

(No Model.)

T. HARDING.

SPRING GUN.

No. 379,782.

Patented Mar. 20, 1888.

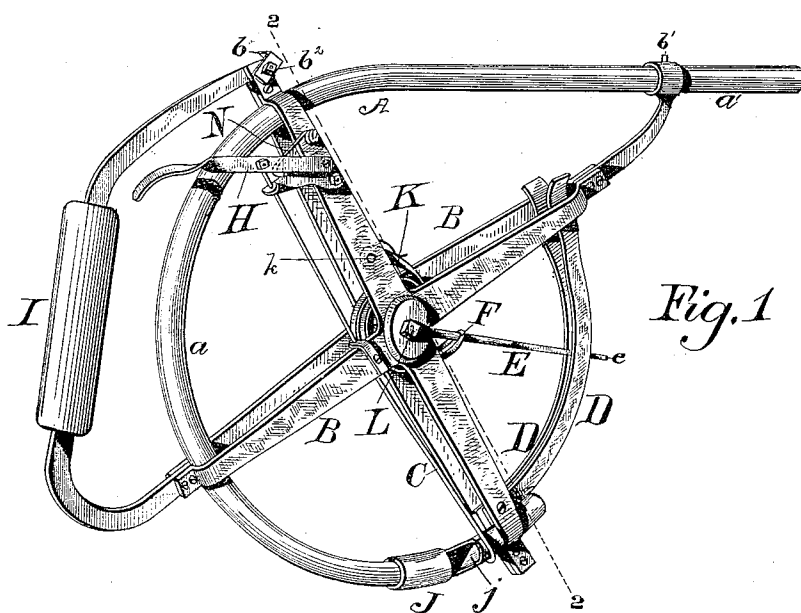


Fig. 1

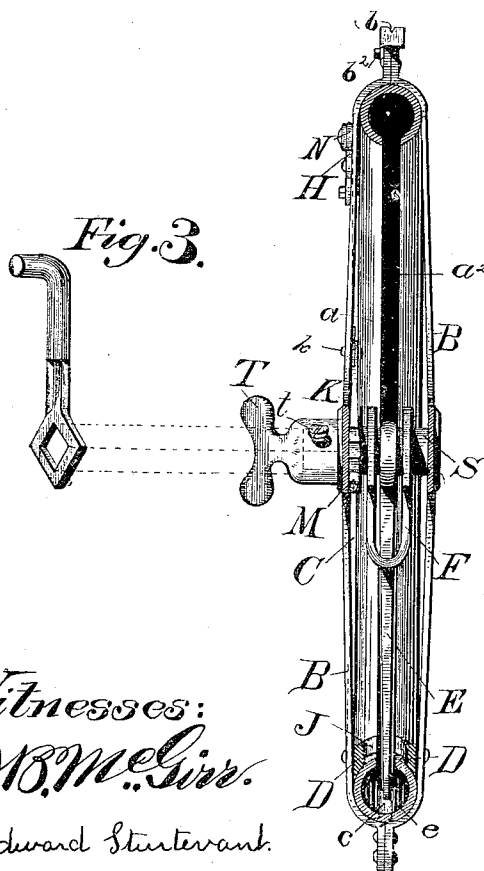


Fig. 2.

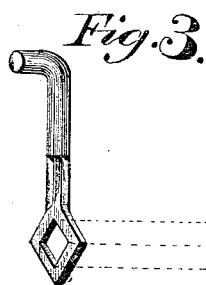


Fig. 3.



Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS HARDING, OF DETROIT, MICHIGAN.

SPRING-GUN.

SPECIFICATION forming part of Letters Patent No. 379,782, dated March 20, 1888.

Application filed October 11, 1887. Serial No. 251,979. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HARDING, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Spring-Gun, of which the following is a specification.

The object of my invention is to provide a spring-gun of considerable power, and adapted for firing bullets or shot-cartridges, which shall at the same time be simple of construction, easy of operation, and effective in range and accuracy.

My invention comprises, essentially, a tube, bent to form the arc of a circle, slotted on its inner side, and terminating in a straight barrel. This tube is held in a clamping-frame of suitable shape to furnish a stock and bearings for the moving parts by which the missile is propelled. The propelling-lever is mounted loosely upon a shaft situated at the center of the arc in which the tube is bent and journaled in the clamping-frame. The lever is radial to the arc of the tube, and extends into the interior of the latter through the said slot. It is free to be revolved around its supporting-shaft, the clamping-frame being so constructed as not to obstruct this movement. A spiral spring, as strong as may be desired, is secured at its inner end to the shaft, and is adapted to bear against the lever, throwing it when it is compressed against the lever, and the latter released, around the arc of the tube with great velocity. When thus thrown, the lever carries with it, by its outer propelling end, any missile with which the tube may have been charged, and expels it in a straight line through the straight portion of the tube.

With the parts above described are combined a catch and trigger for holding and releasing the propelling-lever, and means for charging the tube conveniently with the missile.

In order to make my invention more clearly understood, I have shown in the accompanying drawings a means for carrying it into effect.

In said drawings, Figure 1 is a perspective view of a spring-gun embodying my invention. Fig. 2 is a transverse section of the same on line 2 2, Fig. 1, with the parts in a somewhat different position. Fig. 3 is a view of a removable winding-crank. Fig. 4 is a per-

spective view of one-half of a cartridge-shell which I prefer to use to carry a charge of shot.

Referring to the drawings, A indicates the tube, of which the portion *a* is bent into an arc of a circle and the portion *a'* is straight and forms the barrel of the gun. The portion *a* is slotted on its inner side, as shown at *a*², which slot terminates, preferably, at the rear end of the barrel, and the latter left undivided to strengthen the tube and prevent the scattering of a subdivided charge.

B is a clamping-frame arranged to hold the tube, so as not to cross the slot *a*². The frame is provided with a stock, I, adapted to be grasped by the right hand.

b b' are sights, the former of which is adjustable by a set-screw, *b*², in the construction shown.

The pieces of the frame preferably cross each other, and at their intersection bearings are provided for the transverse shaft S. Loosely mounted on said shaft and extending radially outward is the propelling-lever E, the missile-driving end *e* of which is situated within the tube *a* when in operation. The lever is adapted to make a complete revolution about the shaft S, under the force of the propelling-spring F. This spring may be formed and attached in various ways, so as to be effective, without departing from my invention. I prefer the arrangement shown, in which a two-part or double spiral spring engages by its bight the lever S and is attached at each end to the shaft E, the two coils of the spring being situated one on each side of the lever. The spring may be compressed or set either by turning the lever backward or by holding the spring stationary and turning the shaft forward. In practice I prefer the latter method and have devised appliances for conveniently turning or winding up the shaft, and for retaining it in the wound-up position until it is desired to discharge the gun.

M is a ratchet-wheel secured rigidly to the shaft S, and K a spring-pawl pivoted to the frame B at *k*, and adapted to engage said wheel and hold it from rotation in a backward direction.

In Fig. 2 the shaft is shown as provided with a cross-head by which it may be turned to wind up the spring. This head T may be

kept in place by the set-screw *t* engaging the squared end *L* of the shaft, or the head may be simply applied to the end *L* after a discharge, the spring wound up, and the head then removed before the next discharge and placed in the pocket. In Fig. 3 I have shown a crank adapted to be similarly used.

J is a slide upon the part *a* of the tube, by which may be closed or uncovered an opening, *j*, in said part, through which the bullet may be inserted or the cartridge, when shot is used, put in place. In the rear (to the right hand in Fig. 1) of this slide, which is slotted to permit the passage of the lever *E*, is situated the catch by which the lever is held in position ready for discharge. In the construction shown it consists of the end *c* of a rod, *C*, mounted and adapted to slide in bearings upon the frame *B*, so as to bring said end *c* into the path of the lever *E* or remove it out of said path. The former movement is effected by a spring, *N*, acting upon the rod *C* through the medium of a trigger-lever, *H*, which tends to raise and hold up said rod, bringing its turned-up end *c* through an aperture in the outer side of the tube portion *a*. The latter movement is effected by the downward pressure of the thumb or finger (in the construction shown it would be the thumb) upon the trigger *H*.

In order to arrest the lever *E* as soon as it has imparted the necessary velocity to the missile, I provide a friction-buffer, which effects the purpose without shock.

D D are spring-bars secured to the frame and situated one upon each side of the path of said lever and at a distance less from each other than the thickness of the part *E* where it comes in contact with the bars, so that the lever can pass in between said bars only by pressing them outward. The bars *D* diverge at their upper ends to insure that the lever shall be guided into the narrow space between them, and they should be of such stiffness, compared with the strength of the spring *F* and the velocity which the lever acquires, as to arrest the latter completely before it reaches their lower ends. I prefer to locate the bars *D* at such point that they will not be encountered by the lever till it has carried the missile into the straight portion *a'* of the tube and has passed out of the slot *a*². The maximum velocity capable of being imparted by the spring is thus given.

The operation of my invention is as follows: The shaft *S* is turned forward as many revolutions as may be necessary to store the desired power in the spring *F*, and is held by pawl *K* and ratchet *M*. This operation will bring the lever *E* into position just behind the catch *c*, or it may be so placed by hand. A cartridge is now introduced through the opening *j* and the slide *J* replaced. The sight *b*

having been previously adjusted to the desired range, the gun is now ready for a discharge, to effect which the stock *I* is grasped by the hand, the piece leveled, supported by the left hand near the muzzle or not, as may be preferred, and the trigger *H* depressed by the thumb. This disengages the stop or catch *c* from the lever *E*, whereupon the latter flies around the portion *a* of the tube with great force and velocity, expels the missile, and is caught and arrested by the friction-bars *D*.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a spring-gun, the combination of a tube formed in an arc of a circle and having a peripheral slot, a frame secured thereto, a lever pivoted to the frame at the center of said arc and extending through the slot into the tube, and a spring mounted on the frame and adapted to engage and propel the lever.

2. In a spring-gun, the combination of a tube formed in an arc of a circle and having a peripheral slot, a frame secured to the tube, a central shaft mounted in the frame and provided with a ratchet-and-pawl connection with the frame to prevent backward rotation, a spring secured to said shaft, and a lever mounted at the center of said arc, adapted to be engaged and propelled by the spring and extending into the tube.

3. In a spring-gun, the combination of a tube formed in an arc of a circle and having a peripheral slot, a frame secured to the tube, a lever mounted pivotally at the center of said arc and extending into the tube, a spring connected with the frame and adapted to engage and propel said lever, and a friction device operating as a buffer or cushion to stop the lever after it has propelled the missile.

4. In a spring gun, the combination of a tube formed in the arc of a circle, a frame secured thereto, a spring connected with the frame, and a lever mounted pivotally on the frame at the center of said arc, adapted to be engaged by the spring and extending into the tube for propelling a missile through and from the tube under the stress of the spring.

5. In a spring-gun, the combination of a tube formed in the arc of a circle, a frame secured to the tube, a lever pivoted upon the frame at the center of the said arc and extending into the tube, and a double spiral spring having its ends connected with the frame, situated upon both sides of said lever and engaging by its bight the said lever.

Witness by hand this 3d day of October, 1887.

THOMAS HARDING.

Witnesses:

EDWARD MCCLURE,
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