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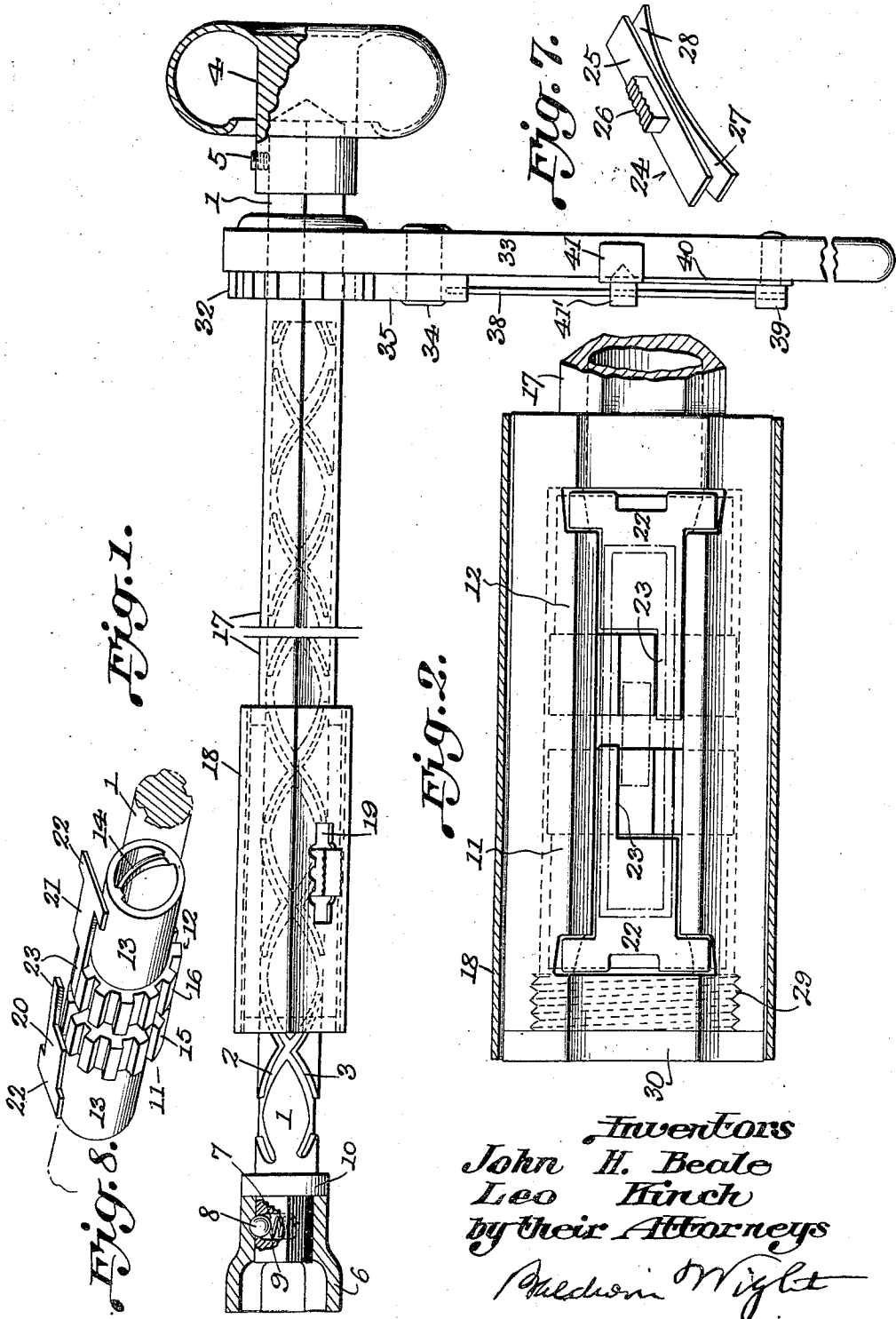
J. H. BEALE ET AL

1,513,212

SPEED RATCHET WRENCH

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2 Sheets-Sheet 1



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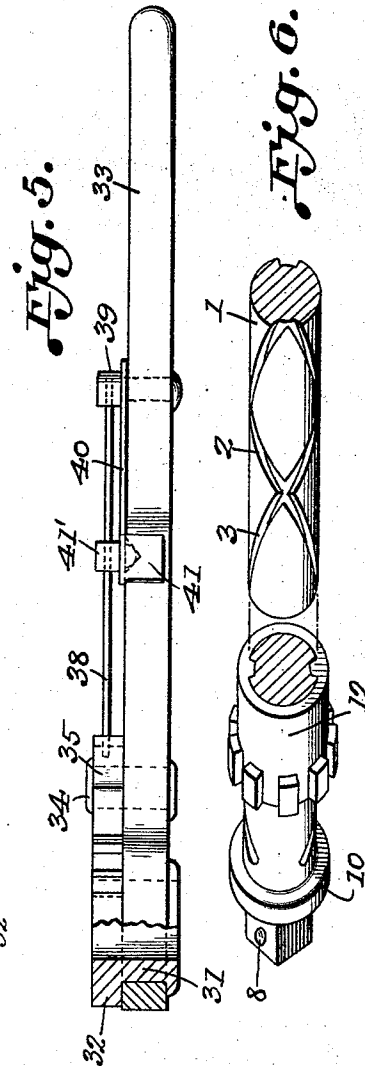
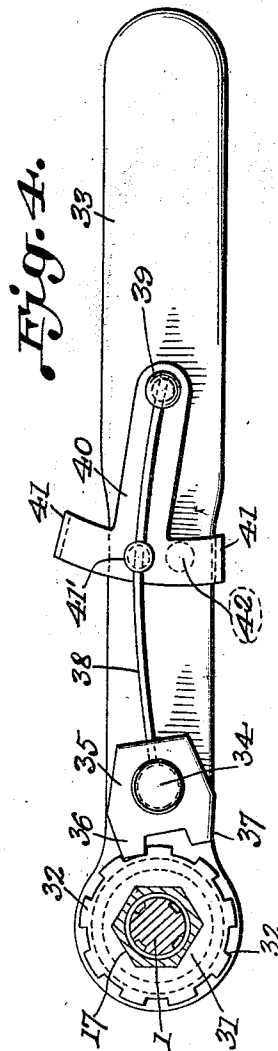
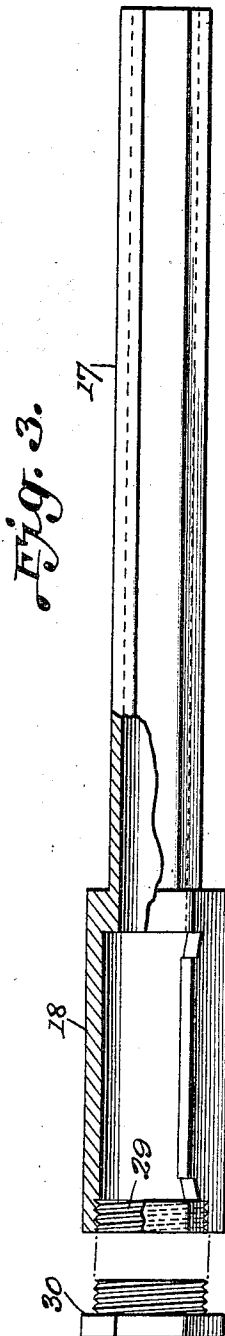
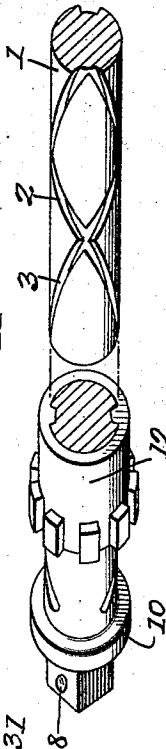


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN H. BEALE AND LEO KINCH, OF EUGENE, OREGON.

SPEED RATCHET WRENCH.

Application filed November 6, 1923. Serial No. 673,176.

To all whom it may concern:

Be it known that we, JOHN H. BEALE, a citizen of the United States, and resident of Eugene, in the county of Lane and State of Oregon, and LEO KINCH, a citizen of the United States, and resident of Eugene, in the county of Lane and State of Oregon, have invented certain new and useful Improvements in Speed Ratchet Wrenches, of which the following is a specification.

Our invention relates to the type of wrenches sometimes known as socket wrenches which may be provided with interchangeable sockets of various sizes and shapes to cooperate with corresponding shapes of nuts and bolt heads, but certain features of the invention are applicable to devices in which the socket may be replaced by a suitable holder for other tools, such as screw drivers, drills, and the like.

An object of the invention is to provide such a device which can be rapidly rotated by pressure on the handle, but when it becomes difficult to turn the driven part, can be turned by a pawl and ratchet mechanism operated by a separate handle or lever.

Another object of the invention is to so arrange the parts that the rapid rotation may be in either direction as desired or in which the parts may be set to prevent relative rotation of the spindle and sleeve.

Another object of the invention is to provide means whereby the lever may actuate the pawl and ratchet mechanism to turn the spindle of the device in either direction as desired.

Other objects will be apparent from the following detailed description and appended claims.

In the drawings:

Figure 1 is a side elevation with parts in section of the wrench.

Figure 2 is a vertical section of a portion of the sleeve with parts in section.

Figure 3 is a side view of the sleeve with portions in section.

Figure 4 is a view of the pawl and ratchet mechanism with lever for operating the same, the spindle and sleeve being shown in section.

Figure 5 is a view at right angles to that of Figure 4.

Figure 6 is a detached view of a portion of the spindle with the ratchet thereon.

Figure 7 is a view of the finger piece

which is set to determine the direction of rotation of the spindle.

Figure 8 is a perspective view of the internally threaded nuts which cooperate with the spiral grooves in the spindle and the pawls for holding either or both nuts against rotation on the spindle.

A spindle 1 is provided with two spiral grooves 2 and 3 for right and left hand rotation thereof. At one end a hand piece 4 of any suitable form is secured to the spindle by a set screw 5 or in any other desired manner. At the other end is carried a detachable and interchangeable socket 6 in the following manner. Near its end in one side thereof the spindle 1 has a cavity 7 in which is retained a ball 8 pressed outwardly by a spring 9. The socket 6 slips over the outer end of the spindle and abuts against a collar 10 thereon at which time the ball 8 is pressed outwardly into a depression in the inner wall of the socket. This will prevent any accidental removal of the socket but will permit it to be readily detached when it is desired to substitute one of different size or form. Obviously the outer end of the spindle 1 will be angular in form and the engaging portion of the socket similarly shaped to prevent relative rotation between the parts.

Fitting on the spindle are two ratchet members 11 and 12, each having a sleeve like portion 13 provided with an internal rib or thread 14 adapted to engage one or the other of the grooves 2 and 3. One of the threads 14 is right hand and the other left hand so that the spindle may be rotated in one direction or the other according to which ratchet member is held stationary. These members 11 and 12 also have teeth 15 and 16 respectively which are adapted to be engaged by pawls as hereinafter set forth.

A sleeve 17 having an enlarged portion 18 surrounds the spindle, and the enlarged portion is provided with an opening 19. The enlarged portion 18 encloses the ratchet members 11 and 12 and the pawls 20 and 21 which are adapted to cooperate therewith. The form of these pawls is clearly shown in Figures 2 and 8, and they have a broad end 22 remote from the teeth 15 and 16 which bears such a relation to the enlarged portion 18 of the sleeve that there can be no relative movement of rotation between the pawls and the sleeve. The broad end 22 of each pawl

is adapted to rest on the sleeve like portions 13 of the ratchet members. Each pawl has a smaller end 23 overlying the ratchet teeth 15 or 16 and adapted to be pressed into engagement with the same.

Within the sleeve and overlying the pawls is an operating member 24 shown in Figure 7 which has a plate portion 25 slidable within the sleeve, a bowed spring on the under side thereof which rests on the pawls at its ends, and a finger piece 26 which projects through the opening 19 in the enlarged portion 18 of the sleeve. Notches may be provided in the edge of this opening as shown in Figure 2 to cooperate with a projection on the member 24 if desired to hold it in adjusted position.

When the member 24 is pushed to the left in Figures 2 and 8, the end 27 of the spring will bear down on the broad end of the pawl 20 lifting the small end 23 thereof out of engagement with the ratchet teeth 15. At the same time the end 28 of the spring will bear down on the small end 23 of the pawl 21 and force it into engagement with the teeth 16. This will lock the ratchet member 12 against rotation relative to the sleeve 17. If therefore the spindle is pushed endwise by pressure on the handle 4 and the sleeve is held against turning, the spindle will be rotated by the engagement of the rib 14 with its cooperating groove in the spindle. If the member 24 is pushed to the opposite extreme of its movement, just the reverse operation will take place and the ratchet member 11 will be held against rotation, and an endwise movement of the spindle will result in its rotation in the opposite direction. If however, the member 24 is moved to central or intermediate position, the spring will engage both pawls in a manner to press the small ends 23 thereof into the two ratchets 15 and 16, locking both ratchet members 11 and 12 and preventing any endwise movement of the spindle relative to the sleeve.

The open end of the enlarged portion of the sleeve is threaded internally as at 29 and a threaded nut 30 is adapted to screw therein to hold the ratchet and pawl members in assembled relation.

For the purpose of holding the sleeve against turning when the spindle is rotated rapidly, and also for turning the sleeve and spindle when they are locked together, the following mechanism is provided. The outside of the sleeve 17 is angular in form, for example, hexagonal, and a short sleeve or collar 31 fits slidably thereover but is not rotatable thereon. This sleeve has a ratchet 32 and a lever or handle 33 has an opening which fits rotatably over the sleeve 31, the edge of the sleeve being turned over as shown in Figure 5 to hold the lever or handle 33 in place. Pivoted by a pin, rivet or similar fastening 34 to the handle 33 is a pawl 35 having

two teeth 36 and 37 so positioned that either of these teeth may be brought to engage the teeth of the ratchet 32. One end of a spring member 38 is attached to the pawl 35 and the other end is attached to a pin, rivet or similar fastening 39 on the handle 33. Also pivoted on the pin 39 is a switch member 40 of the form shown in Figure 4 having downturned ends 41 to engage the handle and limit the movement of the member 40 in either direction. This member 40 carries a stud member 41' through which the spring 38 passes, which stud is adapted to engage either of two notches 42 in the handle to hold the parts against accidental displacement. When the parts are in the position shown in Figure 4, a movement of the lever 33 will cause the pawl 36 to turn the ratchet 32 and consequently the sleeve 17 when rotated in one direction, but not in the other, the pawl teeth being so formed with relation to the ratchet teeth that they will slip over the ratchet on the reverse movement. If it is desired to rotate the sleeve in the opposite direction the switch member 40 is moved to its other extreme moving the tooth 37 into engagement with the ratchet 32 and the tooth 36 out of engagement therewith. It will be noted that the spring 38 operates both to hold the pawl 35 in set position as it is slightly bowed when in either extreme position, and it also tends to hold the detent 41' in engagement with the corresponding depression.

When it is desired to turn the spindle rapidly, the finger piece 24 is set to cause right or left hand rotation as desired by engagement with the proper one of the ratchet members 11 or 12. The handle 33 is employed to hold the sleeve 17 against rotation and pressure on the handle 4 will move the spindle endwise relative to the spindle and rotate the latter rapidly. When more force is desired than can be readily obtained in this manner, the finger piece 24 is set to lock both pawls in engagement with the ratchet members 11 and 12 and therefore prevent any relative angular movement between the spindle and sleeve. The pawl 35 is set for right or left hand rotation as desired, and the handle 33 is oscillated, the socket 6 being held in engagement with the nut or bolt being turned by light pressure on the handle 4.

It will be therefore seen that we have provided a ratchet wrench or similar tool capable of rapid operation in either direction when there is a relatively small resistance to the turning movement, or can be used for slower operation with great power when high resistance is encountered. It will be obvious that various details may be changed and some features of the invention used alone or together with varied forms of devices, and therefore the invention is to be

regarded as limited only by the scope of the appended claims.

We claim as our invention:

1. A ratchet wrench or similar tool comprising a spindle having right and left hand spiral grooves thereon, a sleeve surrounding said spindle and having an enlarged portion, two short sleeve like members each having an internal rib to engage one or the other of said grooves and each having a ratchet, two pawls within the enlarged portion of the sleeve, each having a broad end which prevents its relative rotation with respect to the sleeve, and a narrow end which engages the corresponding ratchet, and a slidable pawl actuating member movable to cause either pawl to engage its associated ratchet or to cause both pawls to engage the ratchets and lock the sleeve and spindle against relative rotation, and lever actuated pawl and ratchet mechanism for turning the sleeve and spindle when thus locked.

2. A ratchet wrench or similar tool comprising a spindle, a sleeve therefor, means whereby relative longitudinal movement of

the sleeve and spindle will produce rotation of the latter or whereby the spindle and sleeve may be locked against relative rotation in either direction, a collar having a ratchet slidably but non-rotatably mounted on the sleeve, a lever or handle rotatable on the collar, and a pawl carried by the lever which engages the ratchet to turn the latter and thereby the spindle.

3. A ratchet wrench or similar tool comprising a spindle, a sleeve thereon, means whereby the sleeve and spindle may be locked to rotate together in either direction at any desired longitudinal position of the same, a collar slidably but non-rotatably mounted on the sleeve, a ratchet on said collar, a lever or handle rotatable on said collar, a double pawl mounted on said lever, and means for holding either tooth of the pawl in engagement with the ratchet.

In testimony whereof, we have hereunto subscribed our names.

JOHN H. BEALE.
LEO KINCH.