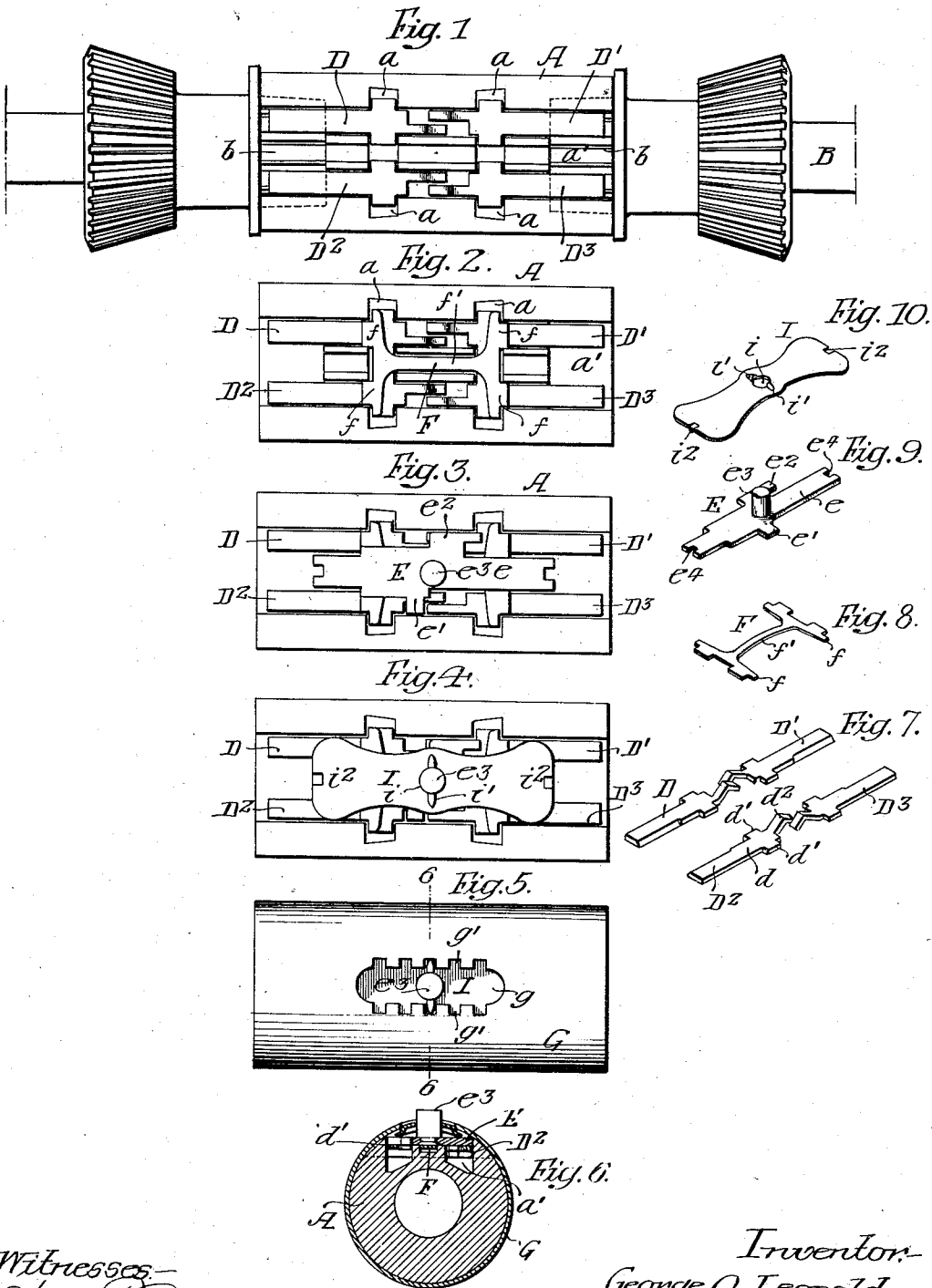


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 RATCHET MECHANISM.
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1,027,261.

Patented May 21, 1912.



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UNITED STATES PATENT OFFICE.

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RATCHET MECHANISM.

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Specification of Letters Patent.

Patented May 21, 1912.

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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.

The object of my invention is to construct a pawl and ratchet mechanism especially adapted for use in connection with hand tools; the pawls being held by spring pressure in engagement with the ratchet wheels, except when forced out of engagement by independent mechanism. This object I attain by having two springs—one a light spring which tends to hold all of the pawls in engagement with their ratchet wheels, and the other spring heavier than the first mentioned spring and adapted to lift the pawls when shifted to a given position.

In the accompanying drawings:—Figure 1, is a plan view of the barrel containing the ratchet mechanism and illustrating the pawls in position and the ratchet wheels in dotted lines; the shifting mechanism being removed; Fig. 2, is a view similar to Fig. 1, with the light spring added; Fig. 3, is a view similar to Fig. 2, with the shifter in position; Fig. 4, is a view similar to Fig. 3, with the heavy spring in position; Fig. 5, is a view of the notched shell showing the shifter projecting through the slot; Fig. 6, is a transverse sectional view on the line 6—6, Fig. 5; Fig. 7, is a detached perspective view of the four pawls; Fig. 8, is a detached perspective view of the light spring; Fig. 9, is a detached perspective view of the shifter; and Fig. 10, is a detached perspective view of the heavy spring.

This invention is particularly adapted for use in hand tools, such as screw drivers and drills, but it will be understood that the invention can be used for any purpose for which ratchet mechanism of this type is needed.

A is the barrel, which is mounted on a spindle B, Fig. 1 and projecting into each end of the barrel is a ratchet wheel *b*, which is loose on the spindle B in the present instance; the barrel being secured to the spindle.

D, D', D², D³ are four pawls which are pivotally mounted on the barrel and are adapted to engage the teeth of the ratchet wheels *b*. Each pawl has a body portion *d*;

trunnions *d'* and tail pieces *d²*, which are bent as illustrated in Fig. 7, so as to be acted upon by the shifter E, which is made as clearly shown in Fig. 9 in the present instance. The pawls are so arranged that one pawl will act when the ratchet wheel is moved in one direction and will lift when the ratchet wheel is moved in the opposite direction. The pawls rest in a groove *a'* in the barrel A as clearly shown in Fig. 6, and the trunnions are mounted in the transverse slots *a*, Fig. 1. The tails *d²* of each pair of pawls pass each other, as illustrated in Fig. 1; being less in width than the body portion of the pawl.

The design of the pawl may be modified without departing from the essential feature of the invention, which is the use of two springs of different strength.

Adapted to rest upon the pawls as illustrated in Fig. 2, is a spring F of the type shown in Fig. 8, having two end members *f—f* which rest on the pawls slightly beyond the trunnions and a cross member *f'* which connects the two end members. The spring has projections which enter the transverse slots *a* in the barrel and are thus held against longitudinal movement so that they will not be moved out of position when the shifter is moved longitudinally as this spring remains in the same position at all times irrespective of the position of the shifter and the tendency of this spring is to force all of the pawls into engagement with their respective ratchet wheels.

The shifter E is made as clearly shown in Fig. 9 and has a longitudinal portion *e* which clears the tails of the pawls and lateral projections *e'* and *e²* which are so formed that any one or two of the pawls can be released while the others of the pawls are held out of engagement. This shifter has a knob *e³* which extends through a slot *g* in a shell G on the barrel A. The shell holds the several parts in position. Mounted between the shell G and the shifter E is the heavy spring I, which has a central opening *i* through which extends the knob *e³* of the shifter. On each side of this opening *i* are projections *i'* which are arranged to engage the notches *g'* in the side walls of the slot *g* to lock the shifter in the position to which it is adjusted. The spring has small projections *i²* on the under side at each end which enters notches *e⁴* at each end of the shifter

E so that the spring is held from swiveling on the central projection e^3 and must move with the shifter.

When the shifter is moved so as to release one or more of the pawls and to raise others out of engagement with their respective wheels the spring I being much stronger than the spring F positively forces the particular pawls out of engagement against the pressure of the spring F, so that the ratchet mechanism is positive in its movement and there will be no possibility of the pawls becoming disengaged owing to the rough usage to which a hand tool of this character is subjected.

I claim:

1. The combination in ratchet mechanism, of a barrel; ratchet wheels; pawls pivotally mounted on the barrel and arranged to engage the ratchet wheels; a single fixed spring bearing upon all of the pawls to force them into engagement with the ratchet wheels; a shifter for releasing some of the pawls; a spring bearing upon the shifter and of greater strength than the fixed spring and a shell inclosing the mechanism.

2. The combination in ratchet mechanism, of a barrel having a longitudinal recess and two transverse recesses; four pawls mounted in the longitudinal recess and having trunnions mounted in the transverse recesses; ratchet mechanism with which the pawls engage; a fixed spring having cross members at each end and a longitudinal member connecting the cross members; said cross members bearing upon the pawls beyond their trunnions and having extensions projecting into the transverse recesses whereby the spring is held against longitudinal movement; a shifter having projections adapted

to press upon certain of the pawls and to lift them out of engagement with their respective wheels; a spring heavier than the first mentioned spring resting upon the shifter; a knob on the shifter extending through the spring; and a shell having a slot therein through which said projection extends.

3. The combination in ratchet mechanism, of a shell having a longitudinal slot therein and two transverse slots spaced apart, ratchet wheels, one mounted at each end of the shell; four pawls having lateral trunnions mounted in the transverse slots of the shell, the body of the pawls being mounted in the longitudinal slots and each pawl having projecting tails; a light spring having lateral extensions at one end and a cross member connecting the extensions; said lateral extensions bearing upon the pawls beyond the trunnions and engaging the lateral slots in the barrel, whereby the spring is prevented from moving longitudinally so that it always has a fixed relation in respect to the pawls; a shifter mounted above the spring and having a lateral extension arranged to bear upon the tails of the pawls to force them out of engagement with their ratchet wheels; a heavy spring mounted above the shifter and adapted to move therewith; a shell inclosing the mechanism and having a slot therein; a knob on the shifter extending through the heavy spring and through the slot.

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

GEORGE O. LEOPOLD.

Witnesses:

JOS. H. KLEIN,

WM. A. BARR.