C. F. MORGAN.

WRENCH.

APPLICATION FILED APR. 28, 1919.

**1,325,407.** Patented Dec. 16, 1919.

Fig. 1.

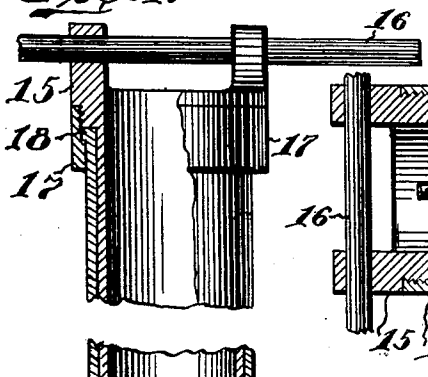



Fig. 4.

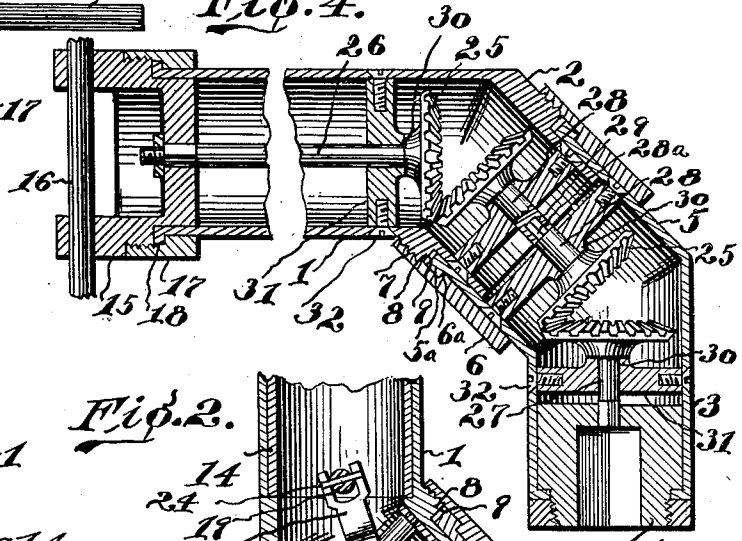



Fig. 2.

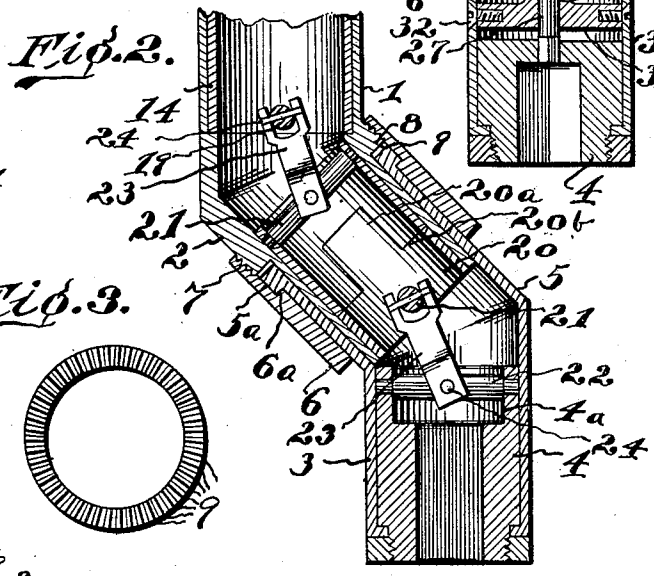



Fig. 3.






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# UNITED STATES PATENT OFFICE.

CARL F. MORGAN, OF JOLIET, MONTANA.

## WRENCH.

1,325,407. Specification of Letters Patent. Patented Dec. 16, 1919.

Application filed April 28, 1919. Serial No. 293,197.

*To all whom it may concern:*

Be it known that I, CARL F. MORGAN, a citizen of the United States, residing at Joliet, in the county of Carbon, State of Montana, have invented a new and useful Wrench; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an operating handle for socket wrenches, and has for its object to provide a device of this character which embodies novel features of construction whereby the handle may be held in a large number of different angular positions with respect to the nut, and the nut screwed into or out of position without difficulty.

Further objects of the invention are to provide a device of this character which can be easily and quickly adjusted, which will enable inaccessible nuts to be manipulated without difficulty, and which is not liable to break or get out of repair.

With these and other objects in view, the invention consists in certain novel combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a longitudinal sectional view through a socket wrench constructed in accordance with the invention.

Fig. 2 is a sectional view through the end of the wrench, showing a different adjustment of the parts.

Fig. 3 is a detail view of the interlocking toothed meeting edges of the elbow sections.

Fig. 4 is a sectional view showing a modified form of the invention.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to Figs. 1 and 2 of the drawings, which illustrate one embodiment of the invention, the numeral 1 designates a tubular stock which is provided at one end thereof with an integral elbow 2, said elbow being arranged at an angle of substantially 45° to the stock. A short tubular arm 3 which has a chuck 4 rotatably mounted in the outer end thereof is provided at its inner end with an elbow 5, said elbow being disposed at an angle of substantially 45° to the arm and telescoping upon the reduced portion $2^a$ of the arm 2, having both a sliding and rotary motion thereon. A coupling sleeve 6 is rotatably mounted upon the exterior of the elbow 5 and one end thereof has a threaded connection at 7 with the elbow 2. A shoulder $6^a$ on the coupling sleeve engages a rib $5^a$ on the elbow 5 so that when the coupling sleeve is screwed tightly in position the end of the elbow 5 will be forced firmly against a shoulder 8 on the elbow 2. In this connection it will be noted that both the shoulder 8 and the end of the elbow 5 are formed with teeth 9 which securely interlock with each other when the coupling sleeve is tightened so that it is impossible for the elbow 5 to work loose and turn upon the elbow 2. However, when the coupling sleeve 6 is loosened the teeth 9 can be disengaged from each other and the elbow 5 rotated upon the elbow 2 to bring the arm 3 into any desired angular relation to the tubular stock 1. Where the two elbows 2 and 5 are arranged at 45° to the stock 1 and arm 3, respectively, it will be obvious that by rotating the elbow 5 on the elbow 2 the arm 3 can be brought into a position at right angles to the stock 1, as indicated by Fig. 1, or parallel thereto, as indicated by Fig. 2, or at any intermediate angle. The chuck 3 is designed to receive the stem 11 of a socket 12, and it will be obvious that proper adjustment can be made to work upon the nut in the most effective manner.

A tubular shaft 14 extends through the stock 1 and is rotatable therein, the outer end of the shaft terminating in a head 15 which is provided with a cross bar 16 forming a handle piece. A sleeve 17 which has a threaded engagement with the head 15 overlaps the end of the stock 1 and is recessed to receive a rib 18 at the end thereof, thereby holding the tubular shaft 14 against longitudinal movement without interfering with the necessary rotation thereof. The inner end of the tubular shaft 14 is provided with a transverse pin 19 which is pivoted so that it is free to turn about a longitudinal axis. The tubular elbows 2 and 5 are each provided with a short tubular shaft element 20 which are provided at their meeting ends with corresponding tongues $20^a$ and notches $20^b$ so that when the parts are assembled the

two tubular shaft elements interlock with each other and form in substance a single tubular shaft extending through the elbow portion of the device. The outer end of each tubular shaft section is formed with a transverse pin 21, said pins being mounted so that they can turn about their longitudinal axes. The chuck 4 terminates at its rear end in a sleeve $4^a$ which is provided with a transverse pin 22 that is mounted to turn about its longitudinal axis. Universal joint links 23 connect the pins 21 of the tubular shaft sections 20 to the pin 19 of the tubular shaft 14 and the pin 22 of the chuck member, respectively. The ends of these link members 23 terminate in bifurcations which are arranged at right angles to each other and which have loose pivotal connections 24 with the respective transverse pins. It will be obvious that the several tubular shaft elements are thus connected by universal joints, so that the chuck 4 can be rotated by turning the handle 16. Means is thus provided for rotating the chuck and socket wrench from a distance, and nuts which would otherwise be inaccessible can be readily operated upon.

A modification is shown by Fig. 4, in which bevel gearing 25 is substituted for the universal joints. A shaft 26 extends longitudinally through the tubular stock 1 and a shaft 27 extends from the back of the chuck 4. Shaft sections 28 are arranged within the respective elbows 2 and 5, one of the shaft sections being formed with a polygonal socket 29 which has a telescoping engagement with the polygonal end $28^a$ of the other shaft section, thereby locking the two shaft sections together, although the elements can be readily assembled or taken apart. The several shafts and shaft sections are journaled in bearings 30 at the middle portions of spiders 31 which are suitably fitted within the tubular elements of the frame and secured in position by fastening members such as the screws 32. This form of the invention can be angularly adjusted in exactly the same manner as the previous form, and the chuck can be readily rotated by turning the handle 16.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A wrench including a tubular stock having an angularly disposed elbow at one end thereof, a tubular arm formed with a complemental angularly disposed elbow which is rotatable upon the first mentioned elbow, means for locking the two elbows together with the tubular arm in different angular positions with respect to the stock, a socket engaging chuck rotatable in the tubular arm, shaft members extending through the stock, elbows and arm, operative connections between the shafts and also between the shafts and the chuck, and means for rotating the shafts.

2. A wrench including a tubular stock having an angularly disposed elbow at one end thereof, a tubular arm formed with a complemental angularly disposed elbow which has a rotatable engagement with the first mentioned elbow, a coupling sleeve for drawing the elbows together, meeting portions of the two elbows being formed with corresponding teeth so that the elbows can be locked together with the arm at any desired angular relation to the stock, a chuck rotatably mounted in the tubular arm, shaft members extending through the stock, elbows and arm, operative connections between the shafts and also between the shafts and the chuck, and means for rotating the shafts.

3. A wrench including a tubular stock having an angularly disposed elbow at one end thereof, a tubular arm formed with a complemental angularly disposed elbow which is rotatable upon the first mentioned elbow, means for locking the two elbows together with the arm in any desired angular relation to the stock, a socket engaging chuck rotatable upon the tubular arm, a shaft extending through the stock, complemental shaft sections extending through the elbows and having a telescoping and interlocking engagement with each other, operative connections between the complemental shaft sections and the chuck and shaft of the tubular stock, respectively, and a handle at the outer end of the shaft of the tubular stock.

4. A wrench including a tubular stock having an angularly disposed elbow at one end thereof, a tubular arm formed with a complemental angularly disposed elbow which has a telescoping and rotary connection with the first mentioned angular elbow, means for locking the two elbows together with the tubular arm at any desired angular relation to the tubular stock, a socket engaging chuck carried by the arm, a main tubular shaft rotatable within the stock, tubular shaft sections rotatable within the respective elbows and formed with complemental tongues and notches arranged to interlock when the parts are assembled, universal joint connections between the respective tubular shaft sections and the chuck and the main tubular shaft of the stock, and a handle at the outer end of the main tubular shaft for rotating the same.

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

CARL F. MORGAN.

Witnesses:
F. G. MORGAN,
F. A. CANNONY.