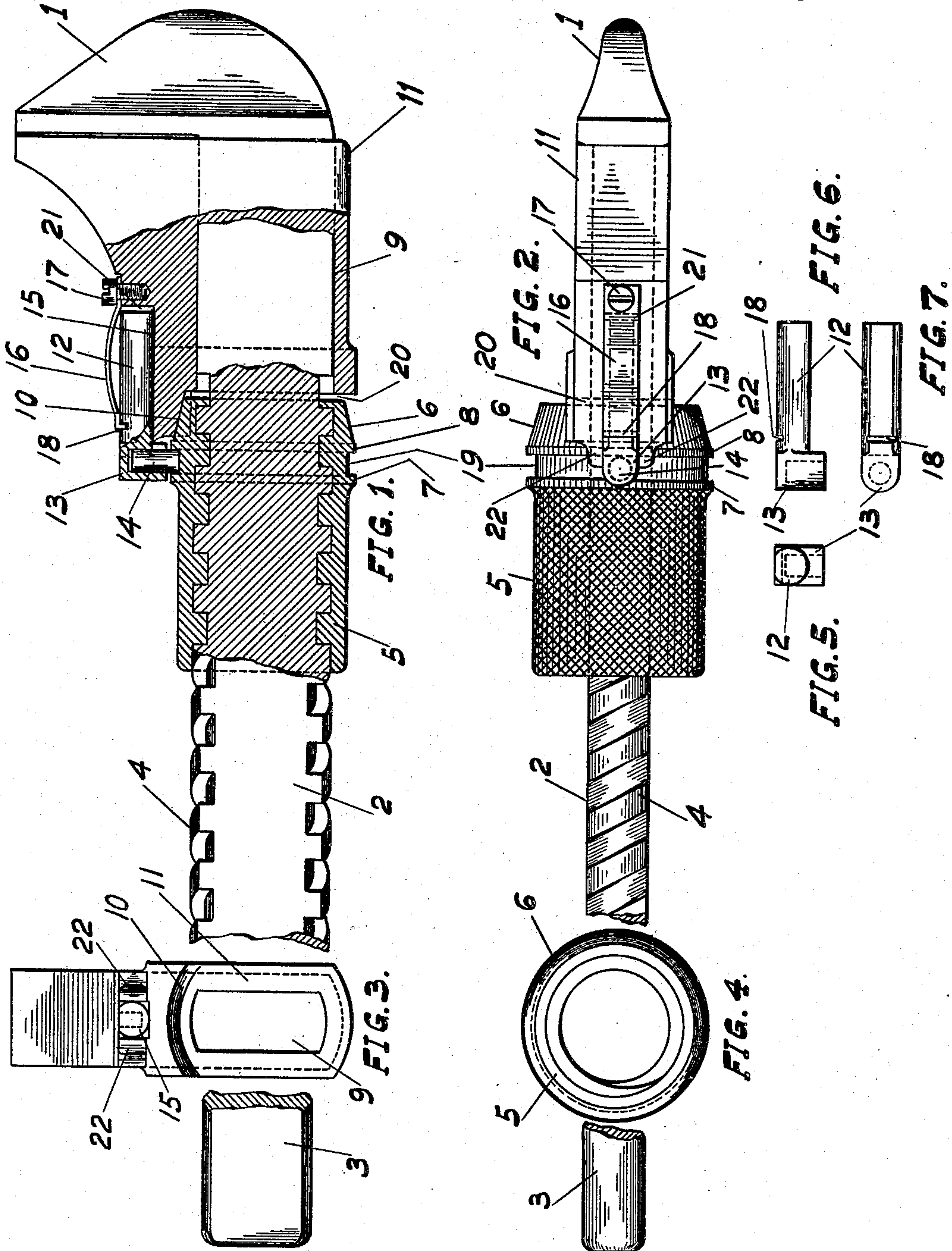


G. W. McELROY.
WRENCH.

APPLICATION FILED APR. 22, 1909.

Patented Aug. 10, 1909.

930,983.



WITNESSES

Edgar A. Jones.
John L. Ellerson.

INVENTOR

George W. McElroy.

UNITED STATES PATENT OFFICE.

GEORGE W. McELROY, OF NEW YORK, N. Y.

WRENCH.

No. 930,983.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed April 22, 1909. Serial No. 491,624.

To all whom it may concern:

Be it known that I, GEORGE W. McELROY, commander, United States Navy, a citizen of the United States, residing at New York, in the county of New York and the State of New York, have invented certain new and useful Improvements in Wrenches, of which the following is a specification.

My invention relates to wrenches; and the object of the same is to provide a wrench which may be quickly and readily adjusted to fit different sizes of nuts.

The general style of wrench on which my improvements appear is the kind having a threaded shank with a nut on same for adjusting the movable jaw.

More particularly the invention provides a wrench having: a fixed jaw, a shank portion thereof, and a handle all in one piece; the shank portion carrying a nut, and each having a thread with the pitch angle equal to or somewhat greater than the "angle of repose," that is to say the tangent of the pitch angle being equal to or somewhat greater than the coefficient of friction for the metals used; said nut having cone or wedge-like contact with a movable jaw and thereby prevented from turning, when under pressure of service, by the friction engendered at the conical surfaces, notwithstanding the steepness of the threads in the nut and on the shank which ordinarily would permit the nut to rotate under end-wise pressure; and finally a pin, a spring and roller connection between the nut and the movable jaw capable of maintaining contact between them until the spring be pressed, by which action the conical surfaces are slightly separated and the jaw and the nut may be then moved to any position within the limits of the wrench without the nut being touched by the hand, contact between nut and movable jaw being resumed when the spring is released.

I am aware that the cone or wedge-like contact described as existing between the nut and the movable jaw is not new. It has been used heretofore, however, only to prevent accidental turning of the adjusting nut of a wrench, intended to be used in the common and well known way, and with no specified or implied intention of applying it to any wrench other than one in which the thread on the shank has the ordinary limitation of bolt threads, that is to say with the pitch angle less than the "angle of repose."

Its use on a wrench having thread on the shank as steep as that described above, the employment of which on an ordinary wrench is not possible, I believe to be new.

Furthermore my invention relates to improvements in the method of preserving and breaking the cone or wedge-like contact between the nut and the movable jaw. My improvements in this direction and their objects are: the substitution of a sliding for a hinged member, thereby rendering action more positive and certain; the introduction of a roller to reduce friction and render manipulation easier; the substitution of a bow spring for a spiral one to suit the use of the sliding member.

Figure 1 is a side elevation of my wrench, a portion thereof being broken away, and is shown partly in section. Fig. 2 is a plan view of the same, a portion thereof being broken away. Fig. 3 is a rear end view of the movable jaw. Fig. 4 is a front end view of the nut. Figs. 5, 6 and 7 are three views of the pin which is an element in the connection between the movable jaw and the nut.

Corresponding parts in all the figures are denoted by the same reference numerals.

In the drawings, 1 designates the stationary jaw of the wrench, 2 the shank, and 3 the handle portion; these are in one piece. The top and the bottom of the shank for a suitable length has an interrupted screw threaded portion 4 to accommodate the thread in the nut 5. The angle of pitch of the threads is made equal to or greater than what is known in mechanics as the "angle of repose", thus permitting the nut, when special means are not provided for holding it stationary, to rotate freely under pressure or force applied endwise to it and to thereby advance along the shank; this movement along the shank, it is to be noted, being accomplished without any direct circumferential force being applied to the nut such as is necessary in turning and advancing the adjusting nuts of ordinary wrenches provided with them. It will perhaps help to an understanding of this action to state that the thread employed is of such steep pitch that if the shank be held with its axis vertical the nut, if freed from all restraint including connection with the movable jaw, will be moved downward and be rotated freely by its weight alone. A multiple thread, though preferable and so shown on

the drawings, is not absolutely essential, the action in the case of a single thread being the same. The essential thing is that the pitch shall be as steep as described. The nut 5 has a conical end 6; and it has a peripheral groove 19 into which fits the roller 14 described further on.

7 and 8 are the sides of the groove.

The movable jaw 11 has a portion thereof shaped to form the conical socket 10, which embraces the conical end 6 of the nut 5 except when they are intentionally separated during adjustment. The socket 10 is shown to be a segmental cone. It can, however, be made to embrace the entire conical end 6 if desired.

9 is the aperture in the movable jaw through which the shank 2 passes.

A pin 12, having an end portion 13 provided with a roller 14 rotatably held therein and working within the peripheral groove 19, is longitudinally and slidably mounted upon the movable jaw 11, which is provided with a suitable longitudinal recess 15. Into said recess 15 the pin 12 is drawn by means of the bow spring 16, which is secured to the movable jaw 11 by means of a screw 17 and having the other end hooked to fit within a slot 18 upon the pin 12. A consequent effect of the drawing of the pin 12 into the recess 15 by the spring 16 is to bring the conical surfaces 6 and 10 together through the medium of the roller 14 which will press against the side 8 of the peripheral groove 19. A clearance space 21 at end of the recess 15 and a clearance space 20 between the end of nut 5 and the movable jaw 11 are provided to insure the conical surfaces 6 and 10 being brought in contact. The spring 16, which is flat, helps to keep the pin 12 from turning in the socket 15 and thus throwing the roller 14 out of the groove 19; to make such turning of the pin 12 impossible its end 13 is made with flat sides so that it will fit the guiding slot formed by the projecting parts 22, 22, of the movable jaw 11.

The practical working of the wrench above described, particularly as to its quick adjustment and capacity for maintaining same, is as follows:—By pressing down the bow spring 16 the pin 12 is moved slightly outward in the socket 15 an amount limited to the difference between the normal distance between the ends of the spring and the distance when it is compressed against the pin, and the conical surfaces 6 and 10 are correspondingly separated since the roller 14 engaging the groove 19 moves with the pin 12. With their conical surfaces 6 and 10 thus held apart friction between them is made impossible and the nut 5 on the movable jaw 8 may be moved to any desired position, the nut 5 revolving freely as it is advanced along the shank 2. Then, by releasing the bow spring 16, the conical sur-

faces 6 and 10 are again brought in contact and if stress be brought on the jaws the friction thereby produced between said conical surfaces will prevent the nut turning and the adjustment will be maintained.

If desired, the adjustment can be made by revolving the nut by hand in the manner usual in wrenches having an adjusting nut. The moderate friction produced between the conical surfaces 6 and 10 by the spring 16 will not prevent such hand adjustment. To facilitate such mode of adjustment the nut 5 is knurled as shown.

It will be obvious that various modifications might be made in the herein described wrench, which could be used without departing from the spirit of my invention. It is also evident that the steep threaded shank and nut and the members connected therewith and with the movable jaw are applicable not alone to a monkey wrench but also to wrenches having jaws, suitable for grasping or cutting pipes, and to vises.

Having fully described my invention, I claim and desire to secure by Letters Patent:—

1. In a wrench of the character described, the combination with a shank provided with a fixed jaw and having a portion thereof screw threaded, of a movable jaw slidably mounted upon said shank, a nut revolubly mounted upon the screw threaded portion of said shank, the tangent of the pitch angle of threads on said shank and in said nut being not less than the coefficient of friction between the materials of which they are made, said nut being provided with a conical shaped end suitable for making surface contact with a conical shaped socket in said movable jaw, and means longitudinally and slidably mounted upon said movable jaw and engaging said nut for maintaining contact between the conical surfaces of said conical end of nut and said conical socket when said means are not specially manipulated to break said contact, substantially as and for the purpose described.

2. In a wrench of the character described, the combination with a shank provided with a fixed jaw and having a portion thereof screw threaded, of a movable jaw slidably mounted upon said shank, a nut provided with a peripheral groove revolubly mounted upon the screw-threaded portion of said shank, the tangent of the pitch angle of threads on said shank and in said nut being not less than the coefficient of friction between the materials of which they are made, said nut being provided with a conical shaped end suitable for making surface contact with a conical shaped socket in said movable jaw, a member longitudinally and slidably working within a recess in said movable jaw and provided with a roller, said roller arranged to work within said periph-

eral groove upon said nut, and means for limiting the slidable movement of said member, substantially as and for the purpose described.

- 5 3. In a wrench of the character described, the combination with a shank provided with a fixed jaw and having a portion thereof screw threaded, of a movable jaw slidably mounted upon said shank, a nut provided
10 with a peripheral groove revolubly mounted upon the screw-threaded portion of said shank, the tangent of the pitch angle of threads on said shank and in said nut being not less than the coefficient of friction be-
15 tween the materials of which they are made, said nut being provided with a conical shaped end suitable for making surface con-

tact with a conical shaped socket in said movable jaw, a member longitudinally and slidably working within a recess in said movable jaw and provided with a roller, said roller arranged to work within said peripheral groove upon said nut, a spring secured upon said movable jaw and adapted to press said slidable member inwardly and to allow
20 it a more limited longitudinal movement outwardly when manipulated, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. McELROY.

Witnesses:

JOHN L. ELBERSON,
ETHAN A. JONES.