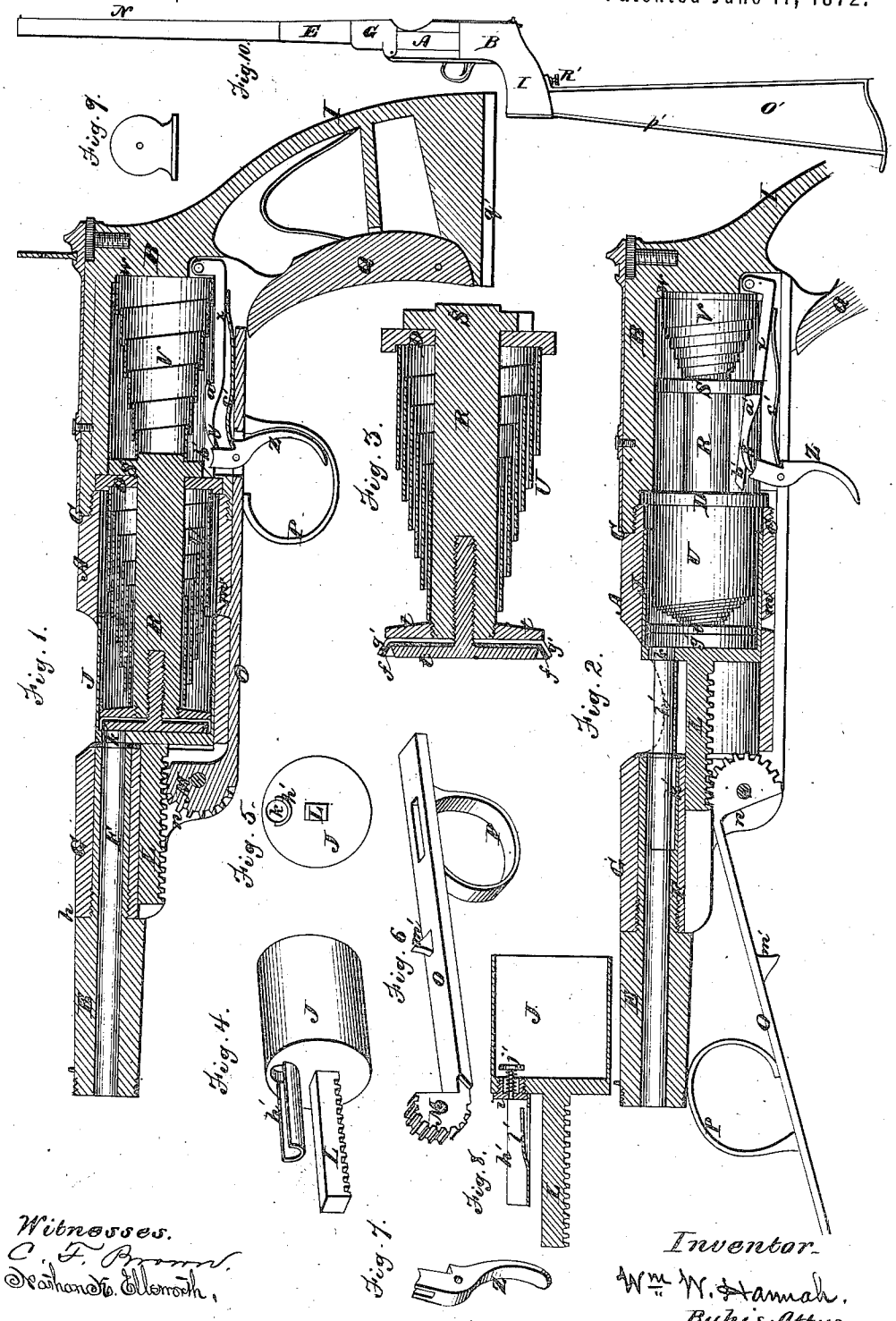
WILLIAM W. HANNAH.

Improvement in Spring-Guns.

No. 127,873. Patented June 11, 1872.



Witnesses.
C. F. Brown.
Heathcote & Ellsworth.

Inventor.
Wm. W. Hannah.
By his Attys.
Hill & Ellsworth.

UNITED STATES PATENT OFFICE.

WILLIAM W. HANNAH, OF HUDSON, NEW YORK.

IMPROVEMENT IN SPRING-GUNS.

Specification forming part of Letters Patent No. 127,873, dated June 11, 1872.

To all whom it may concern:

Be it known that I, WILLIAM W. HANNAH, of Hudson, in the county of Columbia and State of New York, have invented a new and Improved Gun; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a longitudinal section of an air-pistol constructed in accordance with my invention. Fig. 2 is a similar view, showing the application of the cartridge-carrier when the pistol is used as a fire-arm. Fig. 3 is a detached sectional view of the piston and mainspring. Fig. 4 is a detached perspective view of the sliding cylinder, in which the piston operates. Fig. 5 is a front elevation of the same. Fig. 6 is a perspective view of the pinion and lever by which the cylinder is operated and locked in position when the gun is charged. Fig. 7 is a perspective view of the trigger. Fig. 8 is a longitudinal section of the sliding cylinder, showing the cartridge-carrier, retractor, and firing-pin. Fig. 9 is a detached view of the rear sight. Fig. 10 is a side view of the instrument with a stock attached for firing from the shoulder.

Similar letters of reference in the accompanying drawing denote the same parts.

My invention has for its object, first, to provide for public use a pistol or gun which is capable of being employed either as a fire-arm or as an air-gun; secondly, to render the operation of the mainspring more uniform, reliable, and powerful; thirdly, to improve the construction of the lock so as to render the action of the trigger uniform whatever may be the compression and force of the mainspring; fourthly, to provide a convenient attachment for converting the arm into a gun or pistol at will.

To the accomplishment of these ends the invention consists, first, in the employment of a sliding block immediately behind the barrel, operated by spring power, and capable of being used as the pneumatic piston when the instrument is employed as an air-gun, and as the hammer or plunger when the instrument is employed as a fire-arm. It consists, secondly, in the attachment of a guide-rod to said piston, extending back through the center of the chamber that contains the mainspring, and through the wall at the end of said chamber, on the rear side of which it is provided with a head or other suitable means for attaching a supplemental spring. It consists, thirdly, in the employment of a supplemental mainspring, arranged in a chamber behind that which contains the principal mainspring. It consists, fourthly, in encompassing the piston and a portion of the mainspring with a sliding cylinder, operated by a rack and pinion, and so constructed that when retracted it cocks the gun and opens the breech to receive the cartridge or dart, and when thrown forward again it closes the breech and leaves the gun ready to be discharged. It consists, fifthly, in so adjusting the piston-rod above described with relation to the front of the cylinder when closed, to the rear wall of the main chamber, and to the head or other part which receives the force of the supplemental spring, that when the piston is thrown forward by the force of the springs the head upon its rear end will arrest its movement at the instant the piston reaches the end of the cylinder, and thereby prevent injury to the latter. It consists, sixthly, in the improved construction and arrangement of the parts composing the lock. It consists, seventhly, in an improved device for locking the cylinder in firm contact with the breech of the gun when loaded and ready to be used as a fire-arm. It consists, eighthly, in attaching a cradle or holder to the end of the cylinder, to be used for guiding and carrying the dart or cartridge into the breech of the barrel. It consists, ninthly, in constructing said cradle in such a manner that it will not only operate to carry forward but to retract the cartridge or its shell. It consists, tenthly, in the combination of a spring firing-pin with the sliding cylinder.

In the accompanying drawing the breech of the pistol is shown, composed of two hollow cases, A B, screwed together at C, so as to hold a guide-partition, D, between them and form separate chambers. E is the barrel, turned down at its rear end to form a sleeve, F, which is let into the part G of the case A and forms a lining for the same, the two being screwed together at the shoulder *h*. I is the handle, which may be cast or otherwise formed upon the case B. J is a short cylin-

der, placed within the chamber A so as to slide freely therein in close contact with its sides. The front end of this cylinder is closed with the exception of a circular opening, *k*, near its upper side, corresponding to and in line with the bore of the barrel. L is a rack formed upon the head of the cylinder, and extending through the front of the chamber A, beneath the barrel, where it engages with a pinion, M, pivoted between ears *n* upon the under side of the part G. O is a lever, formed upon the pinion, and carrying the trigger-guard P. When not in operation it extends along the under side of the two chambers, fitting over the trigger, and is locked in place by a spring-catch, Q, pivoted within the handle of the pistol, as shown, to hold the cylinder forward against the barrel. R is a rod or block placed within the cylinder J, and extending through the partition D, at the rear of which it is formed with a button or head, S. The front end of the stem within the cylinder carries a piston composed of two heads, *t*, between which is clamped a suitable packing, to be hereinafter described. U is a volute or spiral spring, fitted around the stem, between the piston and partitions D, and constitutes the mainspring of the instrument. V is a supplemental mainspring, placed within the chamber B, and similar in form and construction to the spring U. The front end of the supplemental or re-enforcing mainspring fits over a shouldered projection upon the head S of the stem, and its rear end enters a shouldered recess, *w*, at the end of the chamber. By this provision it is held in position against lateral displacement. The rear end of the mainspring U is also held in place within a recess of the partition D for the same purpose. The piston and head S are so disposed upon the rod that when the piston is thrown forward by the force of the springs the head and partition D will arrest its movement at the instant it reaches the front end of the cylinder, and prevent injury to the latter. The lock of the instrument is composed of a detent, *x*, pivoted within the chamber B, in rear of the supplemental spring, and extending forward beneath the same, so that its points *y* shall come in contact with the trigger *z*. The detent is further formed with a beveled shoulder, *a'*, upon its upper side, in rear of the points *y*, and with an arm, *b'*, extending forward between the points.

To prepare the arm thus far described for firing, the operation is as follows: The lever O is released from the catch Q by pressing the latter within the handle. It is then swung forward, and the pinion and rack move back the cylinder and piston within the chamber A, compressing the springs until the edge of the head S catches over the shoulder *a'* of the detent, when the latter is thrown up by a spring, *c'*, so that the points *y* shall rest upon the upper end of the trigger *z*, as shown in Fig. 2, which operation cocks or sets the piece for firing. A suitable dart is then inserted within the barrel, being introduced through an opening made in the top of the chamber A for this purpose. The lever is now swung back to its place, carrying the cylinder again forward, but leaving the piston and rod set fo firing, as above described.

To discharge the pistol the trigger is drawn backward until the points *y* of the detent slip off its upper end, when the piston is thrown forward by the mainsprings, driving the air from the cylinder through the small opening *k* to project the dart from the barrel. Inasmuch as the shoulder of the detent is held in contact with the head S solely by the trigger, it is evident that when the support of the latter is withdrawn the piston will be thrown forward. This, however, would not be the case if the shoulder *a'* was not beveled, because the detent would then have to be moved down by a force other than that of the mainsprings. By beveling the shoulders, however, the detent is easily thrown down to release the head by the force of the mainsprings when the trigger support is removed. By this construction the action of the trigger is rendered uniform whatever may be the compression or force of the mainsprings.

To remove the supplemental mainspring the sides of the handle I are first taken off in the manner common to ordinary pistols. The spring is then compressed by hand to clear it from the recess *w*, and removed through the open side of the chamber.

The piston packing consists of two flexible disks of greater diameter than the cylinder, the one, *f'*, being composed of thin rubber, and the other, *g'*, of some membranous substance or skin impervious to air. They are clamped between the piston-heads and bent forward around the edge of the front head, as shown in Fig. 2, so that the thin disk *g'* shall bear against the cylinder. When the piston is driven forward by the mainsprings the bent edges of the packing are expanded by the air and thereby prevent the escape of the latter around the heads *t*. The thin disk *g'* acts as a lubricant to reduce the friction due to the contact of the piston and cylinder; but if used without the rubber disk it would be as liable, on account of its thinness, to bend inward against the head by the pressure of the air as to bend outward against the cylinder. It is also liable to warp and wrinkle, and therefore become inoperative. These difficulties, however, are overcome by the employment of the rubber disk, whose tendency is to spring outward and hold the thin disk against the cylinder at all times. The adhesion and expansive quality of the rubber prevents the thin disk from wrinkling or warping, while the same qualities render the rubber disk unsuitable to be employed alone.

h' is a concave holder or cradle attached to the front of the cylinder immediately beneath the opening *k*, as shown in Figs. 4 and 5, which cradle is employed to feed a dart or cartridge into the end of the barrel. I also form a retractor to remove the shell of an exploded

cartridge, by cutting out a thin strip, *v'*, from the cradle, whose free end shall bear against the flange of the cartridge-shell and withdraw it when the cylinder is moved back. The retractor does not interfere with the movements of the dart, nor is it affected by the explosion of the cartridge.

To permit the cradle to feed the dart or cartridge into the barrel I form a recess in the part G of the breech immediately beneath the end of the barrel, as shown at *k'*, Fig. 2. If desired the cradle may be formed directly upon the rack L, as involving less labor in its construction.

To convert the air-gun into a fire-arm I screw a short cup, *i*, carrying a spring firing-pin, *j*, into the opening *k* of the cylinder, as shown in Fig. 8; and to hold the cylinder forward I form a beveled toe, *m'*, upon the upper side of the pinion-lever O, which, when said lever is locked in place, passes through the bottom of the chamber A and bears against the rear edge of the cylinder, as shown in Fig. 1. The cartridge is introduced through the top opening in the chamber A the same as the dart, and is exploded by the piston striking the firing-pin, as will be readily understood. A suitable sight is arranged at the breech of the pistol, and may be either a plain open sight or a "globe sight," as shown in Fig. 9.

To convert the instrument into a gun to be fired from the shoulder, I screw a long tube, N', onto the pistol-barrel E, and attach a skeleton stock, O', to the handle I by slipping the lower arm *p* of such stock into a beveled recess, *q'*, formed in the end of the pistol-handle, and securing it in place by a thumb-screw, R', inserted in the pistol-handle through the upper arm of the stock, as shown in Fig. 10.

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

1. A breech-loading pistol or gun capable of being employed either as a fire-arm or as an air-gun, substantially in the manner herein shown and described.

2. The breech-loading air-gun or fire-arm, constructed with the chambers A B carrying, respectively, the barrel and handle, and adapted to screw together and clamp the recessed guide-partition D between them, substantially as described, for the purpose specified.

3. The supplemental re-enforcing mainspring V arranged in a chamber, B, behind the principal mainspring, substantially as described, for the purpose specified.

4. In combination with the head S of the guide-rod R and with the recess *w* in the chamber B, I claim the removable supplemental mainspring V, substantially as described, for the purpose specified.

5. The sliding cylinder J, operated within the chamber A by a rack and pinion, so that when retracted it cocks the gun, sets the springs, and opens the breech to receive a dart or cartridge, and when thrown forward again it closes the breech and leaves the gun ready to be discharged, substantially as described.

6. In combination with the chamber A and the piston, I claim the cylinder J, rack L, and lever-pinion M O, substantially as described, for the purpose specified.

7. In combination with the cylinder J and pinion-lever O, I claim the locking toe *m'*, substantially as described, for the purpose specified.

8. I claim the locking mechanism, consisting of the trigger *z*, spring *c'*, and the pivoted detent *x*, constructed with the beveled shoulder *a'*, the points *y*, and the arm *b'*, substantially as described, for the purpose specified.

9. In combination with the trigger and the head S of the piston-rod, I claim the detent *x a' b'*, substantially as described, for the purpose specified.

10. In combination with the sliding cylinder J, I claim the cradle *h'* and the spring firing-pin *j'*, substantially as described, for the purpose specified.

11. The retractor *l'*, formed by a spring upon the cradle, substantially as described, for the purpose specified.

12. The firing-pin, operated to explode a cartridge by the same piston used to project the dart when the instrument is employed as an air-gun, as herein shown and described.

WM. W. HANNAH.

Witnesses:

E. A. ELLSWORTH,

NATHAN K. ELLSWORTH.