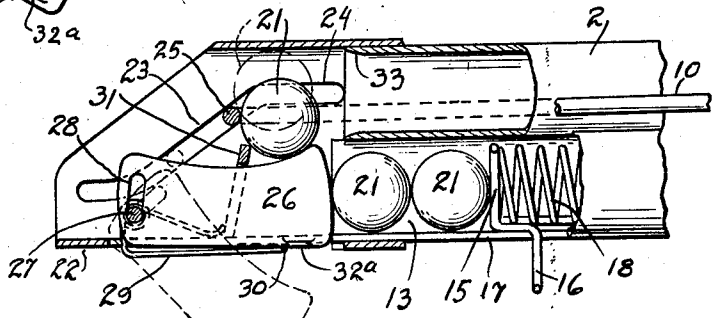
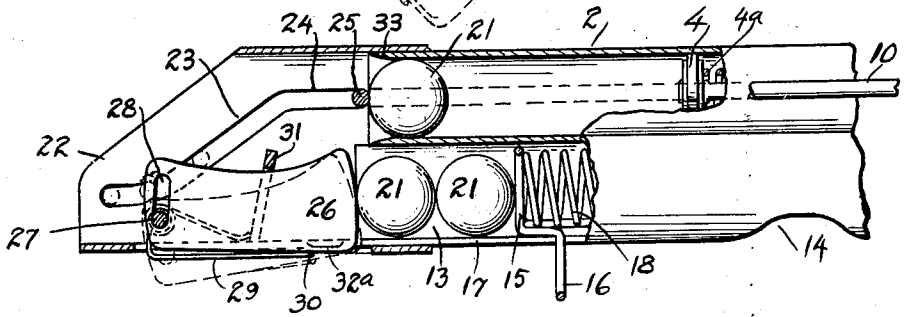


Fig. 7



INVENTORS
Victor H. Forsman, Arnold G. Decker
and Arthur W. Edwards
BY
Stuart C. Barnes
ATTORNEY.

Patented Aug. 4, 1931

1,817,745

UNITED STATES PATENT OFFICE

VICTOR H. FORSMAN, OF DETROIT, AND ARNOLD J. DECKER AND ARTHUR W. EDWARDS, OF WYANDOTTE, MICHIGAN, ASSIGNORS TO ALL-METAL PRODUCTS COMPANY, OF WYANDOTTE, MICHIGAN, A CORPORATION OF DELAWARE

REPEATING AIR GUN

Application filed December 10, 1928. Serial No. 324,880.

This invention relates to a repeating air gun.

The invention is concerned principally with a toy air gun which is in the nature of the so-called pop-gun type; this type being one designed to propel a more or less harmless pellet as for example through the medium of compressed air. The invention is centered around a mechanism arranged to feed the pellets one by one and place them in the barrel, and this mechanism is operably associated with the cocking mechanism for the gun, so that upon cocking of the gun a pellet is placed in the barrel to be projected.

Ordinarily, such a gun has a barrel with a plunger and the pellet is placed into the end of the barrel and as the plunger moves under spring action in the barrel the air between the plunger and pellet is compressed until the pellet is forcibly ejected. Accordingly, the mechanism contemplated by this invention is arranged to carry a plurality of pellets, and the pellets are fed one by one, as the gun is cocked and fired, into a position forward of the barrel and then it is urged into the barrel with the required force to make it sufficiently fast for the purpose.

In the drawings:

Fig. 1 is a side elevational view of a toy gun constructed in accordance with the invention.

Fig. 2 is an enlarged under-side view of the gun barrel illustrating some of the feeding mechanism and with part of the gun casing cut away to illustrate an interior structure.

Fig. 3 is an enlarged section taken on line 3—3 of Fig. 1.

Figs. 4 to 7 inclusive, are similar views, partly in section, in illustration of the operation of the pellet feeding mechanism; Fig. 4 showing the ordinary inoperative position; Fig. 5 showing the first movement in the pellet feeding action; Fig. 6 showing the next step in the pellet feeding operation; and Fig. 7 illustrating the final position of the pellet in the barrel.

The gun is constituted of the usual stock 1, barrel 2, and trigger 3. Within the barrel is a piston or plunger 4 mounted upon a rod 5. A pump handle is shown at 6, and this handle is connected with the rod 5. The handle 6 is reciprocable on the barrel and when it is retracted by the operator the plunger is retracted, as indicated in Fig. 4, thus compressing the usual spring 4*a*; and the plnger is held retracted by suitable trigger mechanism which is released upon actuation of the trigger 3 by the operator. This gun construction forms no part of the invention, as the plunger, spring operation and trigger construction are all well known in the art and any one of various forms may be selected.

With this type of gun, the plunger, when released, will forcibly discharge a pellet which is in the barrel, and repeating or feeding mechanism, now to be described, feeds a pellet into the barrel upon actuation of the pump handle. The pump handle, in the present instance, is secured to sheet metal flange members 7 and 8 which also reciprocate with the handle. The members 8 are each provided with a slot 9 and in these slots are disposed the ends of a U-shaped piece of wire 10 (Fig. 2) the ends of the wire being shown at 11.

Mounted upon the end of the gun, preferably near the end of the barrel, is a tubular magazine 13 having an enlarged opening 14 through which the pellets may be placed in the magazine. A spring pressed plunger or follower device 15 lies in this magazine and it has a handle part 16 which projects through a slot 17 in the magazine. The spring 18 urges the plunger 15 forward, but the plunger can be retracted manually by a pull on the handle piece 16. By referring to Fig. 2 is will be noted that by

retracting the plunger to a point to the right of the opening 14, that a plurality of pellets can be placed within the magazine whereupon the release of the plunger permits the same, under the action of the spring 18, to urge all the pellets forwardly in the magazine. The plunger may be formed by a single length of wire suitably shaped to form the plunger part 15, the handle 16, and rearwardly extending guide rods 19. These guide rods extend through the apertured wall 20 and serve to guide the plunger in its movement.

Thus a plurality of pellets, as referenced 21, and as shown in Fig. 4, are constantly urged forward by the plunger 15. Mechanism is provided at the end of the gun for feeding the end pellet to the barrel and this mechanism will be best understood by reference to views 4 to 7.

At the end of the gun there is a supporting member 22 provided with a slot 23 which, for a portion of its length, is angularly disposed, as shown, and which has a horizontal part 24. This supporting member 22 may be of sheet metal fixably secured to the end of the barrel and magazine, and the slot 23 is in reality two slots, one on each side of the housing shaped sheet metal which forms the support. The bight portion of the U-shaped wire 10 lies in this groove, as shown at 25.

There is a combined stop and feeding member mounted in the support 22 for feeding the pellets out of the magazine. This member is referenced 26 and it is pivoted on a cross pin 27. The stop member 26 has an elongated slot 28 in which the cross pin 27 fits, thus to permit of some relative movement between the feeding member and the cross pin for a purpose which will presently be brought out. A spring 29 in the nature of a U-shaped wire with its ends coiled around the coil spring engages the feeding member 26 and holds it in the position shown in Fig. 4. The bight portion of this spring, as shown at 30, engages the feeding member 26. There is a stationary abutment fixed in the support 22, as referenced 31, and this abutment is slotted centrally as at 32 for receiving the feeding member 26.

The operation of this automatically acting feeding device will also be best understood by considering the following description with Figs. 4, 5, 6, and 7. In Fig. 4 the parts are shown in normal position with a number of pellets in the magazine, and the gun is ready to be cocked by a pull of the plunger rearwardly to the dotted position shown. This is accomplished by pulling the pump handle 6 rearwardly. When this is done, the ends 11 of the U-shaped wire 10 are engaged by the ends of the slots 9 whereupon this wire is retracted with the pump handle. The bight portion 25 of the wire will now be caused to travel from its position shown in Fig. 4 to the position shown in Fig. 7 and in this movement it slides up the cam shaped part of the slot 23 and it also performs several operations on the other mechanism.

The bight portion 25 first comes into contact with one end of the stop 26, and upon continued movement it rocks the stop 26 after the manner shown in Fig. 5. This rocking movement takes place upon the cross pin 27 and against the action of the spring 29. It will be understood that the stop member 26 lies in a slot 31*a* in the housing 22. One end of the stop, therefore, is moved out of the way of the pellets whereupon the pellets are urged forwardly by the spring 18 until the forward pellets are stopped by the fixed abutment 31. The forwardmost pellet is now lying over the stop member 26 (Fig. 5).

Upon further movement, the bight portion 25 moves to the dotted line position of Fig. 6, thus freeing the stop member 26, whereupon the same is snapped back to its normal position by the spring 29. In other words, as the bight portion 25 assumes a position approximating that shown by the dotted line in Fig. 6, the stop 26 is snapped from its dotted line position back to its full line position. Upon referring to Fig. 2 it will be observed that the stop member has outwardly extending ears 32*a* which strike the metal around the slot 31*a* and prevent the stop member from moving past its normal position. The fixed stop 31 may also aid in this respect.

The forwardmost pellet has, by this movement, been moved upwardly from the position shown in Fig. 5 to that of Fig. 6, so that it now lies approximating forwardly of the open end of the barrel. The cocking movement of the pump handle is not yet completed, and further movement causes the bight portion 25 to engage this raised pellet so that the pellet is forced into the end of the barrel as shown in Fig. 7. The end of the barrel may advantageously be swedged out a bit as at 33, so that the pellet is pushed in and the material thereof is more or less compressed in the end of the barrel.

At this time, the gun has been cocked by movement of the pump handle to its rearmost position whereupon the next movement of the operator is to again push the pump handle forwardly. This movement of the pump handle is a similar movement to that of an ordinary pump action gun. This moves the wire 10 and its bight portion 25 back to position shown in Fig. 4. However, it will be noted by reference to Fig. 6, and also Fig. 4, that the stop member 26 more or less blocks the path of the bight portion. However, by reason of the provision of the

elongated slot 28, the bight portion engages the upper part of the stop member when the stop member is in the position of the full lines as shown in Fig. 7, and then urges the stop member down to the dotted line position of this figure. In other words, the stop member is pushed down with the cross pin 27 sliding in the elongated opening 28. In this movement the stop member has sort of a pivotal movement around the ears 32*a* of the member 26. Inasmuch as the bight portion 30 and spring 29 is located between the ears and the cross pin 27, the spring is flexed during this movement, and it urges the stop member 26 back to its normal and full line position after the bight portion 25 has moved into the forward end of the slot.

The gun is now ready to be fired and upon pulling of the trigger, 3, the piston 4 is released and the air is compressed between the piston and the pellet which is frictionally engaged in the end of the barrel and when sufficient pressure is obtained, the pellet is forceably expelled in the well known manner.

It will be noted that some movement of the pump handle 6 is permitted without movement of the wire 10 which is the connecting link with the automatic feed mechanism. The normal position of the parts are about that as shown in Fig. 1 with the ends 11 of the wire positioned near the rear of the slots 9. The handle 6 is of course pulled back quickly with a jerk. Quite some resistance must be overcome in pulling the bight portion 25 from its position in Fig. 4 through the position of Fig. 5 and to the position of Fig. 6, because the bight portion must by a cam action swing the stop member 26 against the spring 29. However, by reason of the slots 9, the handle as it is moved back quickly with a jerk, obtains a considerable momentum as also does the arm of the operator, so that the ends 11 of the wire are quickly jerked when they engage the ends of the slots 9. In other words the cocking movement is well under way by the time there is a pull upon wire 10 so that the bight portion 25 is readily snapped past the stop at feed member 26, and the force required to perform this is not appreciably noticeable. The point which we are trying to make here, is that it would be more difficult to effect the initial movement of pumping action if the initial movement also actuated the stop and feed member 26. As it is however, the feeding mechanism is not actuated until the pumping movement of the arm of the operator is well under way and the jerk and pull of the wire 10 is not appreciably noticeable.

Claims:

1. A repeating air gun, comprising a barrel, cocking means, a pellet magazine, means for feeding the pellets into the outlet end of the barrel with movement lengthwise of the barrel, and means operatively connecting the cocking means and the feeding means to actuate the feeding means upon actuation of the cocking means.

2. A repeating air gun, comprising a barrel, a piston in the barrel, gun mechanism for retracting the piston and releasing the same for ejecting movement of the piston, a pellet magazine, means for feeding the pellets singly and placing the same forcefully in the outlet end of the barrel, and means connecting the said gun mechanism with the feeding means to effect actuation of the feeding means upon actuation of the gun mechanism.

3. A repeating air gun, comprising a barrel, a piston in the barrel, cocking means for retracting the piston, means for releasing the piston, and means for urging the piston in the barrel upon such release, a pellet magazine, feeding mechanism for feeding the pellets singly to a position forwardly of the discharge end of the barrel and including a device for forcibly urging a pellet into the end of the barrel, and means operatively connecting the piston retracting means and said feeding device whereupon actuation of the retracting means actuates the feeding of a pellet into the barrel.

4. A pop gun, comprising a barrel, a spring pressed piston therein, means for retracting the piston against the spring, a trigger for releasing the piston, and means positioned adjacent the end of the barrel for automatically urging a pellet in the end of the barrel with movement lengthwise of the barrel upon actuation of the piston retracting means.

5. A pop gun, comprising a barrel, a spring pressed piston therein, means for retracting the piston against the spring, a trigger for releasing the piston, and means positioned adjacent the end of the barrel for automatically placing a pellet having a diameter greater than the diameter of the barrel in the end of the barrel and under pressure therein upon actuation of the piston retracting means.

6. A pop gun, comprising a barrel, a piston therein, a spring acting upon the piston, means for retracting the piston against the action of the spring, means for releasing the piston, a pellet magazine positioned near the end of the barrel, and automatically acting feeding means associated with the magazine and which is connected with the piston retracting means for automatically feeding pellets one at a time into the end of the barrel in substantially air sealed manner upon actuation of the piston retracting means.

7. The combination, with an air gun construction which includes a movable gun cocking part; of a pellet magazine posi-

tioned adjacent the discharge end of the gun barrel, said magazine having an open end, a combined stop and pellet feeding member positioned adjacent the end of the magazine which normally stops the pellets from discharging from the magazine and means associated with the movable cocking part of the gun for actuating the combined stop and feeding member whereby the same feeds a pellet to a position to be placed into the gun barrel and for moving the pellet lengthwise into the barrel.

8. The combination, with an air gun construction which includes a movable gun cocking part; of a pellet magazine positioned adjacent the discharge end of the gun barrel, said magazine having an open end, a combined stop and pellet feeding member positioned adjacent the end of the magazine which normally stops the pellets from discharging from the magazine, and means associated with the movable cocking part of the gun for actuating the combined stop and feeding member, whereby the same feeds a pellet to a position to be placed into the gun barrel, said last named means also being arranged to urge the said pellet lengthwise into the end of the barrel.

9. The combination, with an air gun construction which includes a movable gun cocking part; of a pellet magazine positioned adjacent the discharge end of the gun barrel, said magazine having an open end, a pivotally mounted combined stop and pellet feeding member positioned adjacent the end of the magazine which normally stops the pellets from discharging from the magazine, a pressed spring follower in the magazine for urging the pellets against the stop, and means associated with the movable cocking part of the gun for actuating the combined stop and feeding member whereby the same feeds a pellet to a position to be placed into the gun barrel, said last named means also being arranged to urge the said pellet into the end of the barrel.

10. The combination with an air gun construction which includes a barrel, ejecting mechanism, and a cocking part; of a magazine positioned near the end of the barrel, a supporting structure disposed forwardly of the magazine and barrel, a feeding device for feeding a pellet from the magazine to a position in front of the barrel, a spring acting on the feeding device and means connected with the cocking part and operable in said supporting structure for actuating the feeding device and for placing a pellet in the end of the barrel.

11. The combination with an air gun construction which includes a barrel, ejecting mechanism, and a cocking part; of a magazine positioned near the end of the barrel, a supporting structure disposed forwardly of the magazine and barrel, a feeding device for feeding a pellet from the magazine to a position in front of the barrel, means connected with the cocking part and operable in said supporting structure for actuating the feeding device and for placing a pellet in the end of the barrel, said means consisting of a cross member slidable with relation to the supporting structure.

12. The combination with an air gun construction, which includes a barrel, ejecting mechanism, and a cocking part; of a magazine positioned near the end of the barrel, a supporting structure disposed forwardly of the magazine and barrel, a feeding device for feeding a pellet from the magazine to a position in front of the barrel, and means connected with the cocking part and operable in said supporting structure for actuating the feeding device and for placing a pellet in the end of the barrel, said means comprising a U-shaped wire having its ends connected with the cocking part and with its bight portion resting and movable in a supporting structure.

13. The combination with an air gun construction, which includes a barrel, ejecting mechanism, and a cocking part; of a magazine positioned near the end of the barrel, a supporting structure disposed forwardly of the magazine and barrel, a feeding device for feeding a pellet from the magazine to a position in front of the barrel, and means connected with the cocking part and operable in said supporting structure for actuating the feeding device and for placing a pellet in the end of the barrel, said means comprising a U-shaped wire having its ends connected with the cocking part and with its bight portion resting and movable in a supporting structure, said supporting structure having a slot therein in which the bight portion of the wire moves.

14. The combination with an air gun having a barrel and ejecting mechanism therein, of a pump handle for cocking the gun mechanism, a pellet magazine positioned adjacent the end of the barrel, a spring pressed follower for urging the pellets forwardly in the magazine, a supporting structure disposed forwardly of the end of the barrel and the magazine, said supporting structure having a slot, part of which is disposed at an angle to the barrel and magazine, a cross member in this slot, a pivoted stop and feed device positioned forwardly of the magazine, and disposed to intersect the slot, means connecting the said cross member in the slot with the gun pump handle, whereby movement of the handle actuates the cross member to in turn engage and actuate the stop and feeding device.

15. The combination with an air gun having a barrel and ejecting mechanism therein,

of a pump handle for cocking the gun mechanism, a pellet magazine positioned adjacent the end of the barrel, a spring pressed follower for urging the pellets forwardly in the magazine, a supporting structure disposed forwardly of the end of the barrel and the magazine, said supporting structure having a slot, part of which is disposed at an angle to the barrel and magazine, a cross member in this slot, a pivoted stop and feed device positioned forwardly of the magazine and disposed to intersect the slot, means connecting the said cross member in the slot to the gun pump handle, whereby movement of the handle actuates the cross member to in turn engage and actuate the stop and feeding device, and a lost play connection between the said cross member and pump handle.

16. The combination with an air gun having a barrel and ejecting mechanism therein, a pump handle for cocking the gun mechanism, a pellet magazine positioned adjacent the end of the barrel, a spring pressed follower for urging the pellets forwardly in the magazine, a supporting structure disposed forwardly of the end of the barrel and the magazine, said supporting structure having a slot part of which is disposed at an angle to the barrel and magazine, a cross member in this slot, a pivoted stop and feed device positioned forwardly of the magazine and disposed to intersect the slot, means connecting the said cross member in the slot to the gun pump handle, whereby movement of the handle actuates the cross member to in turn engage and actuate the stop and feeding device, said stop and feeding device having an elongated slot for this pivotal mounting which permits movement of the member with respect to its pivot, which movement permits the said cross member to return past the stop member to its normal position after the pellet feeding action.

17. The combination with an air gun having a barrel and ejecting mechanism therein, a pump handle for cocking the gun mechanism, a pellet magazine positioned adjacent the end of the barrel, a spring pressed follower for urging the pellets forwardly in the magazine, a supporting structure disposed forwardly of the end of the barrel and the magazine, said supporting structure having a slot part of which is disposed at an angel to the barrel and magazine, a cross member in this slot, a pivoted stop and feed device positioned forwardly of the magazine and disposed to intersect the slot, means connecting the said cross member in the slot to the gun pump handle, whereby movement of the handle actuates the cross member to in turn engage and actuate the stop and feeding device, said stop and feeding device having an elongated slot for its pivotal mounting which permits movement of the member with respect to its pivot, which movement permits the said cross member to return past the stop member to its normal position after the pellet feeding action, and a spring acting upon the stop feeding member which is arranged to return this member to normal position when moved on its pivotal connection and when moved with respect to its pivotal connection.

In testimony whereof we affix our signatures.

VICTOR H. FORSMAN.
ARNOLD J. DECKER.
ARTHUR W. EDWARDS.