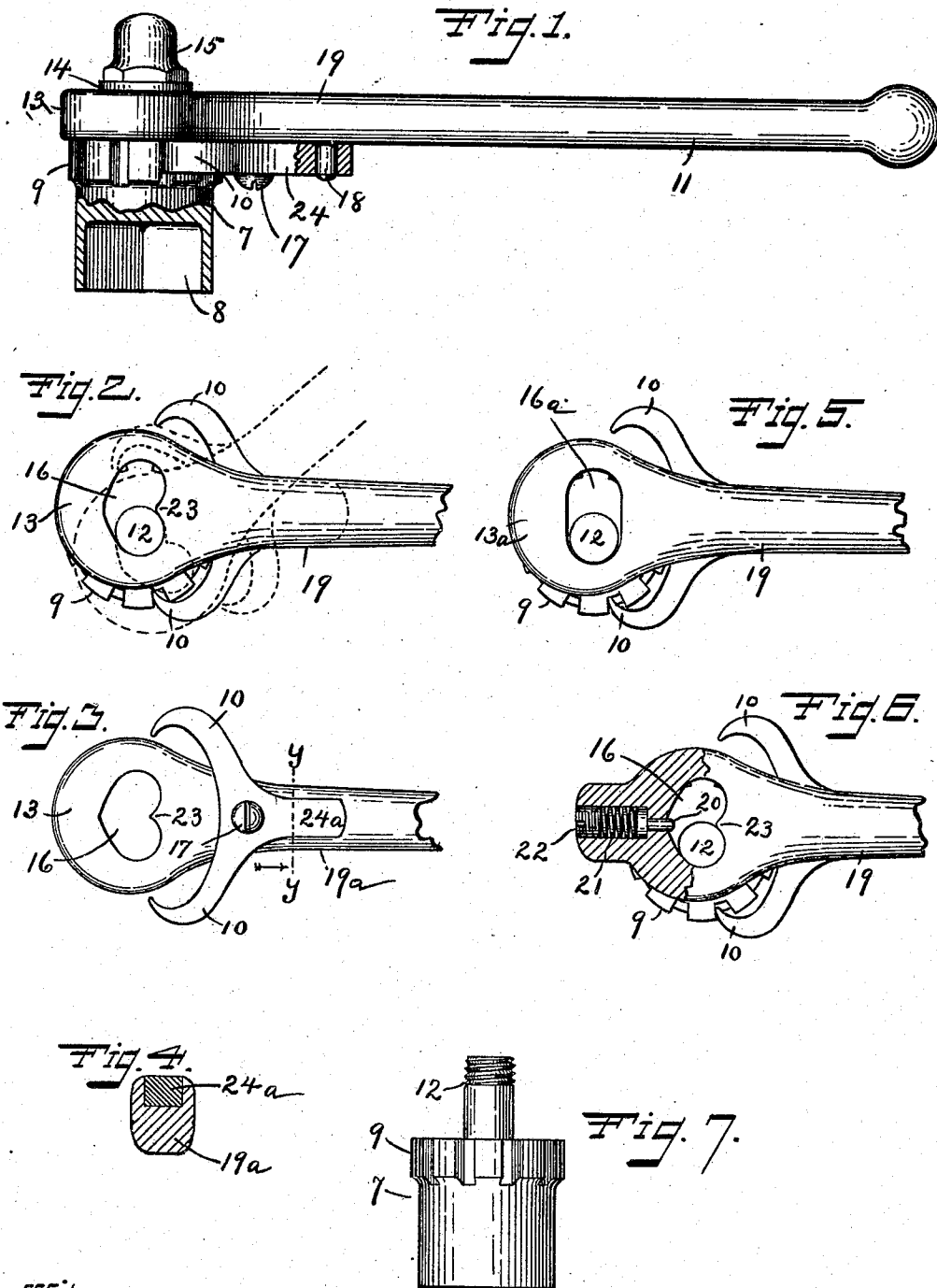


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 RATCHET WRENCH.
 APPLICATION FILED JAN. 14, 1909.

936,640.

Patented Oct. 12, 1909.



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RATCHET-WRENCH.

936,640.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed January 14, 1909. Serial No. 472,247.

To all whom it may concern:

Be it known that I, JOHN KNOWLES, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Ratchet-Wrenches, of which the following is a specification.

My invention relates to improvements in ratchet wrenches and the objects of my improvements are simplicity and economy in construction and efficiency and reliability in use.

In the accompanying drawings: Figure 1 is a side elevation of my wrench partly in central vertical section. Fig. 2 is a plan view of my wrench, with cap, nut and washer omitted and part of handle broken away. Fig. 3 is a bottom view of a modification. Fig. 4 is a transverse section of the same on the line *y y* of Fig. 3. Fig. 5 is a plan view showing another modification. Fig. 6 is a broken out horizontal section of the head with other parts in plan view, of another modification. Fig. 7 is a side elevation of the body member of my wrench.

My wrench is adapted to turn a nut either right or left, whether for tightening or loosening, by simply reciprocatingly operating a handle continually in one plane and to do this without the employment of any relatively moving parts in the mechanism of my wrench other than the body member which turns with the nut, all as will be hereinafter described.

7 is the body member, having a ratchet wheel 9, a socket 8, in the lower part to receive the nut or piece to be turned, and a bearing stud 12 at the top having a thread at the upper end. I prefer to have the socket 8 fit the nut or piece to be turned and have individual body members for each size of nut, although an additional member may be employed for each size nut, having a socket to fit the nut and a head to fit the socket in the body member. The head 13 is formed integral with the shank 19 and the handle 11, and is provided with a double ended bearing slot 16 preferably of heart shape with a central projection 23 on the side toward the shank 19 and a circular recess on each side of said projection 23, to receive the bearing stud 12 on the body member 7, in either of its two bearing positions. Fixed pawls 10 are rigidly mounted on the shank 19 and are preferably made in one

piece with a tongue 24 by which they are attached to the shank 19 in any proper manner, as for example by a screw 17 and pin 18 integral with the shank 19, fitting in a hole in said tongue 24, as shown in Fig. 1. The body member 7 is removably and rotatively mounted in the head 13 by means of any ordinary securing devices as for example, the bearing stud 12, in the bearing slot and a washer 14 and a cap 15 on the outer end of the said stud, as shown in Fig. 1. The dimensions and adjustment of the slot 16, pawls 10, and ratchet wheel 9, are such that when the stud 12 is located at either one of the extreme positions in the bearing slot 16 in one of the recesses at either side of the central projection 23, the pawl 10 on the same side of the shank 19 engages the ratchet wheel 9 and the other pawl 10 will clear and be free from said ratchet wheel 9, so that when rotative motion is applied to the handle 11 one or the other of the said pawls 10 will engage with a tooth of said ratchet wheel 9 so as to apply corresponding rotative motion to the body member.

A modification is shown in Figs. 3 and 4, in the method of attaching the pawls 10 to the shank 19. A groove is provided in the said shank 19^a to receive the modified tongue 24^a.

Fig. 5 shows the head 13^a with a modified form of slot 16^a in which the central projection 23 of the preceding figures is omitted, furnishing the same amount of lateral movement for the head for engaging and disengaging the pawls 10 from the ratchet wheel 9, and also furnishing the two different bearings for the stud 12 when the implement is used for either a right or a left hand wrench.

Fig. 6 shows another modification in which the general form of bearing slot 16 shown in Figs. 1 and 2, is employed and in connection therewith I employ a longitudinally sliding friction pin 20, directly opposite the central projection 23, the said pin fitted in a suitable recess or chamber and yieldingly forced toward the projection 23 by means of a spiral spring 21, which is confined therein by means of a screw cap or plug 22. This friction pin 20 will allow a limited degree of lateral movement of the bearing stud 12 for disengaging the ratchet wheel 9 from the pawls 10, while it will create some friction tending to prevent the bearing stud 12 from accidentally moving from one end of the slot 16 to the other, at the same time it will yield

so that the bearing stud 12 can be readily moved to the other end of the slot 16 by applying sufficient force. Although the construction shown in Fig. 6 is designated as a modification, it is essentially the same construction with the introduction of the said friction pin 20 as an additional feature.

The operation is as follows: When the handle 11 is reciprocated in the ordinary manner as with ratchet wrenches, the motion in one direction for turning the nut and in the other to recover for a repetition of the turning movement, the turning movement causes the stud 12 to glide along the walls of the slot 16 into the recess on the side of the central projection 23 corresponding to the direction of the movement and the pawl 10 on the same side to engage with a tooth 9 of the ratchet wheel for imparting corresponding rotative motion to the body part 7. On the reverse movement of the handle the body member moves laterally a short distance in the bearing slot of the head to disengage the pawl from the teeth of the ratchet wheel and permit the said pawl to draw back over the said teeth ready to reengage the said teeth as soon as the handle is again moved forward and so on repeatedly.

Although I have called the implement herein shown and described a ratchet wrench, it is obvious that my said improvement is applicable to analogous ratchet implements.

I claim as my invention:

1. In a ratchet implement, a body member carrying a ratchet wheel, and a bearing stud projecting from one side of said ratchet wheel, a head having a transverse slot extending vertically therethrough, a shank connecting said head with a handle, and a pawl fixedly mounted relatively to said head, the said head being mounted on said bearing stud with the stud having a lateral movement therein at right angles to the axis of the said ratchet wheel for engaging and disengaging the pawl and ratchet wheel.

2. In a ratchet implement, a body member carrying a ratchet wheel and a bearing stud projecting from one side of said ratchet wheel, a transversely slotted head having a shank and handle that is rigid therewith, and a pair of pawls fixedly mounted relatively to said head opposite the two sides of the said ratchet wheel, the said slotted head being mounted on said bearing stud and the stud having a slight lateral movement in said slotted head for engaging and disengaging said pawls and a further lateral and limited movement therein for carrying the said stud from its position for a right hand implement into its position for a left hand implement.

3. In a ratchet implement, having a body member provided with a ratchet wheel and bearing stud, and an integral transversely slotted head, shank and handle, said head

mounted on said bearing stud so that the stud has a limited lateral movement in said head, a pair of pawls fixedly mounted relatively to said head for reversibly engaging said ratchet wheel.

4. A ratchet wrench, comprising an integral socket, ratchet wheel, and bearing stud and an integral transversely slotted head, shank and handle and pawls, and means for removably mounting said head on said bearing stud so that said stud has a limited lateral movement in said head for reversibly engaging and disengaging the pawls and ratchet wheel.

5. A reversible ratchet implement comprising a body member, a ratchet wheel and concentric bearing stud rigidly carried on said body member, a reciprocating head having a handle and a bearing slot extended laterally to the length of the said handle, within which slot the stud of the said body member is loosely confined, and a right and left hand pawl respectively on opposite sides of the said ratchet wheel and fixedly mounted relatively to the said head, the said bearing slot having a central projection on one side to assist in holding the said stud at the respective ends of the said slot for a right or left handed implement.

6. A reversible ratchet implement, comprising a body member, a ratchet wheel and concentric bearing stud rigidly carried on said body member, a reciprocating head having a handle and a bearing slot extended laterally to the length of the said handle, within which slot the stud of the said body member is loosely confined, a right and left hand pawl on the respective opposite sides of said ratchet wheel fixedly mounted relatively to the said head, the said bearing slot having a yielding sliding pin projecting centrally into the said bearing slot at one side to assist in holding the said stud at the respective ends of the said slot for a right or left handed implement.

7. A reversible ratchet implement, comprising a body member, a ratchet wheel and concentric bearing stud rigidly carried on said body member, a reciprocating head having a handle and a bearing slot extended laterally to the length of the said handle, within which slot the stud of the said body member is loosely confined, a right and left hand pawl on the respective opposite sides of said ratchet wheel fixedly mounted relatively to the said head, the said bearing slot having a rigid central projection on that side of the said bearing slot that is nearest the handle and a yieldingly mounted friction device projecting into the said slot on the opposite side thereof, the said rigid and yielding projections serving to hold the said bearing stud against accidental movement from end to end of the said slot.

8. In a ratchet implement, comprising a

body member and ratchet wheel, a laterally slotted head, having a rigid shank and handle, and a pair of pawls formed in one piece with a central tongue for being rigidly and removably secured to the said shank with the pawls fixed on the respective opposite sides of the said ratchet wheel.

9. In a ratchet implement, comprising a body member, and ratchet wheel, a laterally slotted head, having a rigid shank and handle, a pair of pawls formed in one piece with a central tongue for being rigidly and removably secured to the said shank with the pawls fixed on the respective opposite sides of the said ratchet wheel, and a screw for removably securing the said pawls to the said shank, the said pawls and shank having also the one an opening and the other an integral interlocking projection received in

the said opening to additionally hold the pawls on the shank and permit them to be removed by the removal of only the one screw.

10. A ratchet combination by which rotary motion is effected by reciprocatingly operating a handle in one plane, said combination comprising a body member carrying a ratchet wheel and a bearing stud, a slotted head, shank, handle, and pawls fixedly mounted relatively to said head, the said head being mounted on said bearing stud with the stud having a limited lateral movement in the said head, for engaging and disengaging the pawls and the ratchet wheel.

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