# T. POWERS.

## RIFLING MACHINE.

No. 37,054. Patented Dec. 2, 1862.

Fig: 1

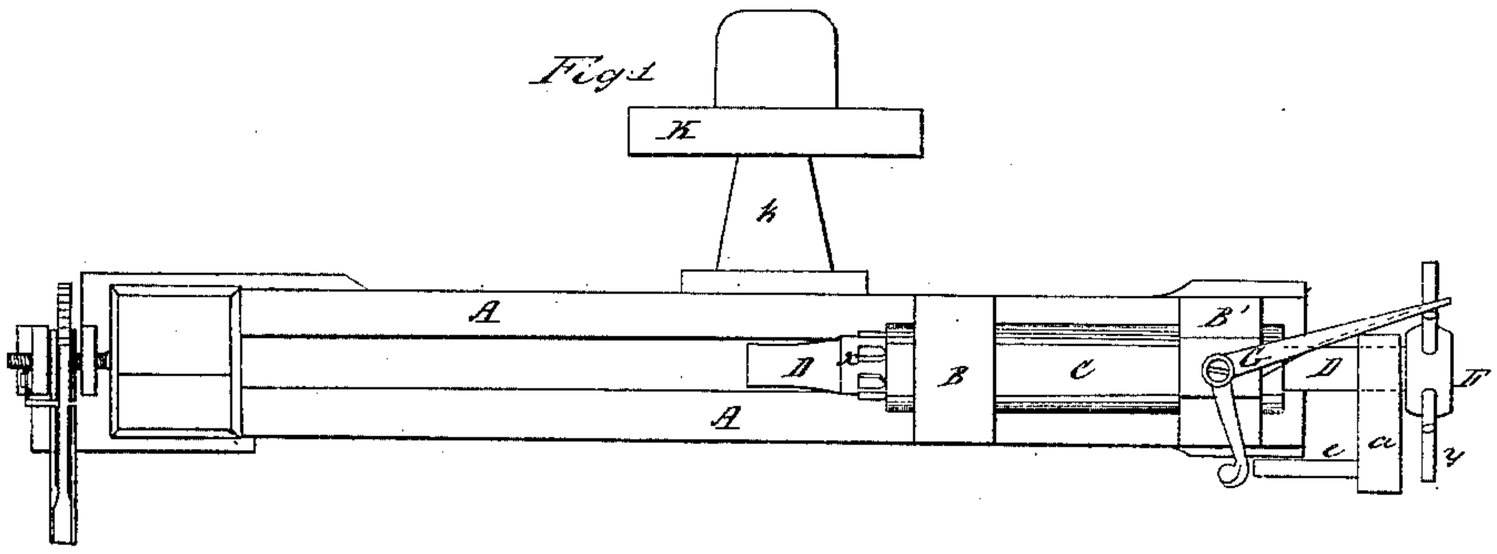



Fig: 5

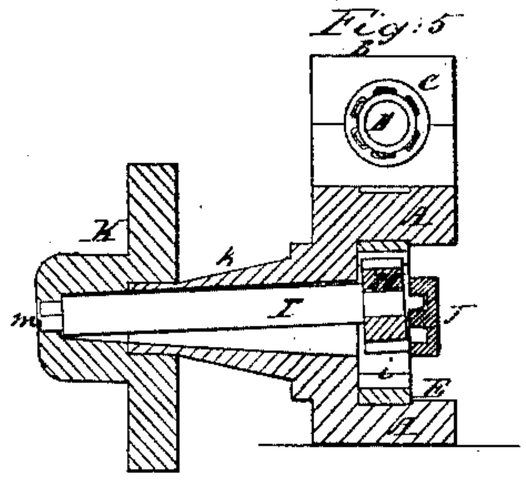



Fig: 2

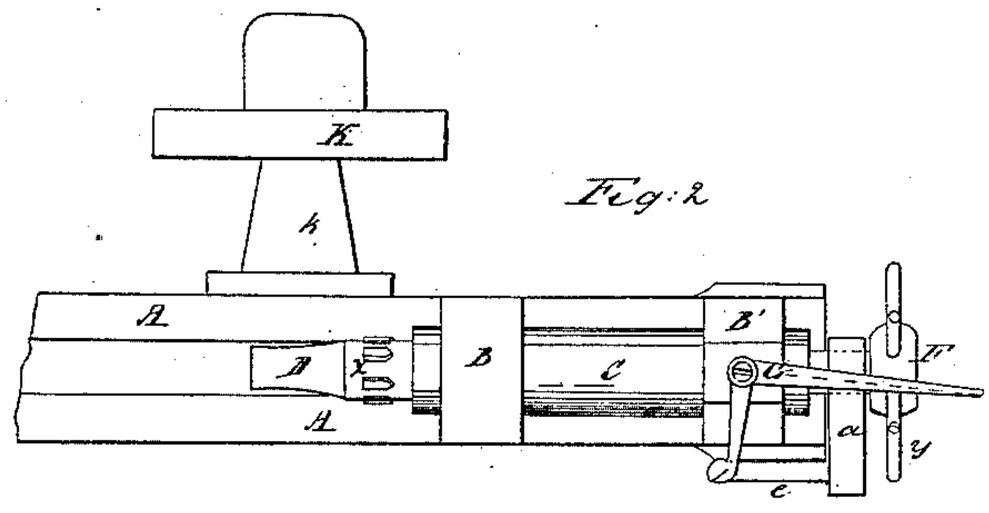



Fig: 3

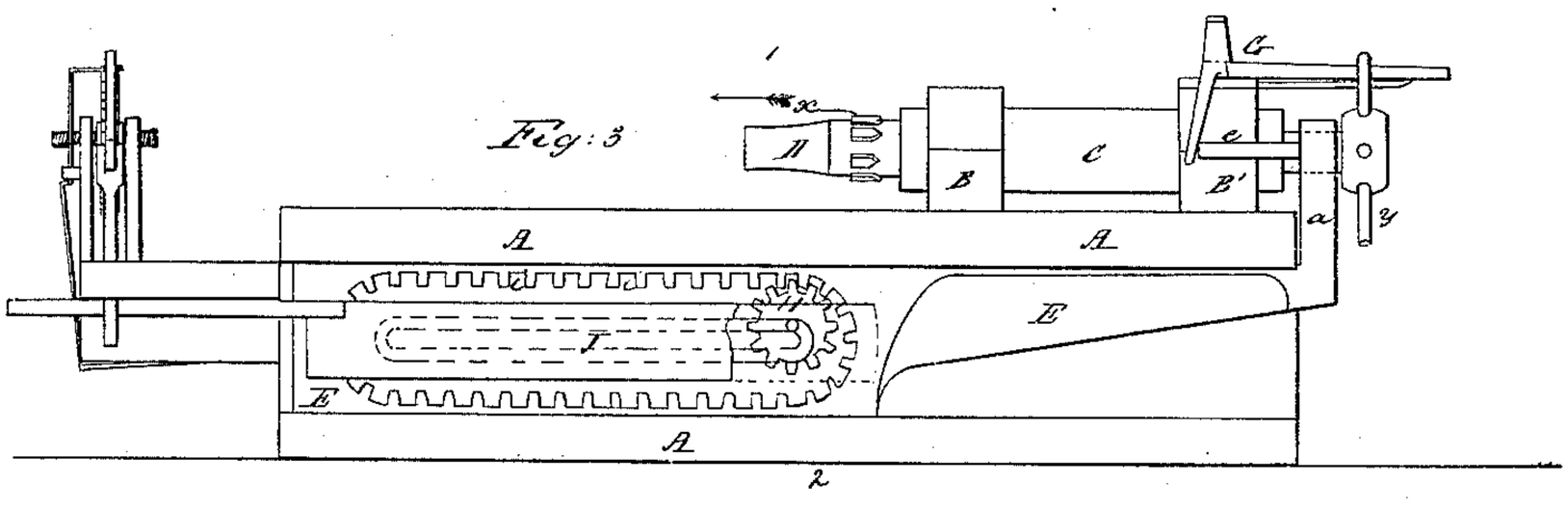
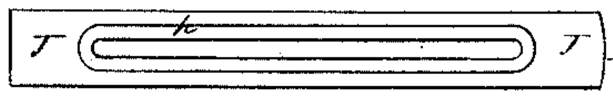



Fig: 4




Witnesses

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# UNITED STATES PATENT OFFICE.

TITUS POWERS, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN RIFLING-MACHINES.

Specification forming part of Letters Patent No. **37,054**, dated December 2, 1862.

*To all whom it may concern:*

Be it known that I, TITUS POWERS, of Philadelphia, Pennsylvania, have invented certain Improvements in Rifling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists of novel mechanism, fully described hereinafter, for imparting to the rods of machines for rifling the barrels of fire-arms, the desired reciprocating motion and intermittent rotating motion.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which forms a part of this specification, Figure 1 is a plan view of my improved rifling-machine; Fig. 2, a part of Fig. 1 with the moving parts in a different position; Fig. 3, a side view; Fig. 3, a side view; Fig. 4, a detached view of part of Fig. 3; and Fig. 5, a transverse section on the line 1 2, Fig. 1.

Similar letters refer to similar parts throughout the several views.

A is the base or frame of the machine, and near one end of the base are projections B and B′, to which is secured a tube, C, the latter having on inside as many spiral grooves as it is desired to cut in the barrel submitted to the machine. In the tube C a piston or plunger, D, is arranged to fit snugly, as well as to turn and slide to and fro freely, the rear end of this plunger being so connected to a projection. *a*, on a reciprocating frame, E, as to turn therein, but without being able to move horizontally independently of the frame, which is arranged to slide in guides formed in the frame or base-plate A. To the extreme rear end of the plunger D is secured a hub, F, from which radiate as many arms *y* as there are spiral grooves in the interior of the tube C. A bell-crank lever, G, is hung loosely to a pin on the projection B′ of the frame, the straight arm of this lever being arranged to act on one or other of the arms *y* on the hub F during the movement of the machine, the bent arm of the lever to be acted upon by a pin, *e*, on the projection *a* of the reciprocating frame E, as more fully described hereinafter. A light spring bearing against the straight arm of the lever G tends to restore the latter to the position shown in Fig. 1, when the bent arm is relieved from the pressure of the pin *e*. In this reciprocating frame E is an elongated opening with semicircular ends, and throughout the interior of this opening are arranged teeth *i*, forming an upper and lower rack, one rack being rendered a continuation of the other by teeth arranged on the semicircular ends of the openings. Into these teeth gear the teeth of a pinion, H, secured to the shaft I, the front end of which is arranged to turn and traverse in a groove, *h*, formed in the inside of the plate J, which is secured to the front of the reciprocating frame E. The groove *h*, the form of which will be best observed on reference to Fig. 4, is composed of two longitudinal recesses, between which a communication is formed at each end by semicircular recesses, and these recesses are so arranged in respect to the teeth of the reciprocating frame that the teeth of the pinion H (guided, as the shaft I is, by the recesses or grooves of the plate J) are always maintained in gear with the said teeth of the frame. For instance, when the end of the shaft I is turning in and transversing the upper portion of the groove *h*, the teeth of the pinion are in gear with the upper teeth in the opening of the frame E, and when the end of the shaft turns in the lower portion of the groove *h*, the teeth of the pinion are in gear with the lower teeth in the opening of the frame. In like manner, when the shaft is traversing the semi-annular communication between the upper and lower portions of the groove *h* the teeth of the pinion are in gear with the teeth arranged at one or other of the semicircular ends of the opening of the frame, to which a reciprocating motion must consequently be imparted by the pinion as the latter revolves. The shaft I passes through a hollow projection, *k*, at the rear of the base or frame A, and on the end of this projection turns a pulley, K, in a square opening, in which the square end *m* of the shaft I fits loosely. The pulley K thus remains as it revolves in the same vertical plane, while the shaft I is permitted to vibrate vertically at the end to which the pinion is secured when the said pinion is in the act of moving from the upper to the lower teeth of the frame E, and vice versa. It will be seen that there are six projections near the front end of the plunger

or piston D, these projections being pointed at the rear end and arranged to fit into the six spiral grooves on the inside of the tube C. The rifling-rod, which is of the usual construction and provided at the outer end with the ordinary adjustable rifling-tool, is secured to the front end of the plunger D, the barrel to be operated on being secured to the base of the machine in such a position that the tool of the rifling-rod acts upon the barrel throughout the whole length of the bore.

On reference to Fig. 2 it will be observed that the reciprocating frame E has reached or very nearly reached the limit of its forward movement, the cutting-tool of the rifling-bar having been consequently projected through the front end of the barrel, and the projections *x* on the plunger D having passed from the grooves of the tube C. Prior to the plunger arriving at this position, however, and as it was in the act of moving in the direction of the arrow, and the projections *x* had just and only just escaped from the grooves of the tube C, the pin *e* of the reciprocating frame E had been brought in contact with the bent arm of the bell-crank lever G, the straight arm of which had been thereby caused to act on one of the arms *y* of the hub F, and to turn the plunger D round to the extent of one-sixth of a complete revolution, so that on the movement of the plunger D in the direction contrary to that pointed out by the arrow the projections *x* will not traverse those grooves of the tube along which they had previously passed, but each projection will enter the groove next to that which it had previously traversed. It will be seen therefore without further description, that the tool of the rifling-rod having cut one spiral incision in the barrel will, during its next movement, cut another incision at a distance from the first, and the cutter will thus pass round the interior of the barrel, continuing to cut the spiral grooves at such a distance from each other and with such a twist or inclination as may be determined by the grooves in the tube C. When six spiral incisions have been thus made in the bore of the barrel, the cutter has to be so altered as to take a deeper cut during its next six movements, and this alteration must be continued until the grooves have been cut to the desired depth and width. This alteration of the cutter may be effected by a variety of devices common to other rifling-machines, and so well known to those familiar therewith that description here has been deemed unnecessary.

The device for imparting a reciprocating motion to the frame E and to the plunger D attached thereto, possesses features in some respects analogous to what is known in mechanism as the "mangle-wheel" motion. There is this difference, however, that the teeth of the frame are arranged in the interior of an opening instead of on the exterior of a longitudinal projection on the object to which the reciprocating motion has to be imparted, as in the ordinary mangle-wheel. In the latter case the vertical vibrating movement of the outer end of the driving-shaft must be at least equal to the diameter of the pinion, while in my arrangement the vibrating movement should be about equal to double the depth of the teeth. Consequently the device is rendered more light, simple, and compact than the ordinary mangle-wheel, and is consequently especially well adapted to take the place of the usual cumbrous crank motions generally used for imparting a reciprocating motion to rifling-rods, the main objection to the crank being the difference in speed with which it moves the rod at different points of the stroke of the crank, an evil obviated by improved method of driving the reciprocating frame, the speed of which is uniform throughout.

Instead of making the tube C stationary, I propose in some instances to allow it to revolve, in which case the projections *x* of the plunger will always traverse the same grooves in the tube.

It will be evident that by securing the hub F to the tube the latter may be caused to revolve to the extent of one-sixth of a revolution by means of the reciprocating frame E and bell-crank lever G, the result as regards the movements of the rifling-rod being precisely similar to those described above.

The well-known universal joint may be used in connection with the pulley K and shaft L, so as to allow the latter to vibrate freely without any interruption of its rotating motion.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of the vibrating pinion-shaft I and pinion H with the reciprocating frame E and plunger D, all constructed and arranged substantially as set forth.

2. Causing the reciprocating frame or any devices connected therewith to impart an intermittent motion to the plunger D or tube C, through the intervention of a bell-crank lever, G, and hub F with arms *y*, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

TITUS POWERS.

Witnesses:
HENRY HOWSON,
CHARLES HOWSON.