No. 850,347. PATENTED APR. 16, 1907.

H. J. COOK.

RATCHET MECHANISM.

APPLICATION FILED MAY 17, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

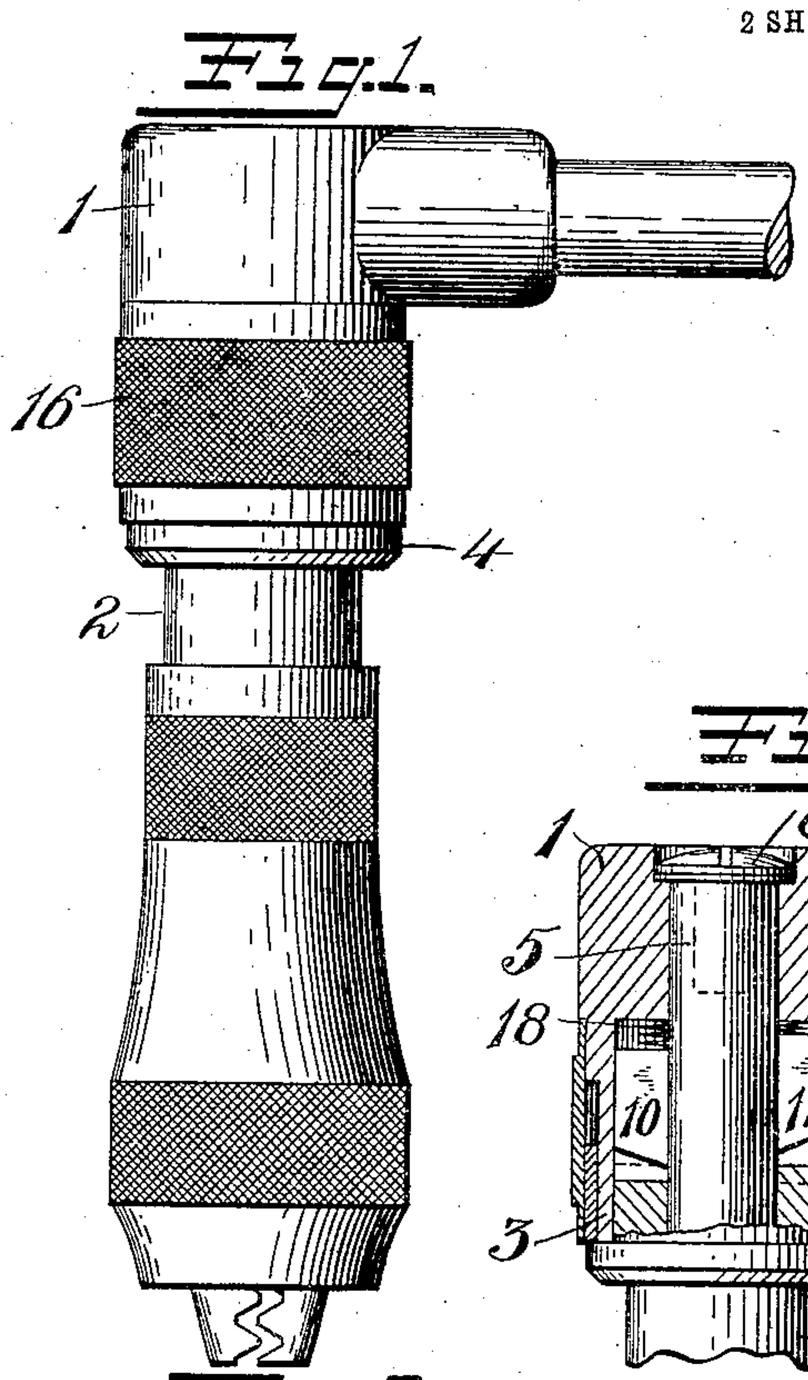


Fig. 2.

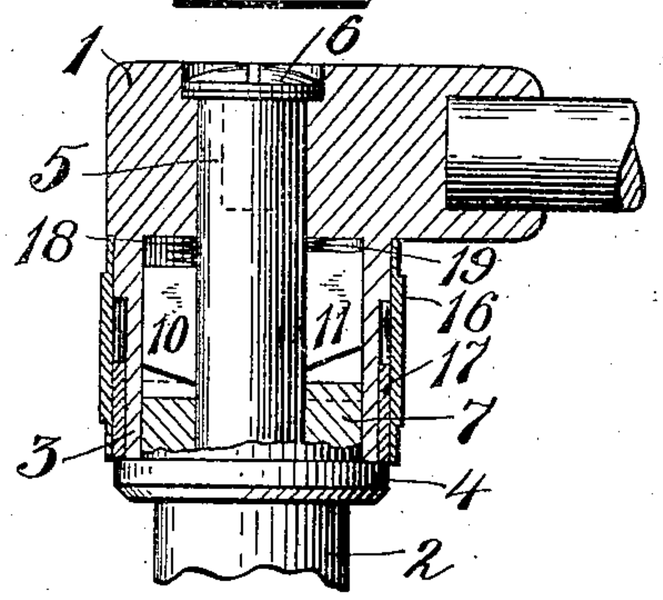


Fig. 4.

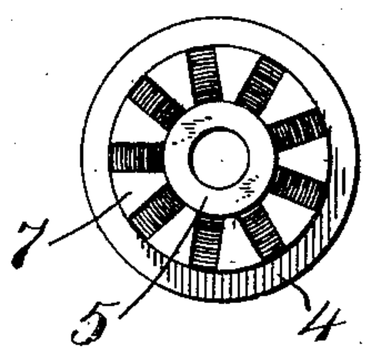


Fig. 3.

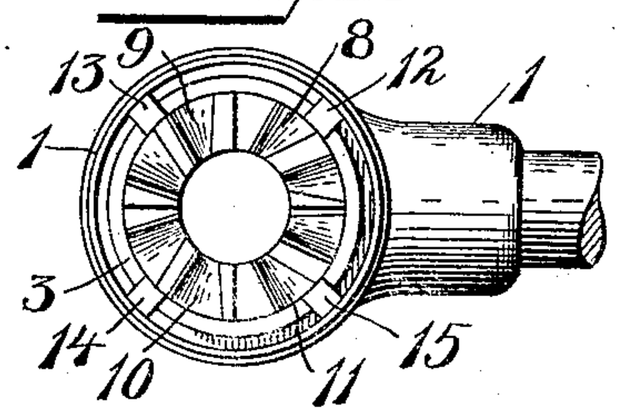


Fig. 5.

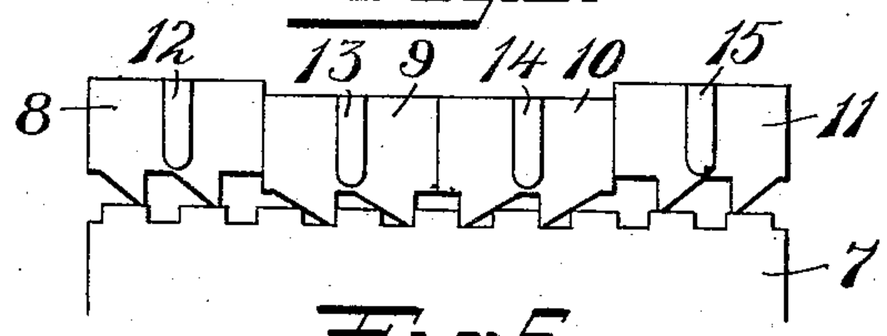
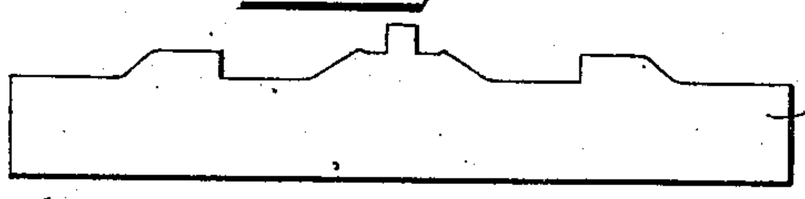


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 7.

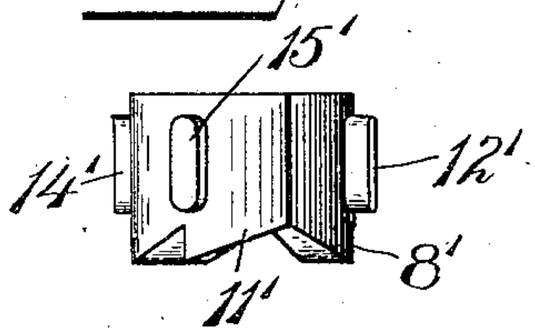


Fig. 9.

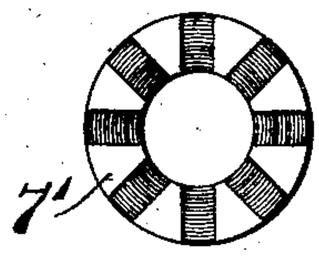


Fig. 8.

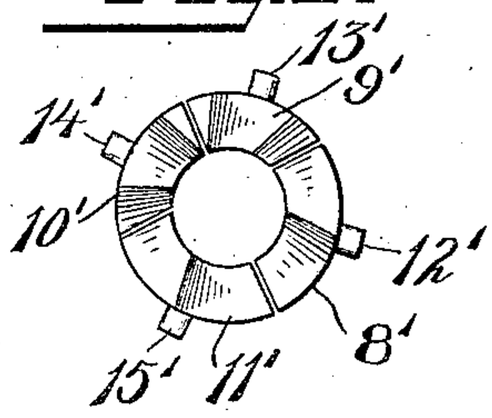
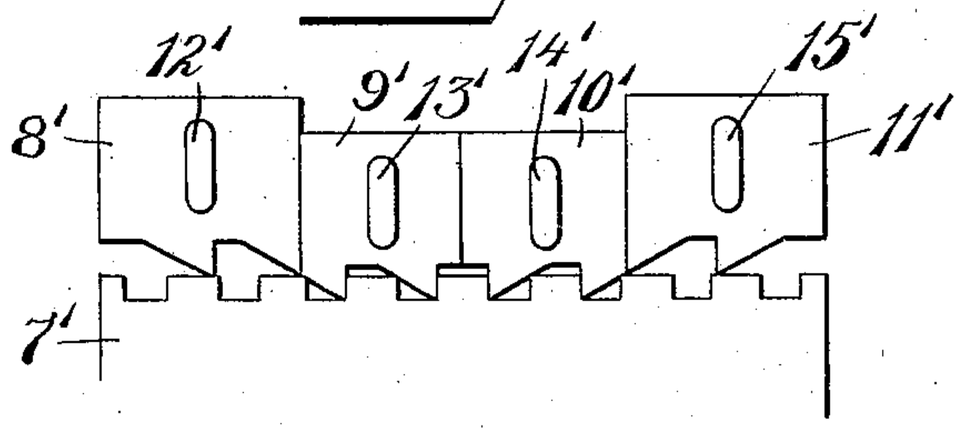


Fig. 10.



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UNITED STATES PATENT OFFICE.

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RATCHET MECHANISM.

No. 850,347. Specification of Letters Patent. Patented April 16, 1907.

Application filed May 17, 1906. Serial No. 317,255.

To all whom it may concern:

Be it known that I, HARRIS J. COOK, a citizen of the United States, residing at New Britain, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Ratchet Mechanism, of which the following is a full, clear, and exact description.

My invention relates to improvements in ratchet mechanism for tools, and particularly of the type set forth in United States Letters Patent No. 758,329, of April 26, 1904, and 813,586, of February 27, 1906.

The object of this invention is to provide an improved mechanism for tools of this character whereby with a comparatively small number of teeth in the ratchet and small number of teeth in the pawls an intermittent clutching action may be effected which may be repeated through a large number of impulses at each revolution of the tool, so that if a portion of the tool be rotated angularly rotation may be effected and the strains transmitted from the driving to the driven part distributed through a large area.

In the preferred form I have shown a ratchet having nine teeth and two pawl members, each being divided into two sections, each of which sections have two teeth, the teeth on one section being located at a relatively different place on said section than the teeth on the companion section. These teeth are so arranged that eighteen impulses may be transmitted from the driving to the driven part in each revolution. In a modified form I have shown the invention in which the ratchet has eight teeth, as before. In this case the pawl-sections each have two teeth, as before; but the sections are of different sizes, so that the teeth are distributed differentially and sixteen impulses are possible in each revolution. In the preferred form it will be seen that the differential movement which makes possible the large number of impulses is occasioned by the difference in the number and location of teeth on the pawl and ratchet members, respectively, whereas in the modified structure the differential action is occasioned by the difference in the spacing of the teeth on the pawl members of each set.

The accompanying two sheets of drawings illustrate the preferred and modified forms of my invention.

Figure 1 is a side elevation of a fragment of a bit-brace embodying the improvements of my invention. Fig. 2 is a fragmentary sectional view of the same. Fig. 3 is an end view of the driving part and pawl member. Fig. 4 is an end view of the driven part and ratchet. Fig. 5 is a diagrammatic view showing the development of the ratchet-teeth and pawl-teeth. Fig. 6 is a diagram showing the development of the operating-cam for throwing the pawls into and out of action. Fig. 7 is a side view of the set of pawls for the modified construction before referred to. Fig. 8 is an end view of the same pawls. Fig. 9 is an end view of the ratchet for use therewith. Fig. 10 is a diagrammatic view showing the development of the ratchet and pawl members.

1 indicates the driving member.

2 indicates the driven member.

The driving member has a hub 3 preferably integral therewith and abutting against the flange 4 of the driven member when the parts are assembled.

5 is a spindle rotatable with the driven member and forming a part thereof which extends through the driving member and is secured in place by means of the screw 6.

7 is a crown-ratchet secured to the driven member so as to rotate therewith. This ratchet has, in the preferred form, nine teeth, each of which has two oppositely-disposed faces.

The pawl member surrounds the spindle and is located inside of the hub 3. There are two separate pawls for right and left hand driving. These are each divided into two parts. These parts are indicated at 8 9 and 10 11, respectively. Each part of each pawl has a portion which projects through a vertical slot in the hub 3. These projections 12, 13, 14, and 15 cause the pawl members to always rotate with the driving part. The inner surfaces of the pawl members bear against the spindle 5, so that in the action of the mechanism the spindle tends to always keep the pawls free from wedging.

16 is an operating-ring having at its interior surface a cam 17. This cam is adapted to engage the projections 12, 13, 14, and 15 of the pawl members and throw them into and out of operative position with the crown-ratchet when desired. Each pawl-section is impelled toward the ratchet 7 by means of a suitable spring, such as indicated at 18 and 19 in Fig. 2. The cam is so constructed that it may be operated to retract simultaneously

the two members 8 and 9 of one pawl or 10 and 11 of the other pawl and hold them retracted. When one pair is held retracted, the other pair is permitted to engage the teeth of the ratchet. The cam may also be adjusted to permit all the pawls to act, in which event the pawl and ratchet members are interlocked and the driven member will rotate with the driving member in either direction.

In the modification, details of which are illustrated on Sheet 2, the pawl divisions are indicated by the reference-numerals 8′, 9′, 10′, and 11′, and have, respectively, the projections 12′, 13′, 14′, and 15′, which project through slots in the hub 3 and are operated upon by means of a suitable cam. The two parts 8′ 9′ constitute, in effect, one pawl for driving in one direction, and 10′ 11′ constitute the other pawl for driving in an opposite direction.

It will be seen that the sections 8′ and 11′ are wider than the respective companion sections 9′ and 10′, with the result that in this form one of the teeth in the crown-ratchet is skipped. This arrangement permits of the unequal location of the teeth on two companion pawl members and yet gives an easy incline to each pawl-tooth. While therefore the teeth may be disposed around the entire pawl member regularly by altering the pitch of the same, the modified construction has an advantage over the form shown on Sheet 1, in that the teeth on the ratchet may all have the same pitch, and hence be of the same size.

It will be observed that all the parts of the pawl members mutually support one another, since their edges practically abut. At their inner sides they are supported by the spindle, while at their outer sides they are supported by the hub.

What I claim is—

In a ratchet mechanism, a driving part, a driven part, a spindle carried by one part and rotatable relative to the other, a vertically-slotted hub carried by the other part, two divided pawl members substantially filling the space between said spindle and said hub, each part of each pawl member having a projection extending through said hub-slots, a ratchet member for coöperation with said pawl member, an operating member for controlling said pawl members, the teeth on one part of one pawl member being spaced to engage against the side of the ratchet-teeth, while the teeth on the companion pawl part are spaced to bear upon the ends of the ratchet-teeth.

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