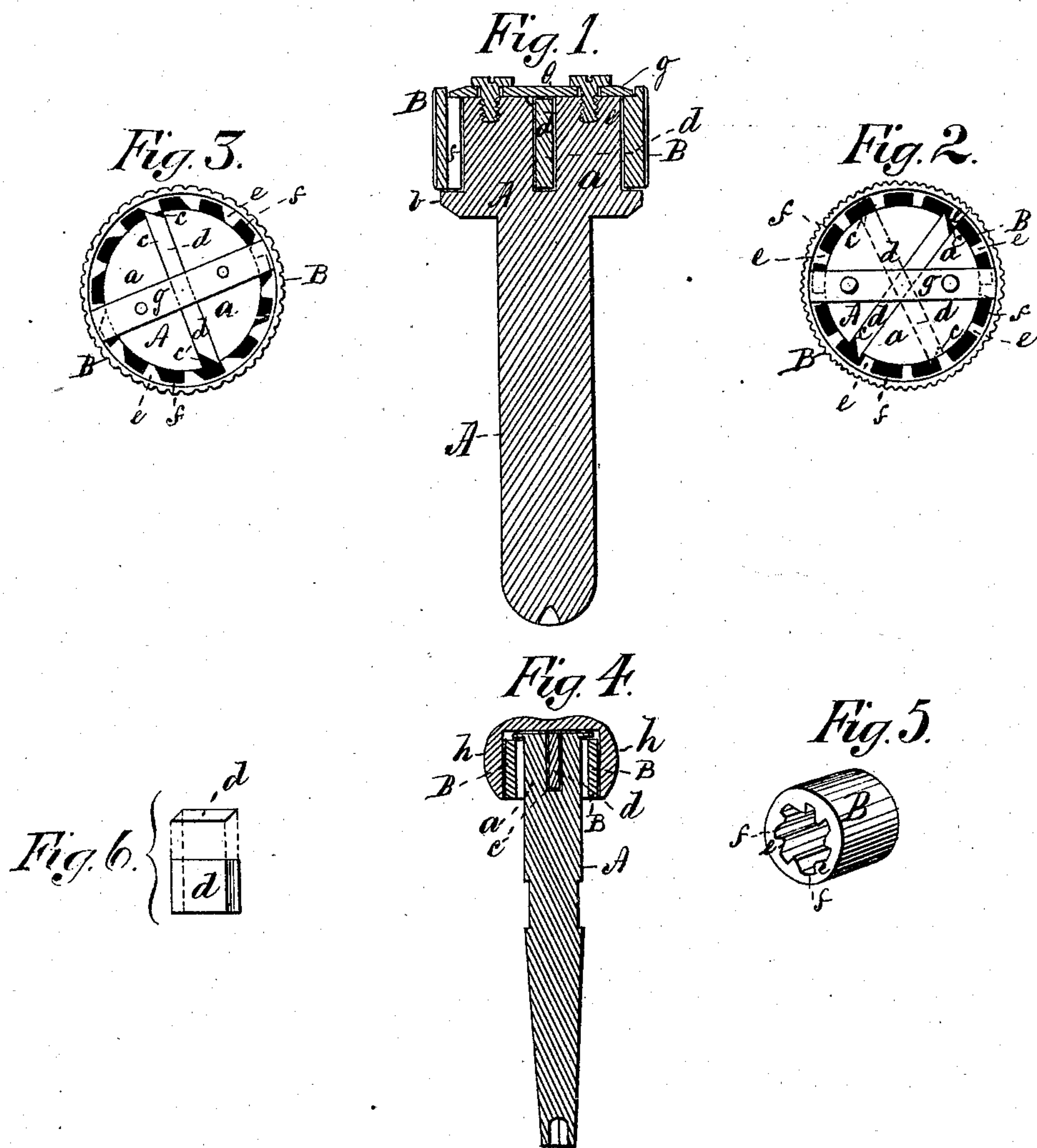


J. D. WRIGHT.
Pawl and Ratchet Device.

No. 203,519.

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IMPROVEMENT IN PAWL-AND-RATCHET DEVICES.

Specification forming part of Letters Patent No. **203,519**, dated May 7, 1878; application filed March 13, 1878.

To all whom it may concern:

Be it known that I, JACOB D. WRIGHT, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Ratchet Devices; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 represents a longitudinal or vertical section of a portion of a tool having my improved ratchet device applied thereto, and Fig. 2 a plan of the same. Fig. 3 represents a view similar to Fig. 2 of a modification of the device. Fig. 4 represents a vertical section of a watch-key, on an enlarged scale, to which my ratchet device has been applied; and Figs. 5 and 6, detail views, representing, respectively, the internally-toothed barrel and sliding pawl which works in it, the pawl being shown both in elevation and in plan, and the two connected by dotted lines.

The object of my invention is, first, to dispense with the spring common to ratchet devices, and thus simplify and strengthen, and, at the same time, render them less liable to get out of order; and, secondly, to make a ratchet that may be readily reversed, so as to operate in either direction.

The invention consists, first, in constructing a short cylinder with a series of internally-projecting teeth and corresponding recesses, either of the usual form of a ratchet-tooth or of a square form; secondly, in so arranging these teeth that each tooth will be diametrically opposite to one of the recesses formed by the projection of two adjoining teeth on the other side of the barrel; thirdly, in combining with a toothed cylinder, constructed substantially as above described, a sliding pawl having its ends beveled or curved on its opposite sides, whereby, as each of the beveled ends of the pawl is brought in contact with one of the teeth, it will at its opposite end be forced into the corresponding recess at that side, and thus be ready to engage on its flat face with the tooth on that side, in order to

perform its functions as a ratchet; and, fourthly, in combining a reversible pawl with a hollow cylinder having internally-projecting square-shaped teeth, or its equivalent, a reversible pawl and reversible hollow cylinder having internally-projecting ratchet-shaped teeth, whereby the instrument can be readily turned either into a right or left handed operating-ratchet.

To enable others skilled in the art to make and use my invention, I will now describe its construction in detail.

In the drawing, A represents a blank arbor shank or stem, which may either form the tool-holder that is to be operated by the ratchet or the arbor through which and a suitable operative device motion is to be imparted to the tool-holder through the ratchet. In this case it is merely used to show the manner of applying my improved ratchet devices. The upper portion *a* of the arbor is enlarged, and is made of cylindrical or other suitable form, and provided with a flange, *b*, at its lower end. Diametrically through its center and upper face is cut a vertical slot, *c*, into which is loosely but snugly fitted a sliding bar, *d*, of a length greater than the diameter of the upper portion or head-piece *a* of the arbor A. This sliding bar *d* forms the sliding pawl, and has one side of each of its ends beveled, but on opposite sides.

Upon the head *a* of the arbor A is mounted a short cylinder or barrel, B, ribbed or milled on its outer periphery, and having a series of internally-projecting teeth, which extend to within a short distance of the outer periphery of the head *a* of the arbor, or at least of those portions of it which give lateral support to the ends of the sliding pawl *d*. This arrangement of the teeth with respect to the head *a* of the arbor is well illustrated in Figs. 2 and 3, and these same figures also illustrate the construction and arrangement of the recesses *f* with respect to the teeth—that is to say, each tooth is so constructed and arranged with respect to the recess on the diametrically-opposite side of the barrel B that its central axial line will coincide with the central axial line of that recess, or thereabout.

In Fig. 2 these teeth *e* are represented as being of square form—that is to say, in which

both sides have a straight or square face in a radial line, as contradistinguished from a ratchet-shaped tooth, like those shown in Fig. 3, in which one side of the tooth is straight or square faced and the other side beveled or inclined.

The barrel B rests on the flange *b*, and surrounds the head *a* of the arbor A, and is intended to be confined thereto in any suitable way. In Figs. 1, 2, and 3 a plate, *g*, secured to the arbor-head, serves to confine both the barrel and the sliding pawl *d* to the arbor-head; but such is not absolutely necessary, as that may be effected in various ways, according to the use to which the device is to be applied. This is exemplified in its adaptation to a watch-key, illustrated in Fig. 4, where the head *a* of the arbor or stem A is, at its upper end, expanded into a flange whose diameter is greater than the internal diameter of the toothed barrel B. By this means, and slipping the barrel B over the small end of the key and bringing it up against the flange, and then slipping a cap-piece, *h*, firmly and tightly over the barrel, as shown, the whole is held in place and ready for use.

Fig. 5 represents a view, in perspective, of the toothed barrel B detached from the stem A, the teeth being of the ratchet variety; and Fig. 6, a side elevation and plan of its sliding pawl.

The operation of this key is simple, (its lower end being provided with the usual square socket to fit the winding-arbor of the watch:) The key is fitted on the arbor, with the thumb and forefinger clasping the cap-piece *h*. It is then turned in the proper direction to wind the watch as far as the hand can turn it. The slide-pawl *d* in this case engages with its square side against the square face of one of the teeth, and thereby causes the stem A to turn with the head-piece *a*. The motion of the hand is then reversed, which causes the teeth of the barrel to act against the beveled sides of the ends of the slide-pawl, thereby forcing the latter out of the way from each side alternately, until the operator is ready to give it another turn to wind up the watch, in which case the square end of the pawl again engages with the tooth, and so on as often as desired, or until the watch has been wound up.

It will now be apparent that, by simply re-

versing the slide-pawl *d* in connection with the rectangular or axially straight-sided teeth shown in Fig. 2, the direction of the movement of the stem A would be changed; or that the same may be effected where the ratchet-shaped teeth are used by reversing the sliding pawl and the ends of the barrel; but the former is much the simpler as well as stronger and better mode, and much less liable to get out of order.

If desired, a groove may be formed on the outside of the barrel B lengthwise, and another on the inside of the cap *h*, and a spline inserted to connect them; or a pin or rib may be applied to the cap on its inside, and which, engaging with the groove in the barrel, will effect the same object, and cause them to move together; or these latter devices reversely applied will do the same thing. For light work, however, as in watch-keys, simple friction will suffice.

From what has been said it will be apparent that my device can be applied to many useful purposes in machinery, and also for the operation of tools of various kinds, and therefore I do not confine myself to its use in any special connection.

Having described my invention, I claim—

1. In a ratchet device, a barrel or hollow cylinder provided with internally-projecting teeth *e* and recesses *f*, constructed substantially as and for the purposes described.

2. The combination of a slide-pawl with the arbor of a ratchet, substantially as and for the purpose set forth.

3. The combination of a sliding pawl, *d*, having each end beveled on one but opposite sides, with a cylinder or barrel, B, provided with recesses *f* and internally-projecting teeth *e*, constructed in the manner substantially as and for the purposes set forth.

4. The combination of a reversible slide-pawl, *d*, with a cylinder, B, provided with rectangular or axially straight-sided teeth, or their equivalents, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JACOB D. WRIGHT.

Witnesses:

JAMES B. MINICK,
FRANK MORRISON.