

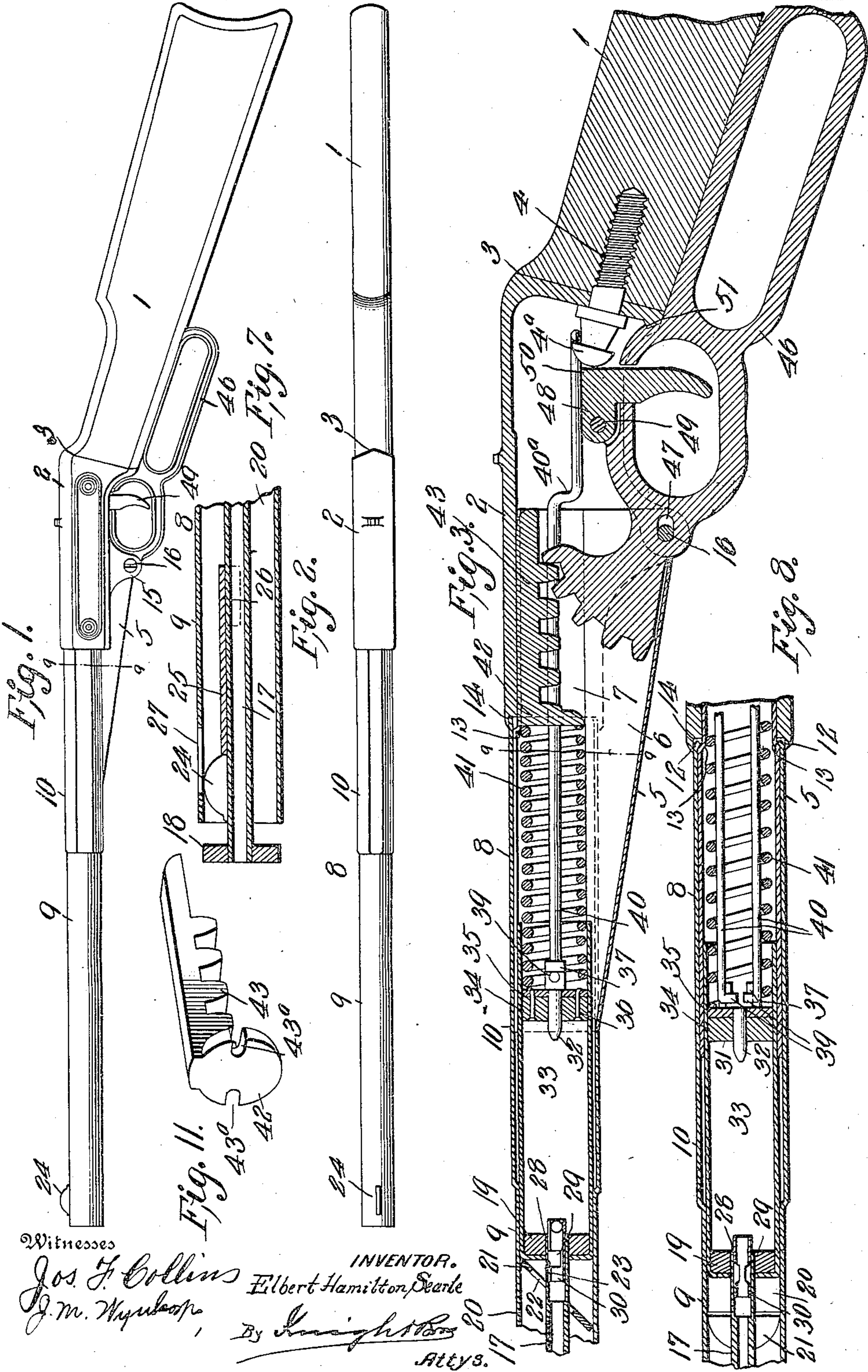
E. H. SEARLE.  
AIR GUN.

APPLICATION FILED AUG. 2, 1907. RENEWED SEPT. 17, 1909.

959,889.

Patented May 31, 1910.

2 SHEETS—SHEET 1.



Witnesses

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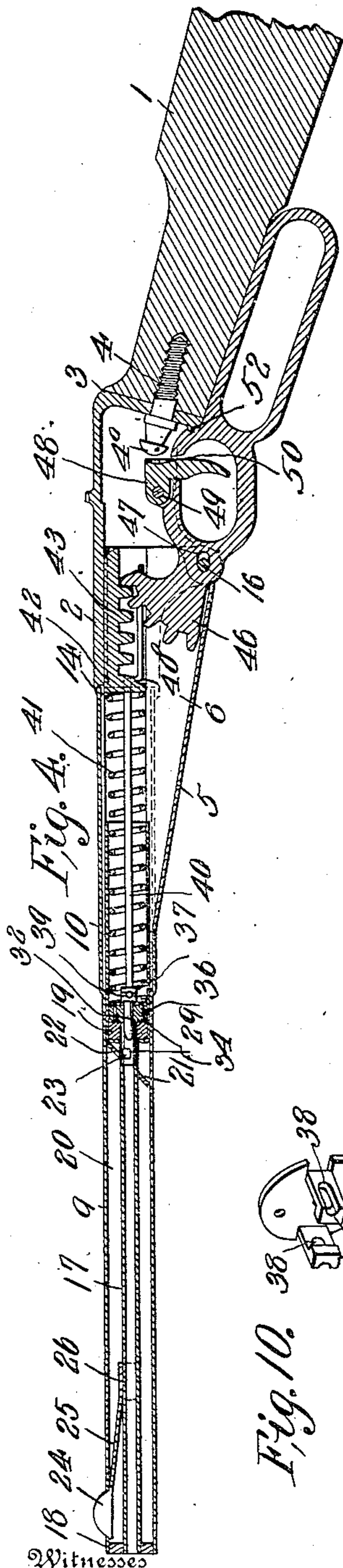


Fig. 10.

Fig. 5.

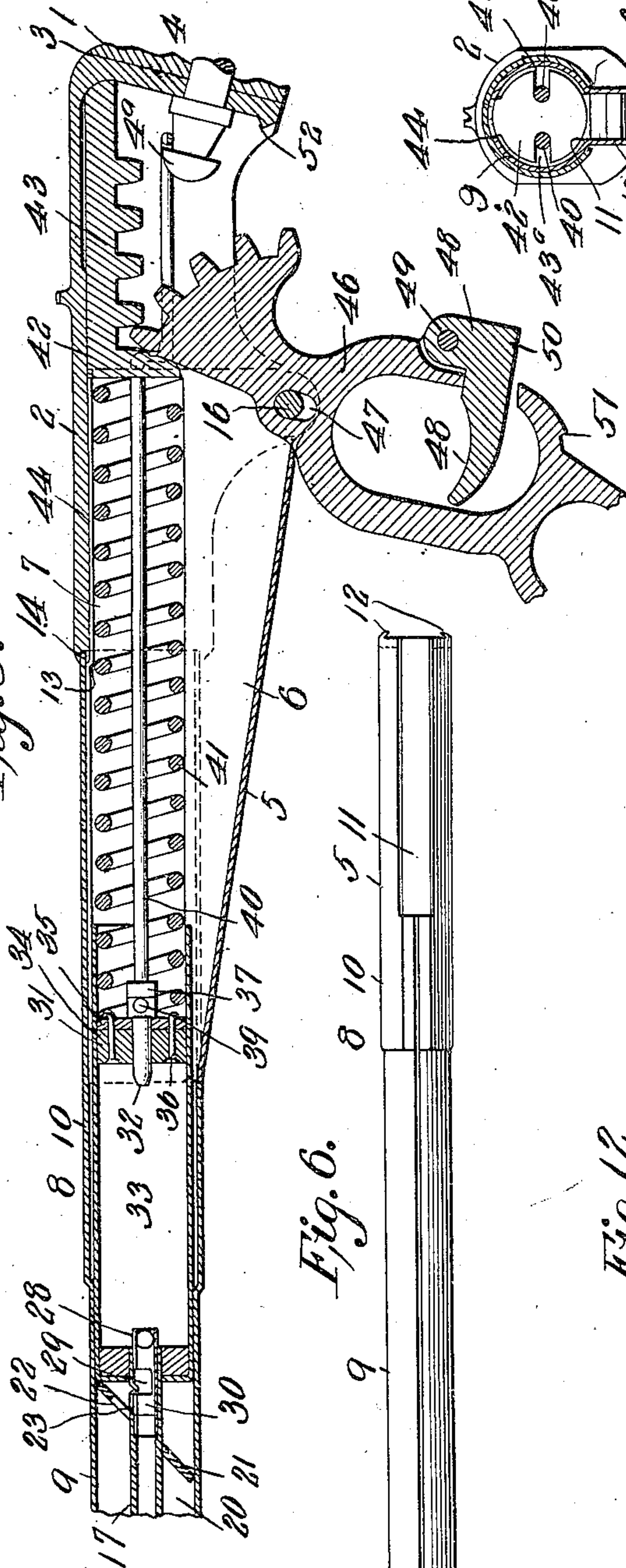


Fig. 6.

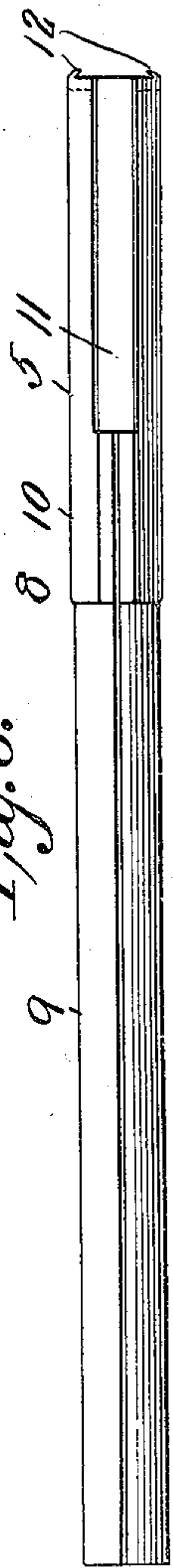
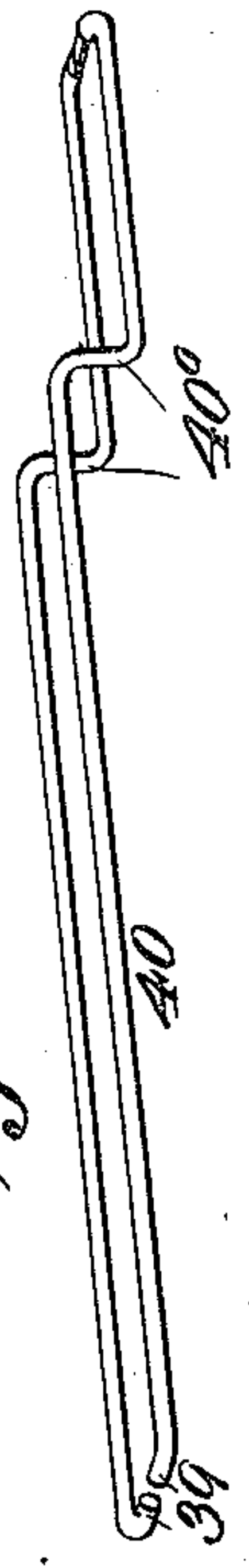


Fig. 12.



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# UNITED STATES PATENT OFFICE.

ELBERT HAMILTON SEARLE, OF SPRINGFIELD, MASSACHUSETTS.

## AIR-GUN.

959,889.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed August 2, 1907, Serial No. 386,847. Renewed September 17, 1909. Serial No. 518,284.

*To all whom it may concern:*

Be it known that I, ELBERT HAMILTON SEARLE, a citizen of the United States, residing at 50 Madison avenue, in the city of Springfield, county of Hampden, and State of Massachusetts, have invented certain new and useful Improvements in Air-Guns, of which the following is a specification.

My invention relates to air guns of that type in which the propelling air is developed by a spring driven piston, which is set in a position with the spring under compression, and released at will, to permit the spring to drive the piston forward and develop the air pressure necessary for propelling the shot through the bore of the gun.

The object of my invention is to produce a gun of this type which shall be of cheap yet durable construction, convenient to manipulate, and efficient in operation.

To these ends, my invention consists in certain novel features of construction and relations of parts hereinafter fully described and particularly pointed out in the claims.

In order that my invention may be fully understood, I will proceed to describe the same with reference to the accompanying drawings, in which,

Figure 1 is a side view of the complete gun; Fig. 2 is a top view of the same; Fig. 3 is a vertical axial section of the intermediate portion of the gun, on an enlarged scale, showing the working parts in position ready for discharging; Fig. 4 is a vertical longitudinal section of the gun on a scale larger than Fig. 1, but smaller than Fig. 3, showing the parts in discharged position; Fig. 5 is a vertical longitudinal section, on an enlarged scale, of the working parts of the gun in a position intermediate between the position shown in Fig. 3 and that shown in Fig. 4, the piston, spring, spring abutment, and rod being collectively moved rearward to engage the rod over the sear, preliminary to putting the spring under tension by swinging the lever upward and moving the spring abutment forward against the restrained spring; Fig. 6 is a detail view of the false barrel seen from beneath; Fig. 7 is a sectional detail view of the false and true barrels in the relative positions which they occupy when the annular magazine chamber between them is being charged with the spherical shot used in the gun; Fig. 8 is a horizontal axial section of the intermediate portion of the gun showing the

connection of the tension and cocking rod with the piston and the method of assembling the false barrel with the frame extension and frame; Fig. 9 is a transverse section on the line 9—9, Figs. 1 and 3; Fig. 10 is a detail perspective view of the piston disk; Fig. 11 is a detail view of the reciprocating spring abutment; Fig. 12 is a detail view of the tension and cocking rod.

1 represents the stock, preferably of wood, 2 the frame which is preferably a casting, fitted to the stock by forming an angular rear end on the frame and a corresponding seat on the stock, as shown at 3, and secured to the stock by screw 4 passing through the rear wall of the receiver into the stock; 5 represents the frame extension preferably struck up from sheet metal to provide the tapering rectangular portion 6, providing the forearm or grip of the gun and the cylindrical portion 7 which provides the forward portion of the receiver; and 8 represents the false barrel preferably constructed of sheet metal, fashioned to provide the cylindrical portion 9 and the rear octagonal portion 10; the said rear portion of the barrel being provided with a slot 11 on its underside as shown in Fig. 6 which permits it to fit over the rectangular portion of the frame extension, and said false barrel having at its rear end the gripping lugs 12 which engage the shoulders 13 of the frame extension (see Fig. 8) to hold the false barrel and frame extension together, said rear end of the false barrel fitting snugly within the enlarged forward end 14 of the frame 2 to hold the parts in engagement. The frame extension projects at its rear end between a pair of lugs 15 on the frame and there receives a pintle 16 which passes through said lugs and through the frame extension and holds the frame, frame extension and false barrel in assembled relation.

Those parts of the gun which are constructed of sheet metal, being constructed with open longitudinal seams, can be fitted snugly together and the seams thereafter closed by a solder or equivalent medium if desired.

17 represents the true barrel having a bore of suitable size to receive a small shot, said true barrel being fitted within the false barrel 8 by spacing and packing rings 18 and 19 which leave the annular magazine space between the true and false barrels.

21 represents an inclined deflecting disk



forming the bottom of the magazine, and having a port 22 which coincides with the port 23 in the true barrel in order to direct the projectiles into the chamber of the gun. To permit introduction of the shot into the magazine 20, the true barrel may be removed longitudinally a sufficient distance to open the forward end of the false barrel. For convenience in releasably holding the barrels in their normal relation, the front sight 24 is carried by a spring plate 25 attached to the true barrel at 26, and said sight projects yieldingly through a slot 27 in the false barrel and prevents a movement of the true barrel in the false barrel until the sight is depressed, as shown in Fig. 7.

To control the admission of the shot into the chamber and to grip each shot successively and hold it in position not only to prevent dropping out but to resist the piston pressure until sufficient pressure develops to act expansively against the shot and drive it forward with increased velocity, the rear end of the true barrel is provided with a chamber lining 28 that serves as a shot retainer, which is in the form of a split cylinder, having a recess 29 which may be moved beneath the port 23, but adapted to close said port by its forward end 30 when the chamber lining is drawn rearward. The chamber lining or shot retainer is so proportioned that it naturally tends to contract upon the shot and grip it with a sufficient degree of firmness to develop the resistance referred to, but is expanded as it moves forward to open the port and admit the shot. To thus control the chamber lining or shot retainer, the piston 31 carries a spreading pin 32 which enters the lining at the end of the forward stroke, as the piston, drives the lining forward to open the port and said pin expands the lining to admit a new shot; then, as the piston withdraws, the pin draws the lining rearward by friction, closes the port, and, on leaving the lining, permits it to contract and grip the shot.

To develop the fluid pressure for driving the shot, piston 31 is suitably housed in a cylinder 33, and provided with a trigger-released cocking or restraining connection and a suitable resilient impelling device with tensioning means as hereafter described. For structural considerations, cylinder 33, at its forward end, fits the false-barrel, carries the spacing and packing ring 19, and receives the inner end of the true barrel which fits a central aperture in the packing; while at its rear end, said cylinder fits the frame extension and is open to permit play of the resilient piston-driving member.

The piston is constructed with a packing 34 and a disk 35 secured to said packing by rivets 36. The disk 35 carries the pin 32 which projects through the packing to per-

form the functions already ascribed to it. Disk 35 is constructed with rearwardly projecting ears 37 perforated at 38 to receive the inturned ends 39 of the restraining and cocking rod 40.

The resilient device preferably comprises a helical spring 41, that is tensioned by compressing it from its rear end, while its forward end abuts against the restrained or cocked piston 31, which holds such compression until the piston is released, and the tension is expended in driving the piston forward in the cylinder.

Rod 40 is bifurcated and its members are spaced apart by the ears 37 a distance approximately the internal diameter of the coil spring 41 so that when the parts are assembled, the spring prevents the members of the rod from leaving the ears by which the rod is connected to the piston. Spring 41 is confined in the cylindrical portion 7 of the frame extension 5, and in the rear end of cylinder 33. It is tensioned from its rear end by the forward movement of an abutment 42; the latter carries a rack 43 by which rearward and forward movements are imparted to it; the rearward movement causing rod 40, piston 31, and spring 41 (relaxed) to move rearwardly, collectively, until the rod is cocked over a fixed sear 4<sup>a</sup>, where it remains, restraining the piston in readiness to resist the forward end of the spring, until after tensioning, and the rod is displaced from the sear for discharging the gun; the forward movement of the abutment causing it to move toward the piston and tension the spring by compression, and load the piston in readiness to drive forward when released. Thus it will be seen, that the piston 31 and the part 40 constitute two movable abutments for the spring, said abutments moving jointly, without tensioning the spring, for cocking and moving relatively, and compressing the spring for tensioning; the forward abutment (the piston) being restrained by the cocking, while the rear abutment is held forward by the operating lever to be described. Again, it will be seen that the work is put into one end of the spring and taken off at the other end.

Abutment 43 is guided by the spaced edges 44 of the cylindrical portion 7 of the frame extension 5, as shown in Fig. 9. Its engagement with bifurcated rod 40, is through its lateral slots 43<sup>a</sup>, which are entered by the rod—as the abutment is introduced between the members of the rod at an angle and then turned parallel to the rod. Shoulders or offsets 40<sup>a</sup> in the rod, limit the separation of the piston and abutment while permitting the abutment to work forward on the rod in compressing the spring.

46 represents the loading, cocking and tension lever which is designed to imitate



the corresponding portion of lever action guns. It is fulcrumed on the pintle 16 by its slot 47 and carries the trigger 48 fulcrumed at 49 and having a shoulder 50 which engages beneath the rod 40 when the parts are in firing position, and is thus adapted to raise the rod out of engagement with the head 4<sup>a</sup> of the fixed sear.

The operation of the gun is as follows:  
 By depressing the front sight 24, the true barrel 17 may be drawn outward sufficiently to open the end of the false barrel and permit introduction of shot to the magazine 20. The true barrel is then pressed inward until the sight 24 snaps into its slot and the gun will be ready for repeated firing. By pressing down the lever 46, the abutment 42 engaging shoulders 40<sup>a</sup>, is caused to draw the rod 40, piston 31, and spring 41, rearward until the rod 40 engages over the fixed sear 4<sup>a</sup>. As the spring is not compressed by this operation, the lever is moved in the forward direction with ease. After the rod is engaged with the sear, the lever is drawn rearward and upward to force the abutment 42 forward, and put the spring under compression. Inasmuch as the spring is compressed by a direct pull instead of by pushing with the back of the fingers in the lever, the loading action is greatly facilitated. On pressing the lever against the grip of the gun, the slot 47 permits the shoulder 51 to ride up over and engage behind the spur 52 and inasmuch as the lever is resisting the rearward movement of the abutment under the action of the spring, the lever will be held securely latched until forcibly moved downward. The spring thus serves a secondary purpose in addition to driving the piston. By pulling the trigger 48, the rod 40 is raised from the sear 4<sup>a</sup> and the piston drives forward, compressing the air in the cylinder 33 and developing pressure sufficiently to drive the shot through the bore. Since the trigger is carried by the lever, there can be no premature discharge of the gun. Inasmuch as the shot is gripped by the retainer 28, it will resist the air until considerable pressure is developed, whereupon the air will act expansively against the projectile and develop a very much greater velocity therein than would result merely from the forward movement of the piston imparted immediately to the projectile. The pin 32 enters the lining 28, and spreads it as the piston drives it forward to open the port for a new shot. Inasmuch as the lining is spread, the shot will move rearwardly under gravity, the muzzle of the gun being held slightly elevated, and will follow the pin as it withdraws until the retainer is permitted to clamp upon the shot. The friction between the pin and the retainer is sufficient to draw the latter rearward and close the port against the admission of another shot

until the gun is again discharged. The pin is flattened to avoid cutting off flow of air through the end of the bore. The lining is limited in its movements by a bead or projection struck from the metal of the true barrel in which the lining works.

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

1. In a gun, the combination of the stock member, the frame member, and a screw passing through the rear wall of the frame member into the stock member and drawing said members together; the abutting portion of each of said members being provided by faces at an angle to each other; the abutting faces on one member forming a reentrant angle, and those on the other member forming an external angle, whereby the members interlock to prevent relative transverse movement.

2. In a gun, the combination of the stock member, the frame member, and a screw passing through the rear wall of the frame member into the stock member and drawing said members together; the abutting portion of each of said members being provided by two faces meeting in a central vertical line; the faces of one member forming a reentrant angle or V-shaped groove and those of the other member forming an external angle or V-shaped projection.

3. In a gun, the combination of the reciprocating member, the fixed sear engaged by the reciprocating member, and the trigger for disengaging the reciprocating member from the sear, and means moving the trigger bodily out of reach of the reciprocating member during the cocking of the gun.

4. In a gun the combination of the frame, the frame extension fitted within the frame, the barrel member fitted over the frame extension, and means securing said parts in the relation described.

5. In a gun the combination of the frame, the frame extension fitted within the frame, and the barrel member fitted over the frame extension, having projections engaging the frame extension and fitted within the end of the frame to hold the parts in such engagement.

6. In a gun the combination of the frame, the frame extension, the barrel member fitting over and engaging with the frame extension and entering the frame to prevent disengagement, and the pintle securing the frame extension against longitudinal movement in the frame.

7. In a gun the combination of the frame, the frame extension having a cylindrical portion fitting within the frame, and movable endwise thereinto, and a downwardly extending portion, the barrel member fitted over the frame extension, and engaging therewith, and means interlocking the down-



ward extension of the frame extension with the frame to prevent relative movement of the parts.

8. In a gun the combination of the frame, the frame extension, the barrel member and the cylinder fitting the frame extension and said barrel-member.

9. In an air gun the combination of the false barrel, the true barrel, the spacing and packing rings fixing the position of the true barrel in the false barrel and the front sight carried by the true barrel and yieldingly projecting therefrom through an opening in the false barrel to prevent relative movement between the barrels.

10. In a gun, the combination of the frame, the frame extension constructed with a cylindrical portion fitted into the frame and with a downwardly extended portion projecting below the frame, and the barrel member fitted over the cylindrical portion of the frame extension and slotted to permit the downwardly extending portion of the frame extension to protrude therethrough.

11. In a gun the combination of the false and true barrels spaced apart to form a magazine chamber between them and the inclined disk surrounding the true barrel within the false barrel and constructed to leave a passage way, for shot, past the disk; the true barrel having an opening in position to receive the shot directed by the inclined disk.

12. In a gun the combination of the false barrel, the true barrel suitably spaced within the false barrel, and having an opening for the introduction of shot and the inclined member surrounding the true barrel and having an opening therein corresponding in position to the opening in the true barrel.

13. In a gun the combination of the magazine, the true-barrel provided with a chamber having a port to admit shot from the magazine, and the chamber-lining within the true-barrel, sliding therein to open and close said port and receiving the shot within it.

14. In a gun the combination of the magazine, the true-barrel provided with a chamber having a port to admit shot from the magazine, and the chamber-lining within the true-barrel, sliding therein to open and close said port, having an opening movable into and out of register with the port in the true-barrel, and receiving the shot within it.

15. In a gun the combination of the barrel having an expansible chamber into which the shot are introduced, and means expanding said chamber to permit introduction of the shot and then withdrawing to permit the chamber to grip the shot.

16. In a gun the combination of the barrel having an expansible chamber, an expanding pin adapted to enter said chamber and expand it to admit the shot; said chamber

being constructed to contract upon the shot as the expanding pin withdraws.

17. In a gun the combination with the barrel, having a port to receive the shot, the expansible chamber lining within the barrel, adapted when expanded to contain a shot, movable in the barrel to open and admit a shot from and then close said port, and the piston moving the chamber lining to open the port and having means for simultaneously entering said lining to expand it to receive the shot.

18. In a gun the combination with the barrel, having a port to receive the shot, the expansible chamber lining, adapted, when expanded, to contain a shot, movable in the barrel to open and admit a shot from and then close said port, and the piston moving the chamber lining to open the port and having means for simultaneously entering said lining to expand it to receive the shot; said expanding means moving said lining in the direction to close the port as the piston withdraws.

19. 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 expansible to admit the shot to the lining, and the piston carrying an expanding pin adapted to enter the chamber lining.

20. In a gun, the combination of a resilient device, two movable abutments for the resilient device, movable jointly for cocking the gun, and movable relatively for tensioning the resilient device, and a cocking means connected to one of the abutments and working through the other abutment; said cocking means being constructed with a shoulder which engages the abutment through which it works, to limit the separation of the abutments under the action of the resilient means, and having a sear-engaging end projecting beyond said shoulder.

21. In a gun, the combination of a resilient device, two movable abutments for the resilient device, movable jointly for cocking the gun and relatively for tensioning the resilient device, and a connecting rod fixed to one abutment, working over but confined against transverse displacement relatively to the other abutment and constructed with a shoulder intermediate of its ends to limit the movement of the connecting rod on said abutment and provide an extension of the connecting-rod through which it may be restrained in cocking the gun.

22. In a spring gun, a self-contained resilient device comprising two abutments constructed for movable introduction into the gun, a connecting rod fixed relatively to one of the abutments but working longitudinally relatively to the other abutment, and a spring surrounding the rod and confined between the abutments; the rod being constructed with a shoulder which engages



the abutment through which the rod works, on the side opposite the spring, to resist separation of the abutments under the action of the spring, and said rod being constructed with a sear-engaging end projecting rearwardly from said shoulder.

23. In a gun, the combination of a tensioning device with a lever slidably mounted normally lying along the stock, and a connection between the two whereby when the lever is pulled toward the user and its normal position, the tensioning device is moved in the direction to develop tension; said lever having a latch engaging and disengaging by a movement of the lever under the influence of or in opposition to the tensioning device.

24. In a gun the combination of the piston, releasable restraining means automatically becoming effective when the piston is moved rearward, a spring for driving the piston forward, a spring abutment movable to compress the spring, and a lever engaging the spring abutment; said lever carrying a trigger brought into releasing relation to the piston restraining means, by the movement of the lever which imparts compressing movement to the spring abutment.

25. In a gun the combination of the air driving piston, the restraining rod connected thereto, the sear with which said rod engages when the piston is moved rearward, the spring for driving the piston, the abutment for compressing the spring, the lever for moving said abutment and a trigger carried by said lever and brought into releasing relation to the rod by the movement of the lever which compresses the spring.

26. In a gun, the combination with the piston, the spring abutment, the spring located between the piston and the abutment, the sear for restraining the spring, and the cocking and abutment-limiting-rod connected with the piston, working through the abutment, offset intermediate of its ends to provide a shoulder engaging said abutment in the direction to limit the separation of the abutment from the piston and having a sear engaging end beyond said offset.

27. In a gun the combination of the spring driven piston, the spring tensioning abutment, the fulcrumed lever for moving said abutment and the retaining latch for said lever; said lever being movable to shift its fulcrum point in the direction to release and engage the latch and being held in the direction of engagement with said latch, by the pressure of the piston spring.

28. In a gun, the combination of the piston, the spring for driving the piston, the abutment for said spring, and the double rod connected with the piston, having its members working through slots in the abut-

ment, and constructed with deflections forward of its rear end forming shoulders to limit the movement of the abutment relatively to the rod, in the direction of cocking, and having its said members united in the rear of said deflections to provide an engaging end.

29. In a spring actuated air gun, the combination of the cylinder, the piston working in the cylinder, the spring for driving the piston, the abutment for said spring, the rod connected to the piston, working through the abutment, and extending beyond the abutment, a rack bar carrying the spring abutment, having guiding and confining bearings in the gun which permit it to slide in the direction of cocking the plunger and tensioning the spring, and a lever having a toothed segment engaging the rack bar and by its respective movements, sliding the rack bar to first cock the gun and then tension the spring.

30. In a spring actuated air gun, the combination of the cylinder, the piston working in the cylinder, the spring for driving the piston, the abutment for the spring, the rack bar having confining and guiding bearings in the gun and carrying the spring abutment, the bifurcated piston rod connected with the piston, extending through the spring and having guiding bearings in the plunger and embracing the opposite sides of the rack bar, and the operating lever having a toothed segment engaging the rack bar by its respective movements, first cocking the piston and then tensioning the spring.

31. In a gun, the combination of the frame, the frame extension, the barrel member fitted over and engaging with the frame extension, a cocking lever and the pintle for the cocking lever passing through the frame and frame extension; said frame extension extending at an angle to the axis of the gun, from said pintle to the barrel, forming a brace for the assembled parts.

32. In a gun, the combination of a frame having a downward projection, a cocking lever, a pintle by which said cocking lever is fulcrumed in said projection, a frame extension secured to the frame projection by means of said pintle and extending forwardly and upwardly therefrom and a barrel secured to the frame extension and braced by the angular portion of said frame extension.

The foregoing specification signed at Springfield Massachusetts this 20th day of June, 1907.

ELBERT HAMILTON SEARLE.

In presence of—  
THOMAS C. MAHER,  
JOSIAH DEARBORN.