Jan. 6, 1931. C. L. COUP 1,788,014

SPEED WRENCH

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Fig. 1.

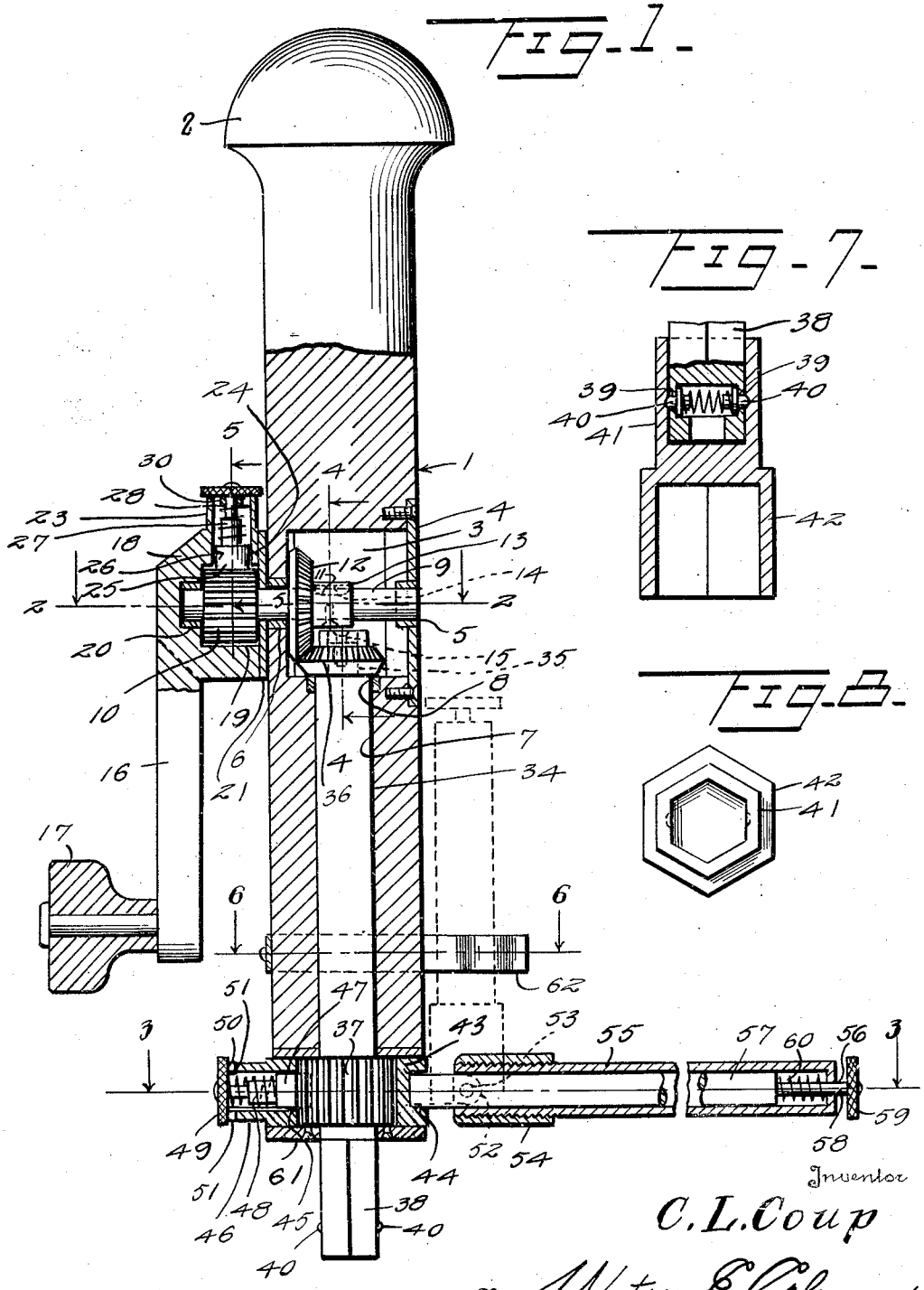


Fig. 7.

Fig. 8.

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Fig. 2.

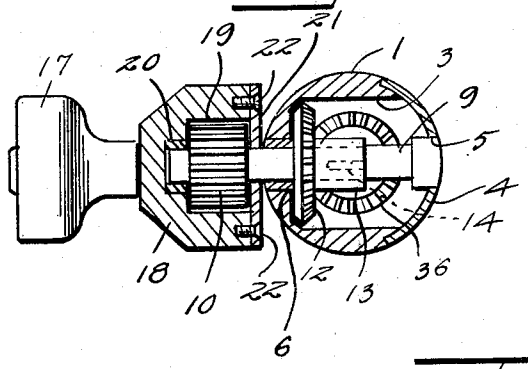


Fig. 5.

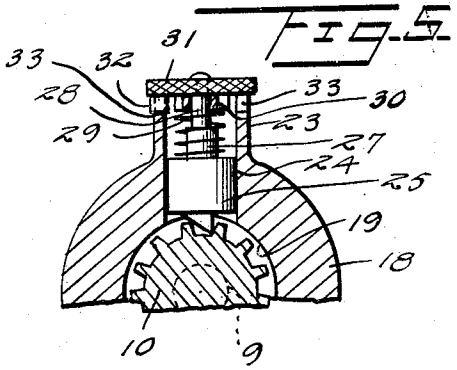


Fig. 3.

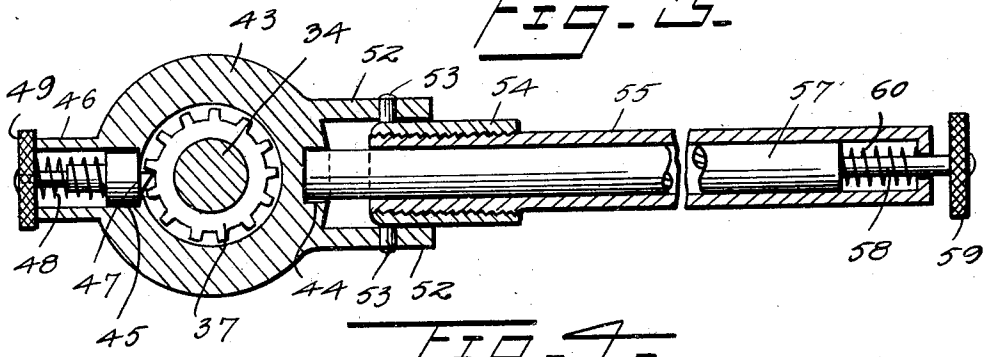


Fig. 4.

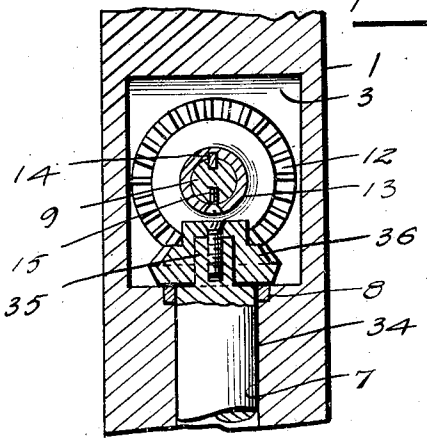
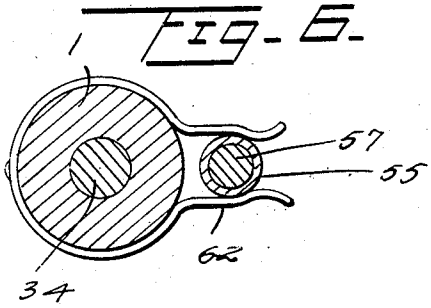


Fig. 6.



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Patented Jan. 6, 1931 1,788,014

UNITED STATES PATENT OFFICE

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SPEED WRENCH

Application filed July 27, 1929. Serial No. 381,519.

This invention relates to the class of tools and pertains especially to an improved type of wrench which, in addition to being constructed to facilitate the speedy removal of a nut or threaded bolt, has means whereby a tightly fixed nut or bolt may be started without placing strain upon the toothed elements of the tool.

In view of the foregoing it will be readily seen that the primary object of this invention is to provide a combination tool which may be employed for starting tightly fitted nuts or bolts and which may then be employed for speedily removing the same from position.

Another object of the invention is to provide means whereby upon the manipulation of a reversing mechanism a complete reversal of the moving parts of the wrench may be effected.

Still another object of the invention is to provide a speed wrench having a lever for applying a strong turning action to a bolt or nut and a crank controlling mechanism for actuating the bolt or nut, wherein the lever element may be conveniently shifted to an inoperative position when not required for use.

Other objects and advantages of the invention will become apparent as a description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming a part of the present invention with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention, as expressed in the appended claims.

In the drawings:—

Figure 1 is a view partly in longitudinal section and partly in side elevation of the wrench embodying the present invention.

Figure 2 is a sectional view taken upon the line 2—2 of Figure 1.

Figure 3 is a sectional view taken substantially upon the line 3—3 of Figure 1.

Figure 4 is a vertical sectional view taken substantially upon the line 4—4 of Figure 1.

Figure 5 is a vertical sectional view taken upon the line 5—5 of Figure 1.

Figure 6 is a transverse sectional view taken upon the line 6—6 of Figure 1.

Figure 7 is a detail view partly in section and partly in elevation of the lower portion of the main shaft of the wrench showing the application thereto of a detachable socket.

Figure 8 is a view in end elevation of one form of socket which may be employed with the wrench.

Referring more particularly to the drawings wherein like numerals of reference indicate corresponding parts throughout the several views, the numeral 1 indicates generally the body of the wrench which consists of a relatively long member having a head 2 at one end and having formed intermediate its ends a chamber 3, one face of which may be open and which open face is normally covered by the removable plate 4. Within the chamber 3 one wall thereof is provided with a bearing recess 5 and the wall opposite this bearing recess has formed therethrough the bearing opening 6. The bottom wall of the chamber has opening therethrough a passage 7 which extends from this point through the central part of the body to the end opposite the head 2, a suitable bearing boss 8 being formed in the chamber 3 about the end of the passage for the support of a gear member hereinafter more particularly referred to.

Designed to extend transversely through the chamber 3 through the bearing aperture 6 and with one end supported in the bearing 5 in the opposite wall, is a short shaft 9 which carries a ratchet 10, the ratchet being so positioned upon the shaft that when the shaft is in place it will be located exteriorly of the chamber but in close proximity to the outer face thereof, as shown. This shaft 9 is slotted to receive a key 11 and this key maintains in position upon the shaft a gear 12, the hub portion 13 of which is elongated, as shown, and provided with a key-way 14 in which the key 11 engages. In addition to the provision of the key 11 for preventing the gear 12 from turning upon the shaft 9, a holding screw 15 is passed through the extended portion of the hub 13 and into the shaft to prevent move-

ment of the gear longitudinally of the shaft.

For the operation of the short shaft 9 there is provided a crank handle 16, one end of this handle being turned laterally and being provided with a rotatable knob 17 while the other end thereof is enlarged to form the circular head 18, the inner face of which is provided with the relatively large recess 19 which opens into the inner smaller recess 20. This smaller recess is formed to receive the outer end of the shaft 9 while the ratchet 10 positions in the larger recess 19. Covering the face of the head 18 and overlying the ratchet 10 to retain it in its recess is a plate 21 which has screw members 22 passing therethrough for engagement in the face of the head 18 in the manner shown.

Upon the upper part of the head 18 a sleeve 23 is formed which communicates through the passage 24 with the recess 19 and rotatably mounted in the passage 24 is a pawl 25 which carries an upwardly extending stem 26 formed in two sections of different diameters, the lower section 27 and the upper section 28 which, as shown, is of smaller diameter than the section 27. The shoulder thus formed between the lower part of the stem 26 and the pawl 25 supports a coiled spring 29 and the upper end of this spring bears against a spider 30 which extends across the upper end of the sleeve 23.

Upon the upper end of the stem 26 there is mounted a cap 31 which has upon its under face adjacent the periphery the depending tooth 32 which is adapted for selective engagement in one of the two diametrically oppositely positioned notches 33, as will be hereinafter described.

Positioned in the passage 7 and projecting from one end into the chamber 3 and from the other end beyond the body, is a shaft 34.

At its upper end this shaft is of polygonal formation as indicated at 35, and adapted to receive a gear 36 which rests upon the boss 8 in the base of the chamber and is in mesh with the gear 12 carried upon the short shaft 9.

At the lower end there is secured to the shaft 34 outside of and bearing against the end of the casing 1 a ratchet 37 and beyond the ratchet the shaft is of polygonal formation, as indicated at 38, and is provided on opposite faces with recesses 39 in which are positioned the friction balls 40. These balls are normally pressed outwardly by spring members arranged therebehind in the recesses so that when the polygonal portion 38 of the shaft is extended into the socketed end 41 of a nut or bolt head engaging body, such as that indicated by the numeral 42, they will firmly engage the wall of the socket and maintain the member in position on the shaft.

Surrounding the ratchet 37 is a collar 43 through which is formed at diametrically opposite points the passages 44 and 45. The periphery of the collar 43 carries a sleeve 46 which is in alignment with the passage 45 and which houses, within the passage, a rotatable pawl 47, similar to the pawl 25, this pawl, like the pawl 25 being normally forced inwardly by a spring member 48 and carrying upon the outer end of its stem a cap 49 which has a tooth 50 adapted for selective engagement in one of the recesses 51 in the wall of the sleeve. This pawl 47 permits the free rotation of the ratchet 37 under certain conditions as will be hereinafter described, and under other conditions engages the ratchet to force the shaft to rotate.

The collar 43 upon opposite sides of the passage 44 carries a pair of arms 52, the outer ends of which are apertured, as shown, to receive the ears 53 projecting from opposite points on a coupling 54.

The outer end of this coupling is interiorly threaded to receive a similarly threaded end of a cylinder 55 which cylinder at its outer end is partially closed having only a relatively small central aperture 56 opening therethrough.

Within the cylinder 55 is positioned a bar 57, the outer end of which is reduced, as indicated at 58, to extend through the aperture 56 and this reduced end of the bar carries, exteriorly of the cylinder, a head 59. Surrounding the portion 58 of the bar is a spring 60 one end of which engages the shoulder formed at the point where the reduced portions 58 joins the bar while the other end bears against the end wall of the cylinder, in the manner shown.

Overlying the face of the collar 43 which lies adjacent the end of the body 1 is a plate 61 which maintains the ratchet 37 in position in the collar, the shifting of the shaft 34 longitudinally in the casing being prevented by the gear 36 carried upon the upper end of the shaft.

Upon the body of the casing 1 adjacent the cylinder 55 and bar 57 is a pair of spaced spring clips 62 which are designed to frictionally engage and maintain the bar in position along side the body 1 when the bar is not in use. It will be readily seen that in order to swing the bar and its engaging cylinder 55 to position beside the body 1 it is necessary that the bar 57 be pulled outwardly against the tension of the spring 58 to disengage the end of the bar from the recess 44 into which the spring arms move to a position at right angles to the body 1.

In the operation of the present speed wrench a suitable socket is frictionally attached to the lower end 38 of the shaft 34 and if the nut to be removed is difficult to start then the bar 57 may be first shifted to a position at right angles to the body of the wrench so that it may engage the collar 43.

The pawl 47 is then adjusted to engage the ratchet 37 so that when the bar is swung ro-

tary motion will be transferred to the shaft 34. Previous to this operation the pawl 25 must be rotated to a position where the ratchet 10 will be permitted to idle therebeneath thus making it possible to rotate the shaft 34 without swinging or disturbing the crank 16.

After the nut has been started by the use of the bar 57, the bar may be swung back to position against the body 1, the pawl 47 disengaged from the racket 37 so as to permit the ratchet to turn therebeneath and the other pawl 25 replaced in its former position so that when the crank 16 is rotated connection will be established between it and the ratchet 10 and the necessary motion transmitted to the nut engaging socket through the gear connected shafts 9 and 34.

From the foregoing description it will be readily seen that with a wrench of the character herein described any nut or bolt may be easily and quickly loosened and speedily removed by the use of the same tool and likewise a nut or bolt may be quickly driven to position and tightened by the device.

It will be noted that the pawl 26 is rotatable from the position shown in Figure 5 to an oppositely disposed position and thus while in Figure 5 it will prevent the ratchet wheel 10 from rotating in a counterclockwise direction, it will permit the rotation of the ratchet 10 in a clockwise direction and the same is true of the rotatable pawl 45. Thus this wrench may be used for either screwing nuts on or screwing nuts off as desired.

Having thus described my invention, what I claim is:—

1. A speed wrench of the character described comprising an axial shank, reversible operating means engaging one end of said shank for rotation thereof, and a second reversible operating means engaging the opposite end of said shank whereby to rotate said shank independently of said first operating means, said second operating means comprising an annulus loosely engaging said shank and having a recess in the periphery thereof, a pair of spaced ears outstanding from said annulus, a tubular member pivotally mounted between said ears, an elongated rod slidably mounted in said tubular member, yieldable means for normally holding said rod in engagement with said recess, means for withdrawing said rod from said recess against the tension of said yieldable means, said annulus having an internal radial recess, a spring pressed reversible pawl in said recess, and ratchet teeth on said shank within the circle of said annulus.

2. A speed wrench of the character described comprising an elongated handle having a bore opening outwardly of one end thereof, an axial shank mounted in said bore and extending outwardly of one end thereof, whereby to provide a shoulder spaced inwardly from the extended end of the shank, reversible operating means engaging one end of said shank for rotation thereof, and a second reversible operating means mounted on the extended end of the shank and abutting against said shoulder, said second operating means comprising an annulus mounted on the extended end of said shank and engaging against said shoulder, said annulus having an external radial recess and an internal recess therein, a tubular member pivotally mounted on said annulus, an elongated rod slidably mounted in said tubular member, yieldable means for normally holding said rod in engagement with said external recess, means for moving said rod longitudinally of said tubular member against the tension of said yieldable means, ratchet teeth on the extended portion of said shank within the circle of said annulus, said annulus having a spring pressed reversible pawl in said internal recess, and a washer mounted on said shank for holding said annulus against said shoulder and against longitudinal movement on said shank.

In testimony whereof I hereunto affix my signature.

CARMON LE ROY COUP.