

E. H. SEARLE.
MAGAZINE AIR RIFLE.
APPLICATION FILED SEPT. 8, 1909.

1,065,556.

Patented June 24, 1913.

4 SHEETS—SHEET 1.

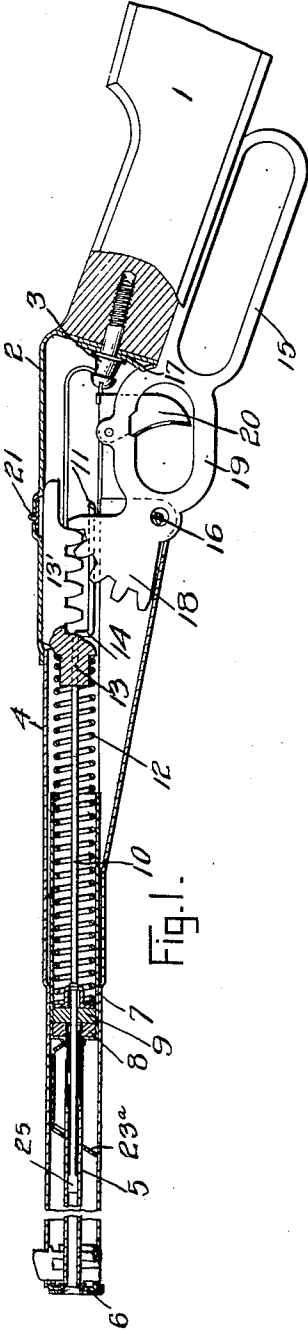


Fig. 1.

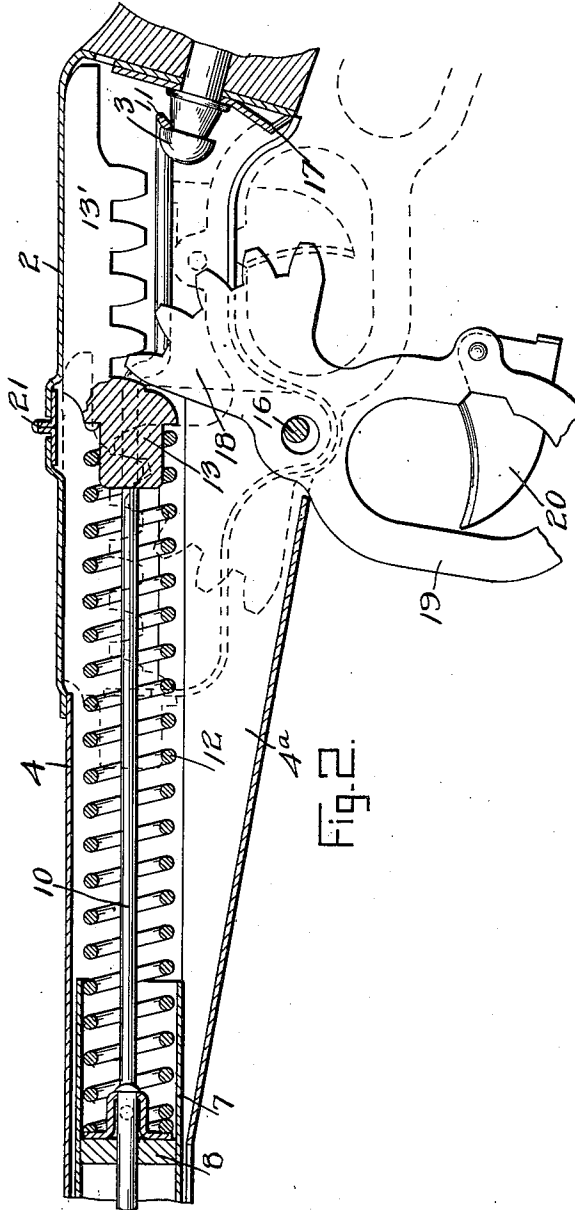


Fig. 2.

Witnesses

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H. H. Byrne

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Inventor:

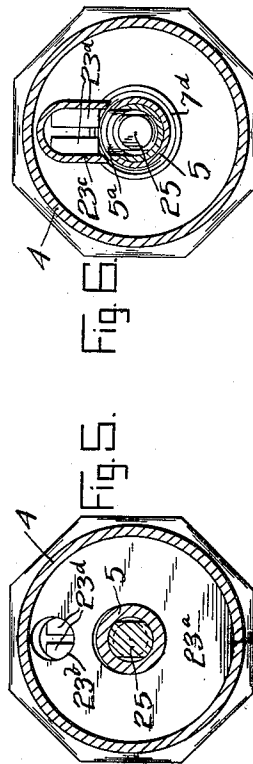
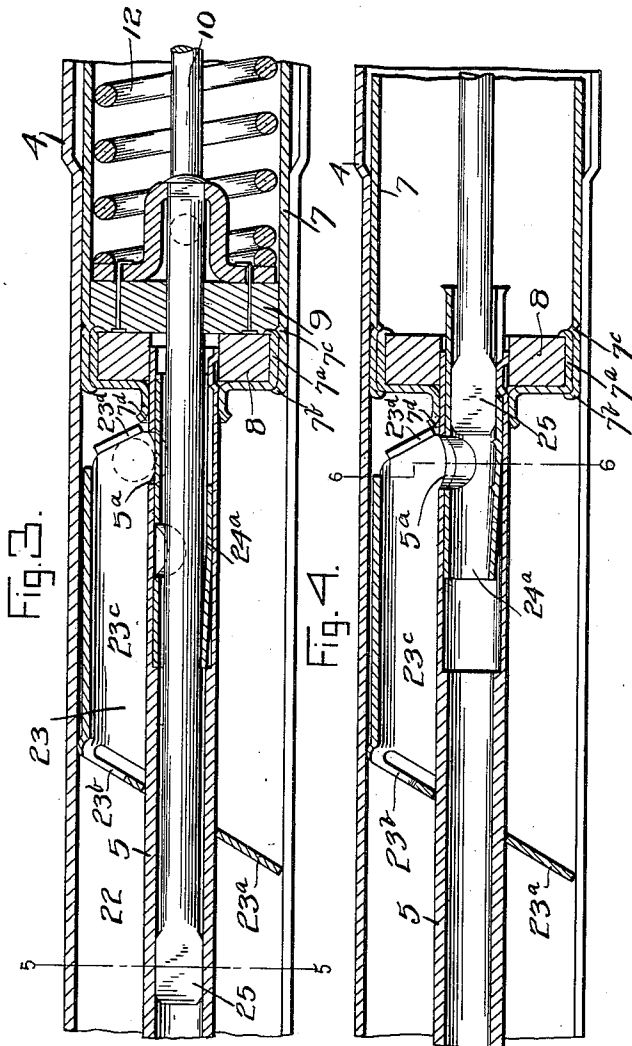
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4 SHEETS—SHEET 2.



Witnesses

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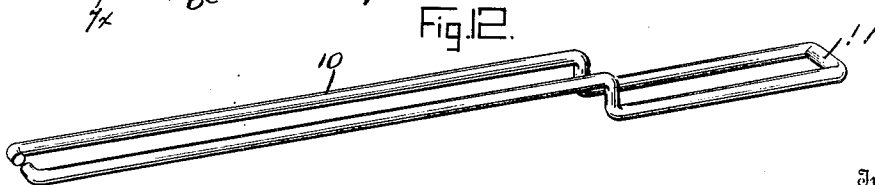
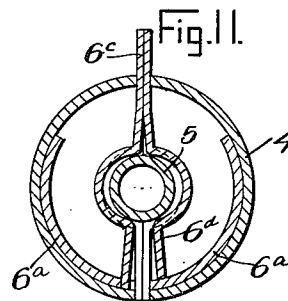
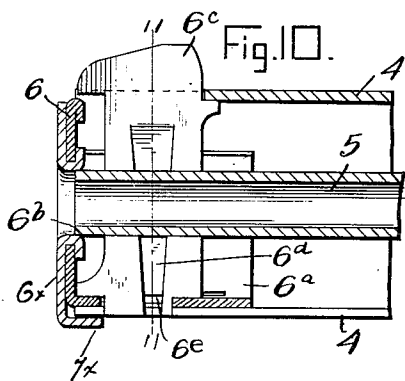
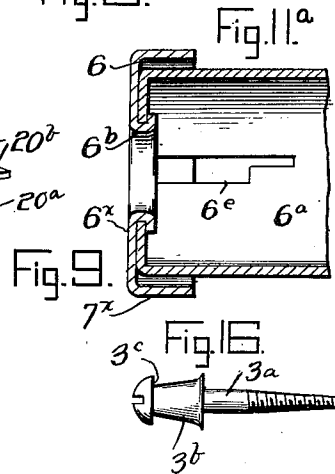
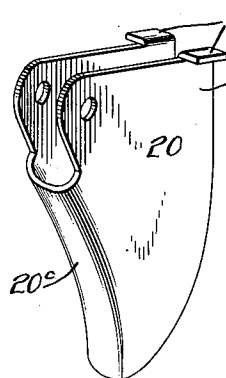
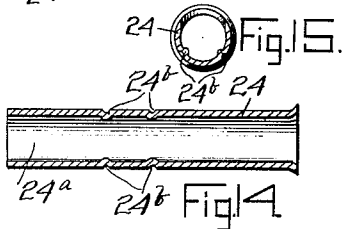
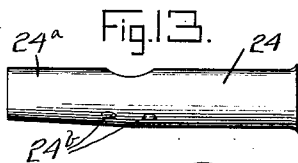
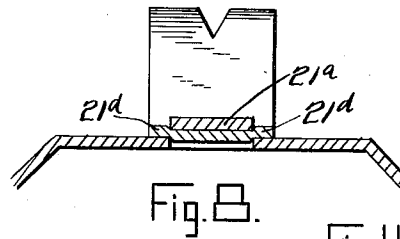
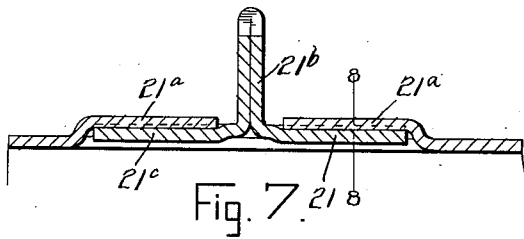
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4 SHEETS—SHEET 3.



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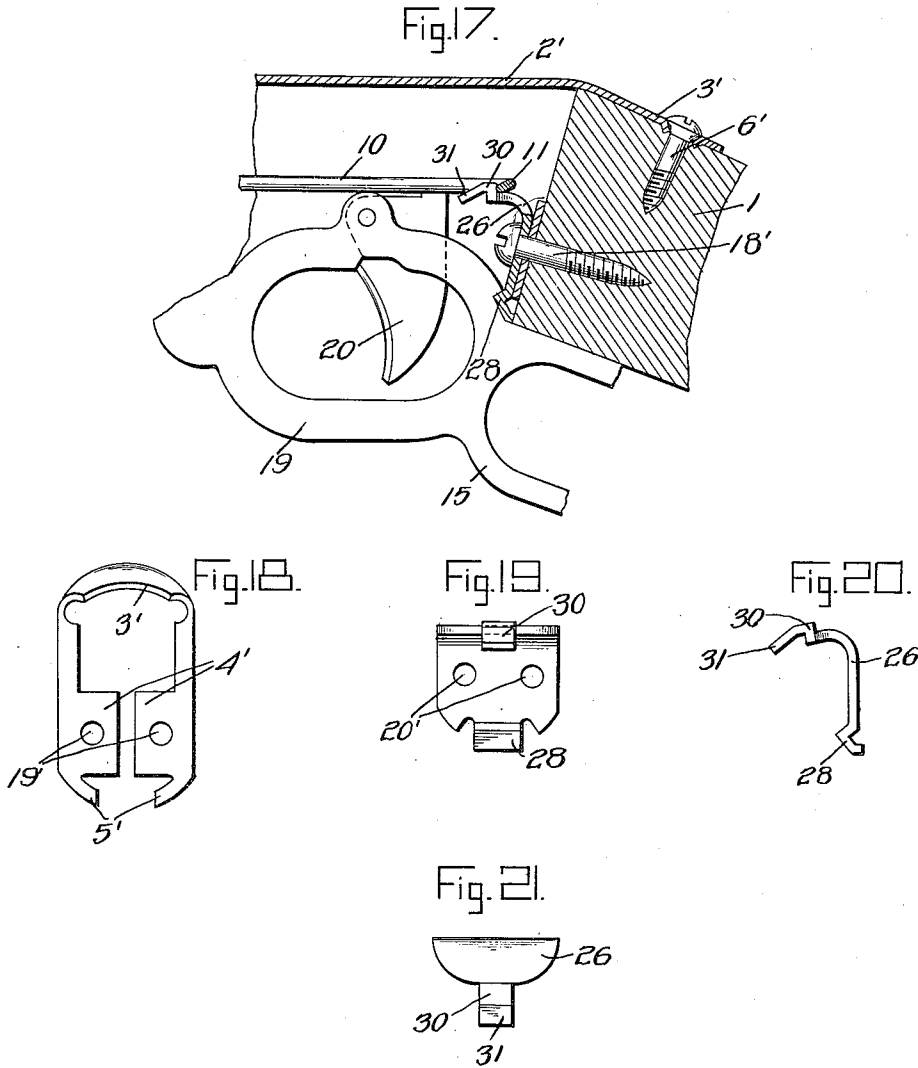
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4 SHEETS—SHEET 4.



Witnesses

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UNITED STATES PATENT OFFICE.

ELBERT HAMILTON SEARLE, OF SPRINGFIELD, MASSACHUSETTS.

MAGAZINE AIR-RIFLE.

1,065,556.

Specification of Letters Patent.

Patented June 24, 1913.

Application filed September 8, 1909. Serial No. 516,711.

To all whom it may concern:

Be it known that I, ELBERT H. SEARLE, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Magazine Air-Rifles, of which the following is a specification.

My invention relates to that type of guns in which a projectile is propelled by air pressure developed by a piston which is driven by spring power, and particularly to guns of this type which are made and sold as toys.

The general principle of my present invention is disclosed in my application for U. S. Letters Patent filed August 2, 1907, Serial No. 386,847, (now Patent Number 959,889) wherein is described a gun having a true barrel with a false barrel surrounding the true barrel and forming therewith a magazine space; a means for feeding projectiles from the magazine space into the rear end of the true barrel; a pressure chamber having a closed and packed end in which the true barrel fits to make air-tight connection with said chamber; a piston working in the air chamber to develop pressure therein, and carrying a pin which projects into the true barrel for the combined purpose of controlling the admission of projectiles and imparting initial movement to said projectiles in discharging; an expansible chamber lining fitting the rear end of the true barrel and movable longitudinally therein to open and close the inlet port for the projectiles; a spring in rear of the piston; a spring abutment in rear of said spring, movable rearwardly to retract the piston and forward to press the spring; a rod connected with the piston, having limited movement relatively to the spring abutment, and a rear end constructed for engagement with a fixed part to restrain the piston, while the abutment tensions the spring; and a pivoted cocking and tensioning lever having rack and pinion connection with the spring abutment, and so arranged that on swinging its lower end forward, it moves the spring abutment together with the piston rearward to engage the cocking rod with the fixed part, and on moving its lower end rearward, it moves the spring abutment forward to compress the spring against the restrained piston; a trigger being carried in such position on the cocking lever that it is brought into displace-

ing relation to the cocking rod when the spring is tensioned, but is out of such relation while the gun is being manipulated; and the fixed part or sear for engaging the cocking rod being in the form of a screw having a notched conical head.

My present invention relates to certain novel features of construction of the fixed sear with which the cocking rod engages; the trigger which is carried by the cocking lever; a rear sight peculiarly adapted for use on guns of sheet metal construction; the means for closing and packing the forward end of the pressure chamber; the construction of the chamber lining, whereby it is better adapted to perform its several functions; the means for directing or supplying projectiles to the inlet port of the true barrel, whereby a provisional supply of projectiles is always confined within reach of said port; and the construction of front sight and means for providing a movable closure for the space between the barrels or magazine feed opening.

My invention will be fully understood upon reference to the accompanying drawings, in which,

Figure 1 is a vertical axial section of an air gun having my several improvements embodied therein, with the parts in the positions assumed after discharging; Fig. 2 is a similar view on an enlarged scale of the intermediate portion of the gun, with the piston cocked and the cocking lever in position to move the spring abutment in the direction to compress the spring; Fig. 3 is a vertical longitudinal section on an enlarged scale, of the feeding and propelling parts of the gun; Fig. 4 is a view similar to Fig. 3, with the parts in the position assumed when a projectile enters the chamber lining in the rear end of the true barrel; Figs. 5 and 6 are sections on the lines 5-5 and 6-6, of Figs. 3 and 4 respectively, looking toward the right; Figs. 7 and 8 are enlarged detail views of the rear sight, Fig. 7 being a vertical longitudinal section central to Fig. 8; and Fig. 8 being a vertical transverse section on the line 8-8, of Fig. 7; Fig. 9 is a detail perspective view of the trigger; Fig. 10 is a vertical longitudinal section of the forward end of the gun, showing the construction of the front sight and its relation to the spacing means for the barrels and the closure for the magazine space between them; Figs. 11 and 11^a are sectional views

of Fig. 10 taken on lines 11—11 and 12—12 respectively; Fig. 12 is a detail perspective view of the cocking rod; Figs. 13, 14 and 15 are, respectively, a side elevation, a horizontal section, and a transverse section of the chamber lining; Fig. 16 is a detail view of the sear; Fig. 17 is a longitudinal sectional view of a modification in the structure of the frame and the sear; Fig. 18 is an end elevation of the frame; Fig. 19 is a detail view of the sear; Fig. 20 is a side elevation thereof, and Fig. 21 is a top plan view of the same.

1 represents the stock of the gun, preferably of wood, 2 the combined frame and receiver, which is secured to the stock by the sear screw 3; 4 is the false barrel which fits the forward end of the receiver and also carries a portion of the receiver 4^a. Said barrel 4 is formed of a longitudinally split or divided tube (see Figs. 5 and 10). 5 is the true barrel spaced within the false barrel at its forward end by the barrel closure 6; 7 is the cylinder which provides the air compression chamber and carries a front end closure 7^a that receives and spaces the rear end of the true barrel 5 within the false barrel; 9 is the pressure piston having a rearwardly extending cocking rod 10, which has its rear end 11 adapted to engage over the sear screw 3, when the rod is moved rearward; 12 is the projecting spring which abuts at its forward end against the piston 9; 13 is the spring abutment mounted to slide longitudinally in the frame 2 and providing an abutment for the rear end of spring 12, as well as a guide bearing for the cocking rod 10, and engaging said cocking rod through the medium of shoulders 14 on said rod; 15 is the cocking and tensioning lever which is fulcrumed at 16 by a loose bearing which permits it to yield sufficiently to snap over its retaining catch 17 and is constructed with a toothed segment 18 that engages a rack 13' on the spring abutment 13 so as to develop a reciprocating movement in the abutment from a swinging movement of the lever. The lever is constructed with a trigger guard 19 within which hangs a trigger 20, at such distance from the fulcrum 16 that when the lever is thrown in the direction to cock the gun, the trigger is removed from effective position, but when the lever is returned to its rearward position, said trigger is brought into releasing relation to the end 11 of the cocking rod engaged over the sear 3.

According to one feature of my present invention, the sear 3, for the sake of economy and cheapness of construction, is produced from a screw 3^a and a struck-up conical collar 3^b which provides the impinging shoulder to adapt the screw to hold the parts together and at the same time leaves the engaging face 3^c for the cocking rod 10.

According to another feature of my present invention, the trigger 20 is struck up from a sheet metal blank fashioned and bent to form the sides 20^a, the displacing lugs 20^b adapted to bear beneath the bifurcated cocking rod 10 and the connecting web 20^c that provides a bearing for the finger.

According to another feature of my present invention, the rear sight 21 is provided by striking up from the upper wall of the sheet metal frame 2, two tongues of metal 21^a until they lie in a plane slightly above the top of the frame and have their ends thus spaced apart, and a sight member 21^b formed by doubling a strip of metal upon itself, as shown, and bending its ends 21^c outwardly in position to engage beneath the tongues 21^a. The ends 21^c are likewise deflected as shown at 21^d to provide central deflections which adapt them to engage in the openings left by the tongues 21^a and also to engage on opposite sides of said tongues. With this construction of sight, the sight member 21^b may be readily pushed into place beneath the tongues and will snap into position and be firmly held without further securing means. I do not limit myself to the use of both the tongues 21^a, as it will be seen that one of said tongues would hold the sight member, provided the latter receives abutment against the metal of the frame to prevent it withdrawing endwise from the tongue 21^a.

According to another feature of my present invention, the magazine 22 is provided with a provisional feed chamber 23, constructed with an inclined guide disk 23^a, surrounding the true barrel 5 formed with an inlet port 23^b in its upper face, and having rearwardly extending side walls 23^c providing a feed chamber of sufficient size to receive and confine a number of projectiles, and bent to form the rear end closure 23^d just beyond the inlet port 5^a of the true barrel. When the gun is elevated to a sufficient angle to cause the projectiles in the magazine to pass through the opening 23^b and fill the provisional chamber 23^c, the projectiles thus confined will be in a position to enter more readily into the opening 5^a, and the feed will be more certain than if the gun has to be elevated each time sufficiently to feed the balls from one side of the true barrel to the other.

Another feature of my present invention consists in constructing the chamber lining 24 not only with the reduced and expansible forward end 24^a, but with a seat that prevents the projectiles rolling either rearward or forward until the gun is discharged; this seat being preferably formed from a plurality of beads 24^b struck up in the wall of the chamber lining, as shown in Figs. 13, 14 and 15.

Another feature of my present invention

consists in so constructing the projecting pin 25 that it never withdraws completely from the chamber lining 24, but fits therein with sufficient tightness to impart longitudinal movement to the chamber lining for opening and closing the inlet port 5^a, and expands the restricted forward end of the chamber lining while driving the projectile forward.

According to another feature of my present invention, and for the sake of economizing in cost of production, the cylinder 7, instead of having an integral forward end closure, as heretofore, is provided with a struck-up end closure 7^a, which is confined between a lip 7^b formed on the forward end of the cylinder, and an internal rib 7^c pressed into the wall of the cylinder immediately in rear of the end closure. The end closure 7^a receives and confines the packing 8 and it is provided with a central opening 7^d to receive the rear end of the true barrel; said opening being flared, as shown, to facilitate introduction of the barrel.

According to another feature of my present invention, the front sight and magazine end closures are so constructed and related that one is sustained by the other, and the sight provides means for releasably holding the end closure in place and permitting it to have a limited outward movement for the purpose of charging the magazine. Accordingly, the end closure 6 is provided with an inwardly extending flange 6^a that fits within the false barrel 4. Overlying the closure piece 6 is a plate 6^b that has a flange 7^{*} which surrounds the outer end of the false barrel 4, said end member 6^b has a central opening 6^b that receives the front end of the true barrel 5. The front sight 6^c extends transversely through diametrically opposite slots in the false barrel 4, so as to be confined against longitudinal movement therein, and it is provided with intermediate laterally displaced spring tongues 6^d. The false barrel slot which receives the lower end of the front sight, intersects the line of separation of the barrel. The flange 6^a of the end closure 6 is provided with a bayonet slot 6^e or a slot having a shoulder therein in position to receive the sight member 6^c in engagement with its said shoulder. And the parts are held in such engagement by the pressure of the tongue 6^d against the opposite wall of the slot. But when the end closure is rotated slightly in relation to the spring tongue and sufficiently to bring the tongue in the plane of the body of the sight member, the shoulder will have been removed from the plane of the sight member and the end closure can then be moved axially outward a distance permitted by the length of its slot, which is sufficient to provide an opening for the admission of projectiles into the magazine.

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

1. In a gun, the combination of the sheet metal gun member having its upper wall struck up to provide a pair of opposed tongues, and a sight projecting between the ends of the tongues and having an attaching base fitting beneath said tongues; said attaching base overlapping the edges of the opening from which the tongues are struck to prevent downward displacement of the same, and having depressions into which the tongues fit to prevent lateral displacement of the sight after it is moved into place.

2. In a gun, the combination of a pair of resilient tongues struck up from a gun member, with their ends spaced apart, and a sight extending upward between the ends of the tongues, said sight comprising a metallic sheet folded upon itself and having opposed base portions adapted to lie between the tongues and the gun member; said base portions being also adapted to overlap the sides of the opening from which the tongues are struck and being provided with recesses to receive the tongues and shoulders to engage the opening in the gun.

3. In an air gun, an air chamber comprising an open-ended tube having an inturned-end flange and an inwardly projecting annular rib, and an end-closure fitted in said air chamber and confined between said flange and rib.

4. In an air gun, the combination of the barrel, an air chamber, and a packing in the air chamber receiving the barrel; and an end closure fitting the air chamber and containing the packing; said air chamber being constructed with an inwardly projecting ridge confining the closure.

5. A gun having an expansible tubular bore section constructed with a reduced portion to prevent escape of the projectile, and having means for introducing the projectile in rear of the reduced portion of the bore, and a plunger preventing the escape of the projectile rearwardly and adapted, on discharging, to effect the expansion of the tube to permit the projectile to pass.

6. A gun having a port in its bore for the admission of projectiles and having a lining sleeve also provided with a port, movable to bring the ports into and out of registry and reduced at a point forward of its port to prevent premature escape of the projectile forward.

7. In combination with a gun having a bore provided with a port to receive a projectile, a lining sleeve also provided with a port and movable to bring the ports into and out of registry; said lining sleeve being reduced to restrict the passage of the projectile forward of the admission port but being divided at such point of reduction to

permit of sufficient expansion to pass the projectile.

8. In combination with a gun having a bore provided with a port to admit a projectile, a sleeve having a port and movable to bring the ports into and out of registry and reduced at its forward end to restrict the passage of the projectile, a plunger working in said sleeve, and means drawing the plunger to a position in rear of the ports when the latter are in registry in order to confine the projectile between the plunger and the reduction in the sleeve.

9. In combination with a gun having a bore provided with a port to admit a projectile, a sleeve having a port and movable to bring the ports into and out of registry and reduced at its forward end to restrict the passage of the projectile, a plunger working in said sleeve, means for drawing the plunger to a position in rear of the ports when the latter are in registry in order to confine the projectile between the plunger and the reduction in the sleeve, and means for actuating said plunger in the direction of discharging.

10. In a gun, the combination of the barrel, the sleeve working in the bore of the barrel having a reduced forward end, a plunger entering said sleeve from the rear end, a piston for developing air pressure in rear of said sleeve, and means for driving the piston and plunger forward.

11. In a gun, the combination of the barrel, the sleeve working in the bore of the barrel having a reduced forward end, a plunger entering said sleeve from the rear end, a piston for developing air pressure in rear of said sleeve, and means for driving the piston and plunger forward, said plunger reaching beyond the reduced portion of the sleeve when at its forward limit.

12. In a gun, the combination of the barrel, the sleeve working in the bore of the barrel having a reduced forward end, a plunger entering said sleeve from the rear end, a piston for developing air pressure in rear of said sleeve, and means for driving the piston and plunger forward, said plunger remaining within the sleeve when at its rearward limit of movement.

13. In a gun, the combination of the magazine tube and the end closure for the magazine tube, comprising the internal cylindrical flange, the abutting radial flange, and the cap fitted over said radial flange and united therewith by a circumferential flange, said cap being provided with an external cylindrical flange fitting around the magazine tube.

14. In a gun, the combination of a magazine, a closure for said magazine formed with a flange fitting within the magazine, said flange having a slot, and a key secured to the magazine and extending through the

slot and permitting limited movement of the closure to open and close the magazine, said slot being formed to provide a shoulder to engage the closure with the key by a rotary movement, to prevent unintentional opening movement.

15. In a gun, the combination of a magazine, a closure for said magazine having a slot and a key secured to the magazine and extending through the slot and permitting limited movement of the closure to open and close the magazine, said slot being formed to provide a shoulder to engage the closure with the key by a rotary movement, to prevent unintentional opening movement, and said key having a spring, resisting rotary unlocking movement.

16. In a gun having a magazine, a closure for said magazine comprising a cap constructed with a shouldered slot and a key secured to the magazine and projecting through the slot; said key being bifurcated and having one of its members engaging the shoulder of the slot and the other member serving as a spring, and engaging the opposite wall of the slot to maintain engagement with the shoulder.

17. In a gun, having a magazine, a magazine closure constructed with a slot, and a key carried by the magazine, projecting through the slot and having a spring forcing it into engagement with a wall of the slot to control the opening movement of the cap.

18. In a gun, the combination of the true barrel, the false barrel surrounding the true barrel and providing therewith a magazine, a closure for the end of the magazine and a key extending through the magazine comprising a plate constructed to provide members embracing the true barrel and spacing it within the magazine, and engaging the closure to control the movement of the latter.

19. In a gun, the combination of the barrel having its wall separable along the longitudinal line and a sight extending transversely through said barrel and fitted in slots therein; one of the slots intersecting the line of separation in the wall of the barrel whereby the wall may be spread to receive the sight into said intersecting slot.

20. A gun having a barrel divided along the longitudinal line in its wall whereby the barrel may be expanded, and having circumferentially separated slots in said wall, and a transverse member secured in said barrel having reduced ends fitting the slots and shoulders abutting the wall of the barrel adjacent to the slots.

21. In a gun, the combination of the barrel having a port, the chamber lining movable in the barrel to open and close the port, and constructed to receive and hold the projectiles for discharging, and the piston carrying a piston rod extension movable within

the barrel for the full charging and discharging movements of the piston and constructed to open and close said movable lining during such movements.

- 5 22. In a gun, the combination of the barrel having a port, a magazine disposed adjacent said port, the chamber lining movable in the barrel to open and close the port thereof and constructed to receive the projectiles singly from said magazine and hold
10 said projectiles for discharging, and the piston carrying a piston rod extension movable within the barrel for the full charging and discharging movements of the piston, and

constructed to engage with and move said lining into loading position on the completion of the inward movement of the piston and to move the lining into closed position on the beginning of the outward or discharging movement thereof.

The foregoing specification signed at Springfield Mass. this 19th day of August, 1909.

ELBERT HAMILTON SEARLE.

In presence of—

RAY V. SEARLE,
FLYNT LINCOLN.