Jan. 2, 1962 W. BUYER 3,015,246

SLIDABLE OUTER JAW WRENCH

Filed May 15, 1959 2 Sheets-Sheet 1

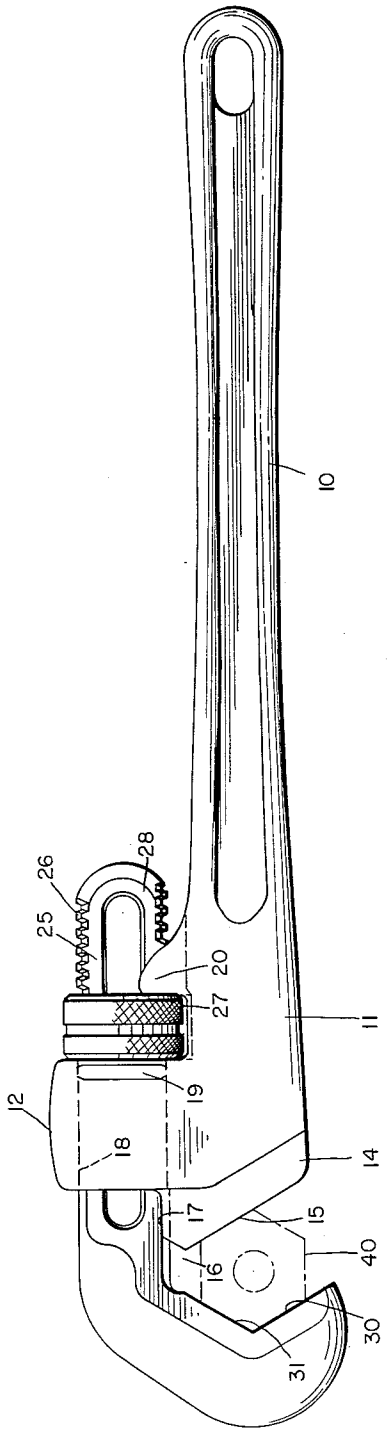


Fig. 1

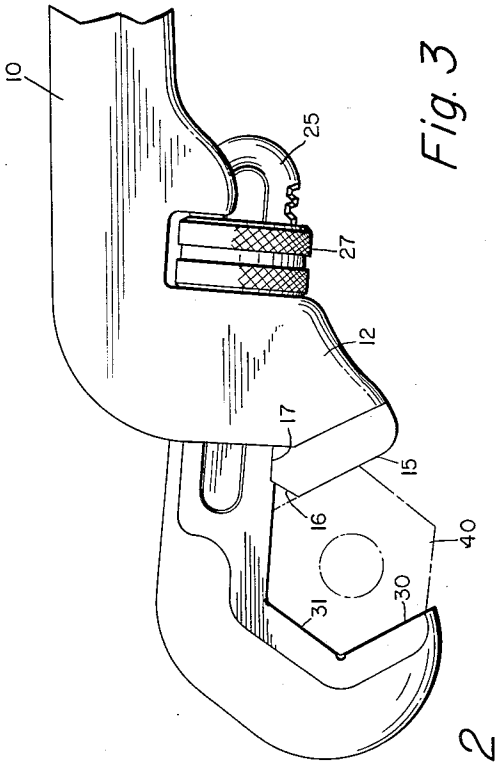


Fig. 3

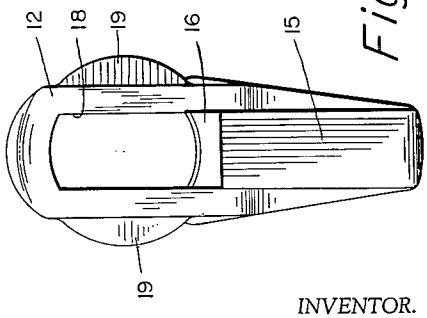


Fig. 2

INVENTOR.
WALTER BUYER
BY J. D. Douglas
His ATTORNEY

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SLIDABLE OUTER JAW WRENCH

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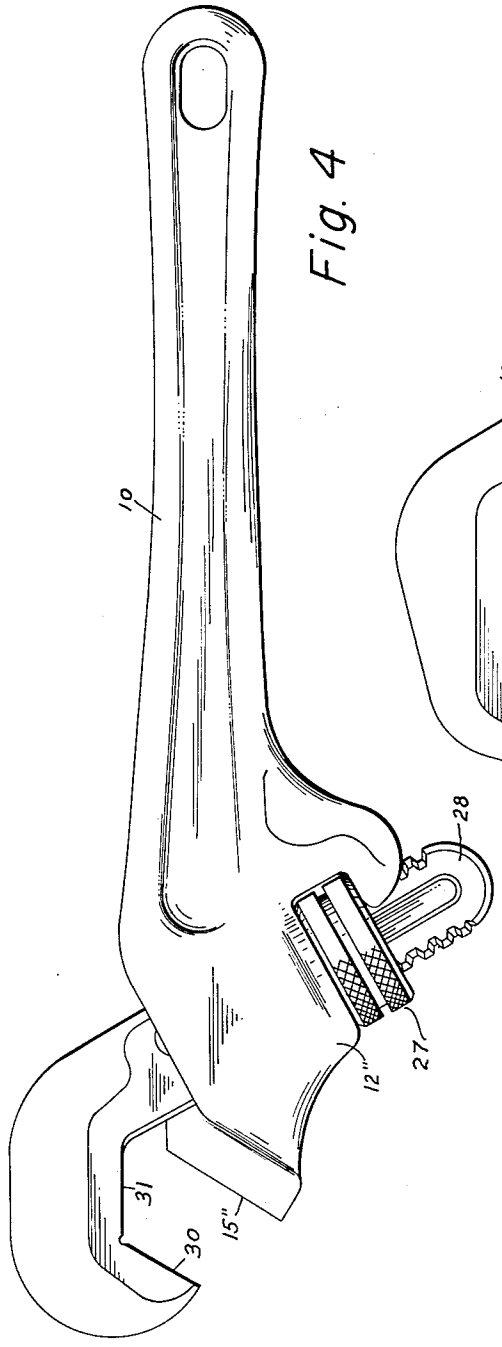


Fig. 4

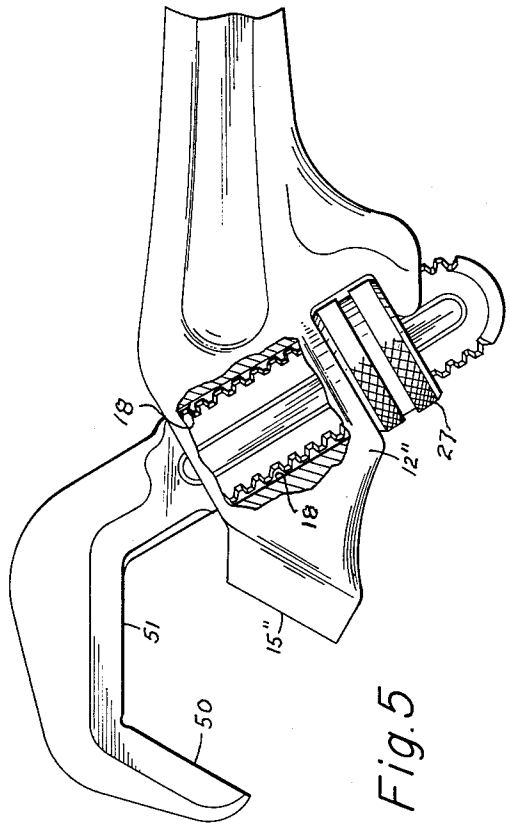


Fig. 5

INVENTOR.
WALTER BUYER

BY
J. V. Douglas
HIS ATTORNEY

United States Patent Office

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SLIDABLE OUTER JAW WRENCH

Walter Buyer, North Olmsted, Ohio, assignor to The Ridge Tool Company, Elyria, Ohio, a corporation of Ohio

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5 Claims. (Cl. 81—167)

This invention relates to improvements in wrenches and more particularly to an improved adjustable wrench for engagement with hexagonal objects. It is a continuation-in-part of my copending application Serial No. 746,739 now abandoned.

It will be appreciated that a hexagonal nut has less surface area for gripping on opposite sides and that therefore it is desirable to have a wrench which will grip as many surface areas as possible.

Heretofore it has been proposed to provide an adjustable wrench for engaging hexagonal nuts, bolts or rods but there have been certain disadvantages thereto residing largely in the fact that the jaws comprise two opposed V-shaped seats adjustable toward and away from each other. This provided a fair grip, but made it necessary to open the jaws wide each time a new grip was taken on a nut or bolt where the wrench had to be applied to the bolt from the side. This was also particularly noticeable where it was impossible to get at the object from the end.

Although wrenches have also been previously designed wherein the heel jaw has had a V-shaped article engaging face, these prior wrenches have failed to fulfill the object of this invention in that the heel jaw in any wrench acts as a fulcrum and the actual turning power is applied to the hook jaw. Thus, although these devices may at first glance appear to have some of the attributes of the invention, they are actually no more efficient for turning an object of hexagonal form than a plain wrench having parallel jaws. The important feature of the present invention resides in the fact that the hook jaw has a V-shaped nut engaging surface which is large enough to engage the entire adjacent sides of a hexagonal nut, providing a resultant more firm grip and distributing the turning forces over a larger area of the nut, which is important for both tightening and loosening the nut.

By the present invention it is possible for the wrench to be placed onto the bolt, nut or rod from the side. It also provides a more economical structure in that less machine operations are required in its manufacture.

Furthermore, the user cannot readily use the wrench on nuts larger than those for which the wrench was intended. This prevents breakage of the wrench and also prevents mutilation of the nuts.

Although the wrench is most effective when used with hexagonal nuts, it is also as useful, in connection with ordinary square nuts, as the ordinary straight type of so-called "monkey" wrench.

Still other objects of the invention and the invention itself will become more apparent from the following description of an embodiment of the invention, which description is illustrated by the accompanying drawings and forms a part of the specification.

In the drawings:

FIG. 1 is a side elevational view of a wrench embodying the invention;

FIG. 2 is an enlarged end view with the hook jaw removed;

FIG. 3 is a side elevational view of a modified form;

FIG. 4 is a side elevational view of another modified form of the invention; and

FIG. 5 is a fragmentary side elevational view of another embodiment, with a portion of the housing broken away to show the interior of the construction.

Referring to the drawings, throughout which like parts are designated by like reference characters, the wrench includes a handle 10 which is widened out at 11 to provide a laterally extending hook jaw housing 12. The end of the handle, at the housing, is provided with a heel jaw 14 the face 15 of which extends at an angle 60° to the center line through the wrench. The heel jaw can be integral with the handle or be a separate hardened member secured in place by a pin, not shown, as is well known in the art. Near the base, the heel jaw slants in the opposite direction to the center line of the wrench at an angle of 60° for a short distance. The heel end of the wrench then drops back at 17 to meet the hook jaw housing 12, which extends laterally to one side of the handle. The housing 12 is provided with a hook jaw receiving opening 18 extending through the housing longitudinally parallel to the axis of the handle. Laterally extending nut guards 19 are provided on opposite sides of the housing and nut stops 20 are provided spaced from the housing for engagement with the opposite side of an adjusting nut.

The hook jaw includes a shank 25 of generally rectangular formation in cross section, it being substantially the same size as the channel 18 and slidable therein. The shank is threaded on its edges 26 to receive a knurled adjusting nut 27 which is threaded on the shank and is disposed in the notch formed by the stops 20 and the guards 19 on the housing. The sides of the shank are machined smooth at 28 to provide an easy but close sliding fit in the channel 18. It should also be noted that the shank as well as the crests of the threads 26 provide a close sliding fit with the walls defining the longitudinally extending opening 18 in the housing so that rocking action of the hook jaw is substantially eliminated, or greatly reduced.

The end of the hook jaw extends beyond the housing and then angles over the heel jaw. The inner face of the hook jaw is provided with article engaging faces 30 and 31 disposed at an angle of 120° to each other with the face 30 being parallel to the heel jaw face 15. The faces 30 and 31 have substantially the same nut contacting length as the face of the heel jaw.

Preferably the outward tip of the hook jaw is in alignment with the outer end of the heel jaw and the inner face of the hook jaw is slightly longer than the outer face.

The construction is such, the jaw faces 30 and 15 being parallel, that the wrench can be placed on a hexagonal object from the side with a minimum of opening of the jaws. This becomes important when the wrench cannot be placed on the object from the end and particularly when frequent changing of the wrench, as during a tightening of the object, is necessary.

As can be seen in FIG. 1, the object 40, which is depicted as a hex nut, is embraced on two of its faces by the faces 30—31 and at the opposite side, as a power fulcrum point, by the face 15. This provides ample engagement with the object for all normal purposes, allows the wrench to be attached to and removed from the object quickly and easily, with a minimum of adjustment. It should be particularly noted that the length of the hook jaw faces is such that full engagement of each of the faces of the object is realized providing the object does not exceed the capacity of the wrench. Due to the fact that the heel jaw acts as a fulcrum, when pressure is applied, the hook jaw faces are pressed firmly against the object, thus providing a large contact area for turning the object.

It will also be noted that the slant of the heel jaw at 16 enables the hook jaw to be moved closer to the heel jaw without interference therewith and that thus a smaller nut may be engaged. The loss of surface area of the

heel jaw when it is engaged with larger nuts, is not important since its most important function is that of a fulcrum.

In this respect when pressure is exerted on the nut the hook jaw tends to rock over the heel jaw, the amount being determined by the looseness of the fit of the hook jaw shank in the housing which in the constructions is reduced to a minimum to prevent such rocking. Nevertheless the pressure is such as to more firmly seat the hook jaw and the greatest pressure exerted on the heel jaw is toward the outer edge which is always in contact with the nut on the opposite side to the hook jaw.

In FIG. 3 there has been illustrated an offset type wrench embodying the invention. The principal difference between the two wrenches resides in the fact that the housing **12** is offset at an angle to the horizontal and on the opposite side from that shown in FIG. 1, otherwise its operation is the same.

In FIG. 4 I have shown another embodiment of my invention where the housing **12''** is so arranged that the hook jaw guiding opening extends at an angle of approximately 60° to the longitudinal center line of the wrench. In this instance, the heel jaw **15''** carried by the housing is inclined at an angle of 120° to the center line of the handle.

The hook jaw is preferably identical to that shown in FIG. 1 and includes the object engaging faces **30—31**, the face **30** being parallel to the heel jaw face **15''**. The above construction provides a wrench having an opening in the endwise direction which permits it to be used in confined spaces.

In FIG. 5 I have shown a similar wrench to that of FIG. 4 but which is particularly designed for engagement with large coupling nuts as are used on traps for sinks, bathtubs and the like.

The hook jaw in this instance is provided with an inner face **51** which is substantially longer than the outer face **50**, and the outer face **50** is of substantially the same length as that of the heel jaw **15''** and parallel thereto. As in the other embodiments the two faces on the hook jaw are at an angle of 120° to each other.

The above described construction thus provides a wrench which may be used in closely confined spaces and still provide the improved gripping action characterizing the other constructions.

Having thus described the invention in several embodiments thereof it is appreciated that numerous and extensive departures may be made therefrom without departing from the invention as defined in the appended claims.

I claim:

1. A wrench for engaging a hexagonal article including a handle having a housing with a hook jaw receiving recess through the housing at an angle to the handle and a hook jaw adjustably carried therein, a heel jaw carried by the handle housing at an angle relative to a longitudinal center line of the handle and so disposed that all thrust is into the housing, said hook jaw having a pair of article engaging faces including an outer face which is disposed parallel to the face on the heel jaw and an inner face which is disposed at an angle to the outer face, said outer face being substantially as long as the face on the heel jaw.

2. A wrench as described in claim 1 wherein the inner face is longer than the outer face.

3. A wrench including a handle, a housing carried on the end of the handle and having a hook jaw shank receiving channel therethrough, said channel extending at an angle between 90° and 120° from the center line of the handle, a heel jaw disposed on the end of the housing and having an article engaging surface extending at an angle of between 90° and 180°, a forked projection carried by the handle and extending in spaced relation opposite to the housing with the fork elements being aligned with the sides of the housing to provide an adjusting nut abutment, a hook jaw having a shank slidably disposed in the housing and having its marginal edges threaded, an adjusting nut in threaded engagement with said shank and disposed between the housing and said forked portions, said hook jaw being formed with article-engaging faces, said faces being disposed at an angle of 120° to each other and one of said faces being parallel to the face of the heel jaw, said faces being substantially as long as the heel jaw.

4. A wrench including a handle, an enlargement formed on one end of the handle, a heel jaw disposed on the enlarged end of the handle and having a single face for engagement with an article, said face being inclined at an angle relative to a longitudinally extending center line through the length of the handle, said angle being less than 90°, said enlargement of the handle being formed with a housing having an opening therethrough and a hook jaw having a shank adjustably disposed in the opening at an angle of less than 90° to the said longitudinal center line and inclined in the opposite direction to the inclination of the heel jaw face relative to said center line, said hook jaw having a pair of adjacent article engaging faces disposed at an angle of 120° to each other and with the outer face being parallel to the face of the heel jaw, the inner of said faces on the hook jaw being of such a length that the outer face thereof is always opposite to the face of the heel jaw throughout the range of adjustment.

5. A nut wrench including a handle having a hook jaw receiving housing at one side thereof and formed with a hook jaw receiving opening extending parallel to the longitudinal center line through the handle, a heel jaw on the end of said handle adjacent said housing inclined at an angle between 90 and 180° to the center longitudinal line of the handle, a hook jaw having a threaded shank extending through the housing and a nut threaded on said shank and engaging with the housing, said hook jaw having a V-shaped inner and outer nut engaging portion providing two faces substantially an angle of 120°, the outer one of said faces being parallel to the heel jaw, the combined length of said inner and outer nut engaging faces on the hook jaw being greater than the length of said heel jaw surface and with the apex of said V-shaped surfaces being substantially opposite to the longitudinal center line through the handle.

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