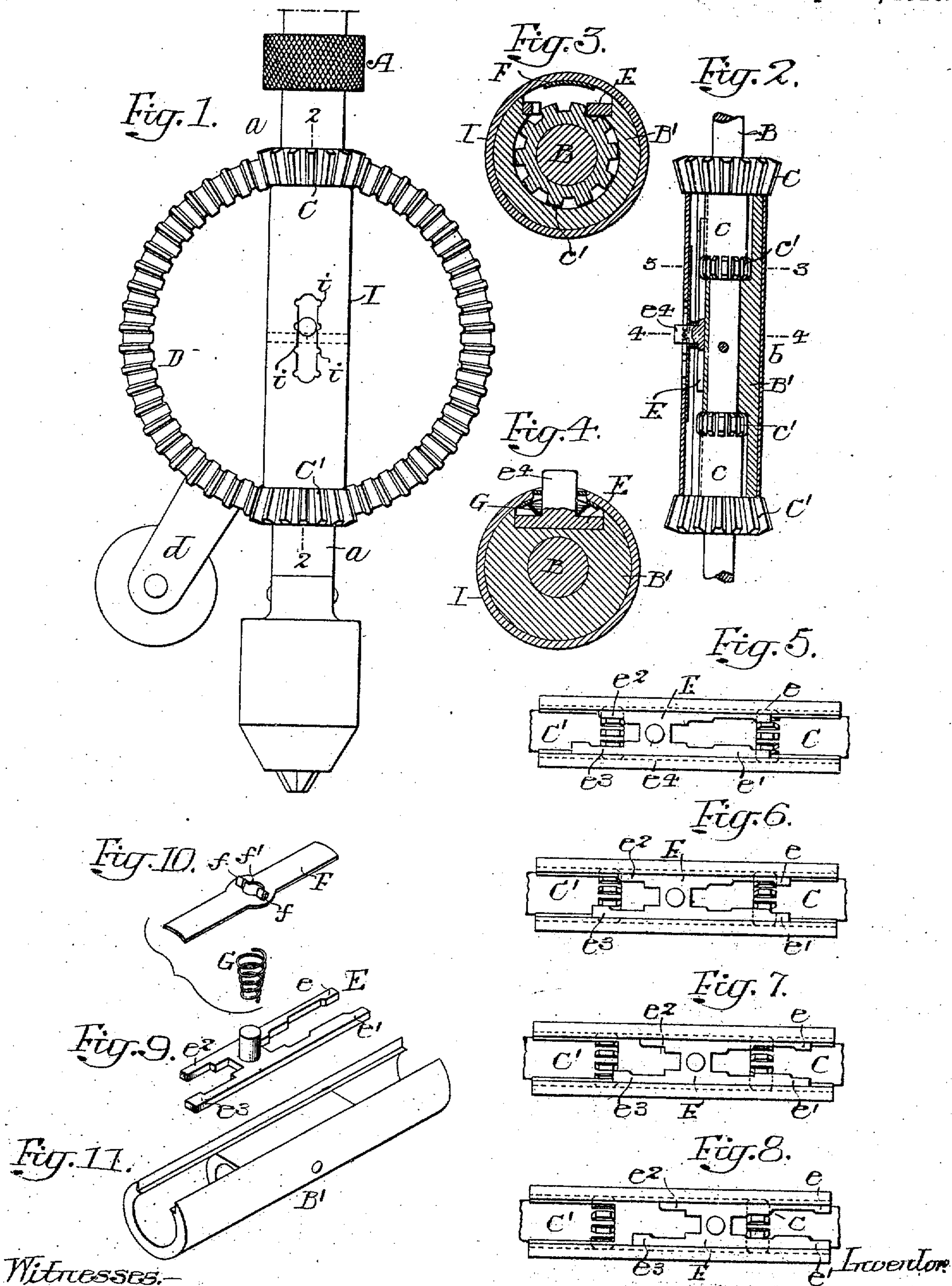


954,980.

Patented Apr. 12, 1910.



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# UNITED STATES PATENT OFFICE.

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## RATCHET MECHANISM.

954,980.

Specification of Letters Patent.

Patented Apr. 12, 1910.

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*To all whom it may concern:*

Be it known that I, GEORGE O. LEOPOLD, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Ratchet Mechanism, of which the following is a specification.

My invention relates to certain improvements in ratchet mechanisms, especially applicable to screw drivers, ratchet drills and other small tools, but it will be understood that it can be used for other purposes without departing from the essential features of the invention.

The object of the present invention is to simplify the construction of the ratchet mechanism and to reduce the number of parts, and this I do by making the shifter and pawls all in one piece, as fully described hereafter, reference being had to the accompanying drawings, in which,—

Figure 1, is a side view of sufficient of the ratchet tool to illustrate my invention; Fig. 2, is a sectional view on the line 2—2 Fig. 1; Fig. 3, is an enlarged sectional view on the line 3—3 Fig. 2; Fig. 4, is an enlarged sectional view on the line 4—4 Fig. 2; Figs. 5, 6, 7 and 8 are diagram views showing different positions of the pawl; Fig. 9, is a perspective view of the pawl; Fig. 10, is a perspective view of the detent plate and spring, and Fig. 11, is a perspective view of the carrier.

A is the frame of the hand-tool in the present instance having bearings *a— a* for the spindle B, on which is mounted a carrier B' secured to the spindle in the present instance by a pin *b*.

C—C' are beveled pinions which mesh with the driving gear D, having a handle *d* by which it is turned. The beveled pinions have hubs *c* which extend into the ends of carrier B' and at opposite ends of the hubs are ratchet teeth *c'* which engage the arms of the sliding pawl piece E adapted to slide longitudinally in ways in the carrier B'.

The pawl piece is made as clearly shown in Fig. 9, having four arms *e*, *e'*, *e<sup>2</sup>* and *e<sup>3</sup>*. Two of these arms are arranged to engage the ratchet teeth on the pinion C and the other two are arranged to engage the ratchet teeth on the pinion C'. When the pawl piece is in the position shown in Fig. 5, both ratchet wheels, C, C' are locked and the

pawl spindle cannot be moved. When in this position the chuck can be turned to engage or disengage a pawl without the necessity of the operator grasping one of the gear wheels to prevent it from turning. When the pawl piece is moved to the position shown in Fig. 6, then the two arms *e'* and *e<sup>3</sup>* engage the ratchet wheels. When moved to the position shown in Fig. 7, both the arms *e<sup>2</sup>* and *e<sup>3</sup>* are out of engagement as well as the arm *e*, the arm *e'* being the only one in engagement with the ratchet wheel. When in the position shown in Fig. 8, the arm *e* is the only arm in engagement with the ratchet wheel, but the arms *e'*, *e<sup>2</sup>* and *e<sup>3</sup>* are free of the ratchet wheel. Thus it will be seen by the above construction that the tool can be locked rigidly, or can ratchet to the right or left or be used as an ordinary hand drill, the casing turning with the spindle.

The pawl is yieldingly held to its seat by the cover plate F and spring G. When any of the pawls are in a position to ratchet the pawl piece is simply raised by the ratchet wheel compressing the spring G. The cover plate F has an opening *f'* for the passage of the operating stud *e<sup>4</sup>* and has two projections *f* on each side of the opening, which enter the notches *i* in the casing I which incloses the carrier B', so that by this means the pawl piece is locked in the position to which it is adjusted, but with force the pawl piece can be shifted from one position to another.

It will be seen by the above construction that I provide a ratchet mechanism without the use of pivoted pawls and that I make the pawls solid with the shifting device, thus reducing the number of parts, and I use one spring to control the four pawl arms.

I claim:

1. The combination in a ratchet mechanism of a carrier, a spindle secured thereto, two ratchet wheels mounted in each end of the carrier, a sliding pawl piece having four arms, said arms having portions arranged to engage the ratchet wheels when shifted to certain positions and means for yieldingly holding the pawl piece in position.

2. The combination of a carrier, a spindle, said carrier having a slideway therein, ratchet wheels mounted in each end of the sleeve, a sliding pawl piece mounted on the slideway and having a central operating



stud and four arms, said arms being cut away on the inner side so as to form pawls to engage the teeth of the ratchet wheels, the said arms being so arranged that either one or the other or both of the ratchet wheels will be engaged by the pawl piece.

3. The combination in a carrier, a spindle secured thereto, said carrier having a slide-way and recessed at each end, two beveled pinions loosely mounted on the spindle and having hubs entering the recesses in the ends of the sleeve, ratchet teeth on the inner ends of the said hubs, a sliding pawl piece made of a single piece of metal having four arms, the arms being irregular on their inner surfaces so as to form pawls to engage with the ratchet teeth, a sliding cover plate having projections, a slotted shell with notches on each side of the shell to receive the projections on the sliding cover plate, a stud on the pawl piece extending through an opening in the cover piece and through the slot in the shell, a coiled spring mounted between the cover piece and the pawl piece.

4. The combination in a ratchet mechanism, of a carrier, a spindle, two ratchet wheels thereon and spaced apart, a sliding pawl piece having two arms, said arms being cut away on the inner side to form pawls to engage the teeth of the ratchet wheels, the sides of the pawl piece bearing against the carrier when lateral pressure is applied.

5. The combination in a ratchet mechanism, of a carrier, a ratchet wheel, a sliding pawl piece having two arms, each notched at its inner edge to clear the ratchet wheel, so that on sliding the pawl piece it can be moved into and out of engagement with the ratchet wheel.

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

GEORGE O. LEOPOLD.

Witnesses:

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