C. SAUER.

WRENCH.

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938,020. Patented Oct. 26, 1909.

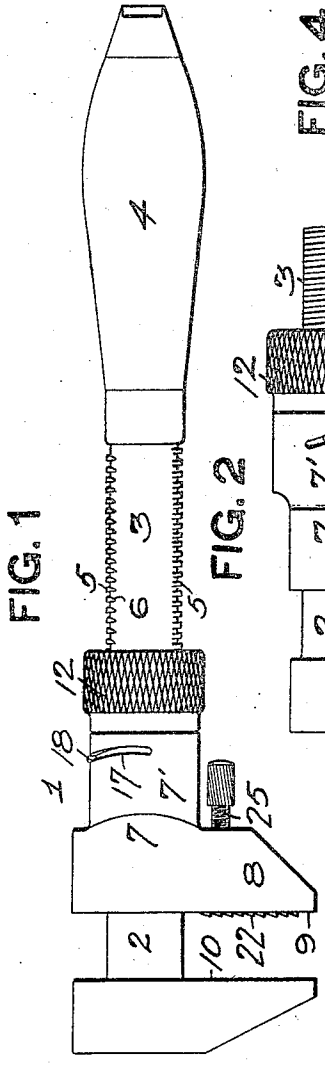


FIG. 1

FIG. 2

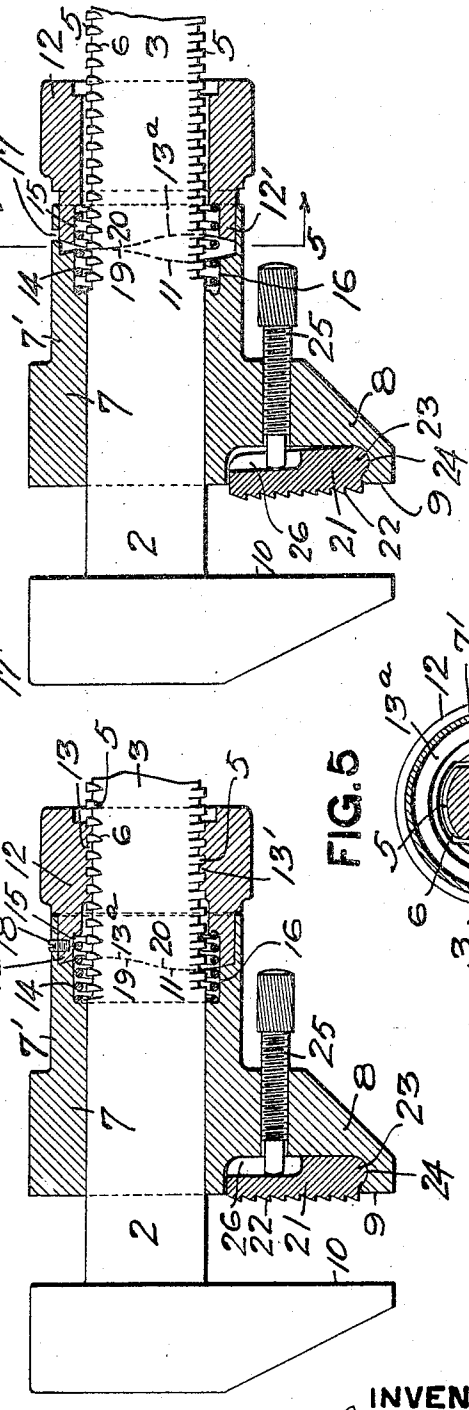


FIG. 3

FIG. 4

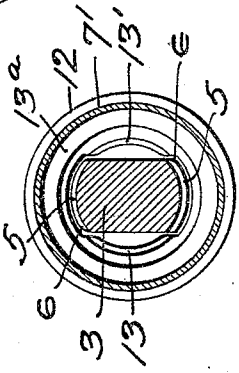


FIG. 5

WITNESSES.

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WRENCH.

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To all whom it may concern:

Be it known that I, CONRAD SAUER, resident of Homestead, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Wrenches; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to wrenches. Its object is to provide an improved wrench which may be readily adjusted to the work and conveniently secured in tight gripping position.

It consists, in general terms, in a wrench having a wrench bar, a body portion, longitudinally movable thereon, and having a cam bearing face, a sleeve rotatable on said wrench bar and longitudinally movable thereon, and also provided with a cam face adapted to inter-play with the cam face on the body portion.

It also consists in certain other improvements hereinafter set forth, including a spring between the sleeve and the body portion adapted to insure more easy and effective working.

In the drawings Figure 1 is a full length side view of the wrench; Fig. 2 is a detail plan view; Fig. 3 is a detail cross section illustrating my invention in one position; and Fig. 4 is a like view illustrating my invention in another position; Fig. 5 is a cross section on the line 5—5 Fig. 4.

The wrench 1 illustrated in the drawing has the wrench bar 2 provided with the shank portion 3 which extends to the handle portion 4, which may be of any suitable construction. The shank portion 3 is provided with the interrupted or mutilated threads 5. Each of these threads is preferably constructed with the tapering end or entrance portions 6, as shown clearly in Fig. 3. The wrench bar is of the shape in cross section illustrated in Fig. 5, each mutilated thread extending in a segment of a circle slightly less than one-fourth of the circumference. The body portion 7 of the wrench is provided with the jaw 8 having the jaw face 9 opposite to the jaw face 10 of the wrench bar 2. Inserted in this jaw face is a pipe lock of my invention to be subsequently described.

The body portion 7 is provided with a cam face 11 of peculiar construction. The cam portion of this face is illustrated as extending conveniently entirely around the face of the body portion, as indicated by Figs. 3 and 4. The sleeve 12 is provided with the mutilated threads 13, 13′ on its inner face. These threads each extend approximately around one-fourth ($\frac{1}{4}$) of a circumference, as shown in Fig. 5. They are adapted to mesh with the corresponding threads 5 of the shank portion 3 of the wrench bar when the sleeve is turned so as to engage them. The sleeve 12 is also provided with the cam face 13^a adapted to play on the corresponding cam face 11 of the body portion 7. A spiral spring 14, shown, is situated between the off-set or cored-out face 15 of the sleeve and the corresponding off-set 16 in the inner face of the body portion 7. The body portion 7 and the sleeve 12 are preferably also connected by the curved slots 17 in the extension 7′ of the body portion, and the pin 18 in the reduced end 12′ of the sleeve. The slot 17 is of exactly identical curvature with one wave of the cam faces 11 and 13^a. It extends also through part of another wave, as illustrated in Fig. 2, for the purpose set forth below.

When it is desired to set the wrench to a given piece of work, the sleeve 12, which is then in the unlocked position or that indicated by Fig. 5, is pushed forwardly along the wrench bar shank portion 3 until the work is firmly met and grasped between the jaw faces 9 and 10. The sleeve 12 is then firmly turned by the hand so as to interengage the threaded portions 13, 13′, and 5 on the sleeve and wrench bar respectively. The first part of this turning merely sets the wrench for the reason that the opposite portions 19 and 20 of the cam faces are constructed so as to correspond identically in pitch with the pitch of the interrupted threads 5, 13 and 13′. This turning will bring the wrench to the position illustrated by Fig. 3.

I thus by my invention provide a wrench which can be set to working position by purely longitudinal movement, and can be turned into set position without loosening in any manner the grip. It will be observed that as the work desired to be gripped will not always correspond in the diameter engaged to an exact inter-engaged position of the mutilated threads 5, on account of the pitch of the threads, even this set position may not be entirely satisfactory in tightly holding the cut pipe or other object or work to be turned. If, however, a satis-

factory grip has been obtained up to this point, the compression spring 14 will insure that the mechanism remains firmly in the position obtained and desired and will prevent rattling of the wrench during operation. The tapered ends 6 of the threads 5 insure also an easy entrance of the threads in adjusting the wrench to the work. If, however, the operation described above has not entirely succeeded in obtaining a secure grip, the sleeve may be further turned through a small arc. By this further turning the converse portions or curves 19 and 20 of the cam faces are moved across each other to a position like that illustrated in Fig. 4. This results in a further tightening by forcing the body portion 7 along the wrench bar. This further tightening may be carried to an extent equal to the pitch of the screw threads, as illustrated in Fig. 4. Therefore, by my construction of cam faces and mutilated threads, I provide a wrench which will grip with absolute accuracy and great tightness any desired piece of work. This is apparent when it is considered that the longitudinal movement obtained by the cam faces after having reached a set position is equivalent to the pitch of the threads. Hence, this movement, if carried to the extreme, would bring the opposing jaws 9 and 10 to a degree of separation which could have been obtained by inter-engaging the next set of threads to that actually engaged. I, therefore, in effect, provide a wrench which by longitudinal movement of the reciprocating portions to a caught or approximately caught position, and by a convenient radial movement of the sleeve portion, will firmly grip any object. As indicated above, the slot 17 corresponds exactly to a cam face and, therefore, maintains the sleeve and body portion in close fitting contact at any relative position.

Another improvement of my invention consists in the construction of the pipe lock 21 having the serrated teeth 22. This pipe lock is provided with the pivotal end 23 fitting in the socket 24 in the jaw portion 8 of the body portion 7. The threaded bar 25 screws into the jaw portion 8 and engages the pipe lock 21 preferably in the slot 26 therein. By turning the threaded bar 25 the pipe lock 21 is forced outwardly to the position illustrated in Fig. 4 so as to grip the pipe when the wrench is to be used for that purpose. This construction eliminates pivot pins and other parts liable to breakage while at the same time providing a simple device which can be readily replaced when worn out.

What I claim is:

1. In a wrench, the combination of a wrench bar having a shank portion provided with a mutilated thread, a body portion having a bearing face, a single sleeve rotatable on said wrench bar provided with a mutilated thread adapted to mesh with the aforesaid mutilated thread, and with a face in engagement with said bearing face on said body portion, one of said engaging bearing faces being of a cam surface having a reflex curve.

2. In a wrench, the combination of a wrench bar, a body portion and a sleeve longitudinally movable thereon, the sleeve being also rotatable relative to said wrench bar and body portions, and the sleeve and body portions being each provided with engaging faces, one of which is of cam construction having a face with a double curve.

3. In a wrench, the combination of a wrench bar having a shank portion provided with a mutilated thread, a body portion reciprocally movable thereon provided with a cam face, a sleeve provided with a mutilated thread adapted to engage with the aforesaid mutilated thread and with a cam face adapted to engage with the aforesaid cam face, the cam faces being adapted when moved along each other to separate the body portion from the sleeve.

4. In a wrench, the combination of a wrench bar, having a shank portion provided with a mutilated thread, a body portion reciprocally movable thereon provided with a cam face, a sleeve provided with a mutilated thread adapted to engage with the aforesaid mutilated thread and with a cam face adapted to engage with the aforesaid cam face one of said cam faces extending around the sleeve, and being of waving curved outline, and means connecting said body portion and said sleeve and holding them from longitudinal movement relative to each other beyond the play of said cam faces.

5. In a wrench, the combination of a wrench bar having a shank portion provided with a mutilated thread, a body portion reciprocally movable thereon provided with a cam face, a sleeve provided with a mutilated thread adapted to engage with the aforesaid mutilated thread and with a cam face adapted to engage with the aforesaid cam face, the curve of said cam faces corresponding in part to the pitch of said mutilated threads and in part being reversed in direction to tighten the body portion against the work.

6. In a wrench, the combination of a wrench bar having a shank portion provided with a mutilated thread, a body portion reciprocally movable thereon, provided with a cam face, a sleeve provided with a mutilated thread adapted to engage with the aforesaid mutilated thread and with a cam face adapted to engage with the aforesaid cam face, means connecting said body portion and said sleeve and holding them from longitudinal relative movement to each other beyond the

play of said cam faces, and a spring between said sleeve and said body portion.

7. In a wrench, the combination of a wrench bar having a shank portion provided with a mutilated thread, a body portion reciprocally movable thereon provided with a cam face, a sleeve provided with a mutilated thread adapted to engage with the aforesaid mutilated thread and with a cam face adapted to engage with the aforesaid cam face, the curvature of said cam faces corresponding to the pitch of said threads, a pin and slot connection between said body portion and said sleeve, and a spring between said body portion and said sleeve.

In testimony whereof, I the said CONRAD SAUER have hereunto set my hand.

CONRAD SAUER.

Witnesses:
JAMES I. KAY,
G. C. RAYMOND.