March 19, 1940. H. A. MEAD 2,194,049

WRENCH

Filed Nov. 28, 1938

Fig. 1

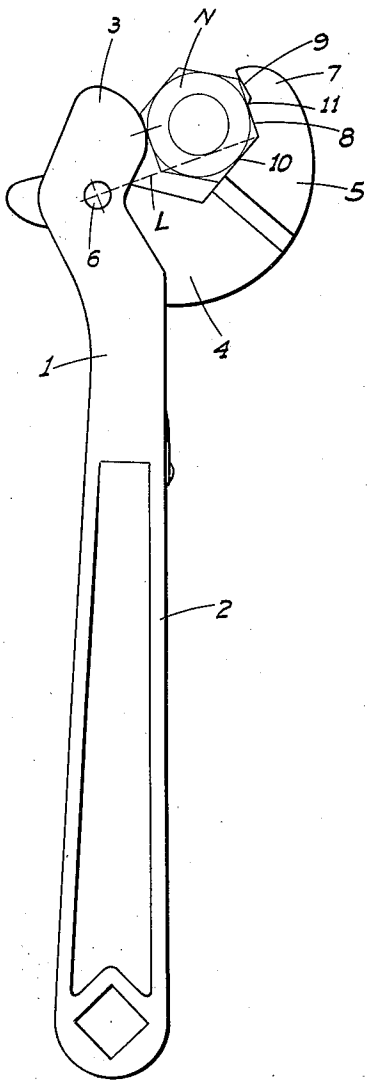
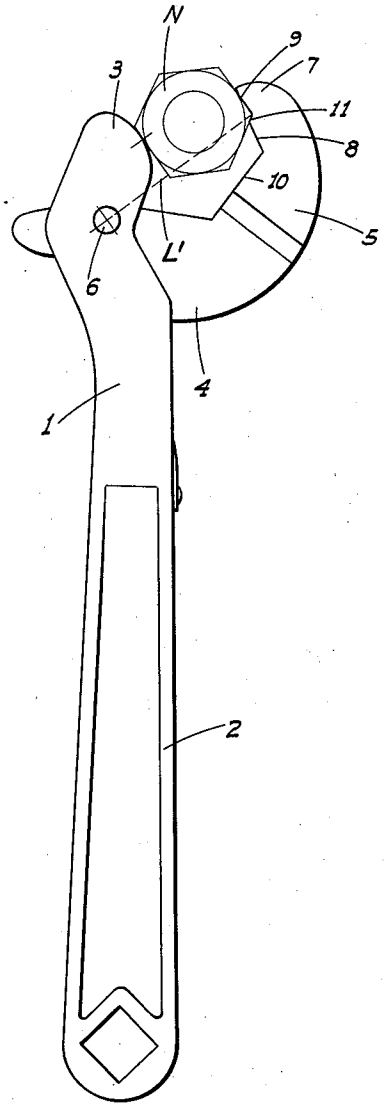


Fig. 2



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UNITED STATES PATENT OFFICE

2,194,049

WRENCH

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Application November 28, 1938, Serial No. 242,663

2 Claims. (Cl. 81—99)

This invention relates to wrenches of the type having a fixed jaw and a handle unit, and a swinging jaw pivoted in connection with the fixed jaw and adapted to conform to nuts and bolt heads (particularly those of hexagonal form) of various sizes within the range of the tool. Such a wrench is shown in my Patent No. 1,735,257, dated November 12, 1929, as well as in Patents No. 1,533,602 and No. 1,634,908; the present wrench particularly representing an improvement over the wrench of said patents.

In the original wrench a single face was provided to engage the side of the nut opposite that engaged by the fixed jaw. This was effective and satisfactory under operating conditions which enabled the nut to project well into the throat formed between the opposed jaw faces. It frequently happens, however, that the clearance about the nut on one or two sides is insufficient to receive the outer end of the swinging jaw (unless said jaw is made so thin as to be very weak), and only the outermost portion of the swinging jaw face could engage a portion of one side of the nut.

Since this face when thus positioned could not then engage the nut flatly, it tended to slip off when turning pressure was applied to the wrench. This was a bad feature, since the hand of the operator was sometimes hurt by a sudden slipping of the wrench, and such slipping soon rounded off the corners of the nut, making it then hard to hold with any wrench.

This condition was remedied by providing the jaw face with teeth, but these teeth marred and cut into the nuts—a feature objected to by many users.

It is therefore the principal object of the present invention to eliminate any slipping of the wrench on a nut when in cramped quarters, and also avoid the use of teeth on the swinging jaw, by providing the same with a double or stepped nut engaging face, so arranged that the nut will be firmly held even when it is impossible to project the nut the full distance between the jaws.

Another advantage of my improved wrench is that it enables a nut to be effectively advanced or retracted in step-by-step amounts less than the length of one side of the nut, when the nut is disposed in such a position relative to obstructions in the path of rotation of the wrench handle, that said handle cannot be swung sufficiently to turn the nut the length of one side.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of my improved wrench, as engaging a nut with the inner face portion of the double-face swinging jaw.

Figure 2 is a similar view, showing the nut engaged by the outer face portion of said jaw.

Referring now more particularly to the characters of reference on the drawing, the wrench comprises a body 1 formed with a handle 2 on one end and a fixed jaw 3 of convexly curved form on the other.

Movable in a slot (not shown) in the body 1 just under the fixed jaw, is a shank 4 of the swinging jaw 5, which is pivoted on the body by a pin 6. This jaw is of substantially the same configuration, and is spring urged toward a closed position in the same manner as shown in my Patent No. 1,735,257, so that it is unnecessary to here show or describe this feature of construction. Also, the pin is offset from the center of curvature of the jaw 3, as before.

The jaw 5 is formed with an overhang 7 opposite the fixed jaw, and forming a throat in said jaw 5 of sufficient depth to take the maximum sized nut N for which the wrench is suitable, for substantially its full depth.

The jaw overhang 7 is formed on its underside, or that facing the fixed jaw, with an inner nut engaging face 8 and an outer nut engaging face 9 disposed in shallow stepped relation to face 8 radially out relative to the pivot pin 6; the length of the faces being substantially equal to half the length of one side of said maximum sized nut N. The face 8 is disposed at right angles to a radial line L projected to the back end of said face from the pin 6, as shown in Fig. 1, while the face 9 is disposed at right angles to a radial line L′ projected to the back end of face 9 as shown in Fig. 2.

It is this feature of construction, together with the fact that the curving face of the fixed jaw is disposed so as to always engage its side of the nut at a point outwardly of a radial line projected from the axis of the nut centrally of said side, which enables a nut to be flatly gripped by the outer face 9 as well as by the inner face 8, and the wrench prevented from slipping, merely

by shifting the position of the nut in the throat and with the accompanying slight swinging movement of the jaw 5 necessary to accommodate it to the nut in either position.

It will be seen that due to the shallow stepping of the faces 8 and 9 relative to each other, and to their right angular relationship to radial lines projected from pivot 6 are described, the inner face 8 is but a little distance farther from the pivot than the outer face 9, while the distance of both faces from the curved jaw 3 is substantially the same with any setting of the jaws. The faces 8 and 9 are thus adapted to engage the same side of a nut, and when the nut is so engaged with one face the handle will be offset considerably from the position occupied by the handle when said nut side is engaged by the other face. This difference in position of the handle when gripping the same side of the nut with one jaw face or the other is such that it enables the nut to be retracted or tightened up with a minimum amount of arcuate movement of the handle, and a correspondingly small clearance space for the handle movement is thus ample for tightening or loosening the nut without merely engaging the the same at the corners or "by a hair."

Since the jaw 3 is disposed so that the side of the nut will always be initially and normally engaged closer to its outer than its inner corner, there is no likelihood of said jaw slipping off the nut, inasmuch as the nut-turning rotation of the wrench is necessarily in a direction which will tend to cause the jaw 3 to move further along its engaged nut side rather than the reverse.

That portion 10 of the back wall of the throat which projects from the face 8 is disposed at an angle of at least 120° thereto, so as to conform to one side of a hexagonal nut and enable the face 8 to be utilized for its full length. Similarly, the shoulder 11 which is formed between the adjacent ends of the stepped faces 8 and 9, is disposed at an angle of at least 120° to face 9 for the same reason.

It should also be noted that the length of face 9, and the depth of shoulder 11, are such that the outer end of said face will not project below the line of face 8 if extended, so that no interference with the desired flat engagement of the face 8 with a nut will be had regardless of the size of the nut.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

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

1. A wrench comprising a shank, a fixed jaw having a working face of convex curvature on the shank, a swinging jaw to cooperate with the fixed jaw in opposed relation thereto, a pivot mounting the swinging jaw on the shank and offset from the center of curvature of the fixed jaw and a pair of longitudinally extending faces on the swinging jaw to flatly engage the same side of a nut alternately and disposed substantially at right angles to radial lines projected from the pivot to the back ends of the faces; the latter being positioned in such stepped relation to each other that a nut engaged on one side by either face will be engaged on its opposite side by the fixed jaw at a point on said opposite side intermediate the corners thereof.

2. A wrench comprising a shank, a fixed jaw having a working face of convex curvature on the shank, a swinging jaw to cooperate with the fixed jaw in opposed relation thereto, a pivot mounting the swinging jaw on the shank and offset from the center of curvature of the fixed jaw and a pair of longitudinally extending faces on the swinging jaw to flatly engage the same side of a nut alternately and disposed substantially at right angles to radial lines projected from the pivot to the back ends of the faces, the outermost face being a relatively small distance farther from the pivot than the inner one of said faces but being disposed relative to the fixed jaw so that the width of the opening between the working face of the latter and both the swinging jaw faces is substantially the same with any setting of the swinging jaw

HOMER A. MEAD.