

Aug. 7, 1951

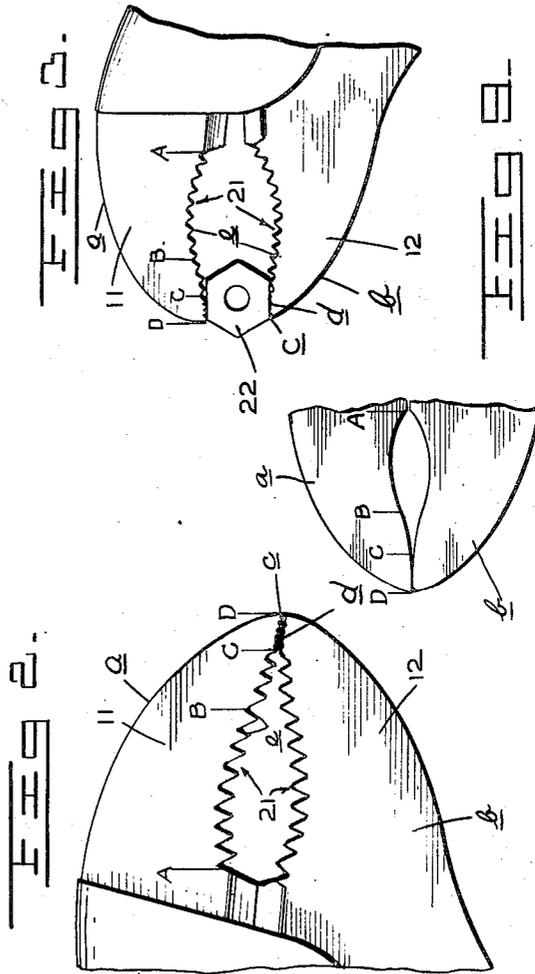
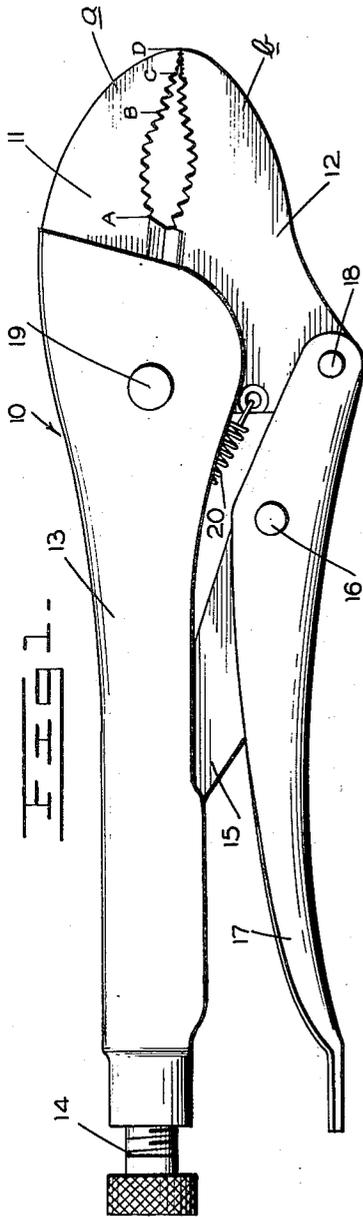
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2,563,267

WRENCH JAW

Filed Nov. 12, 1947

2 Sheets-Sheet 1



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WRENCH JAW

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2 Sheets-Sheet 2

FIG 4.

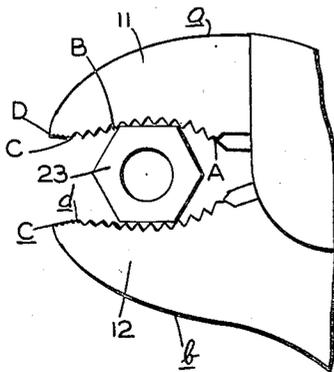


FIG 5.

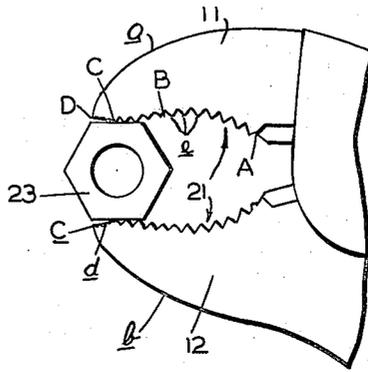


FIG 6.

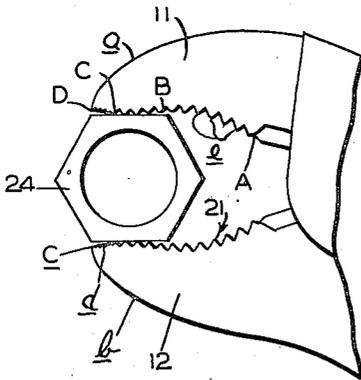


FIG 7.

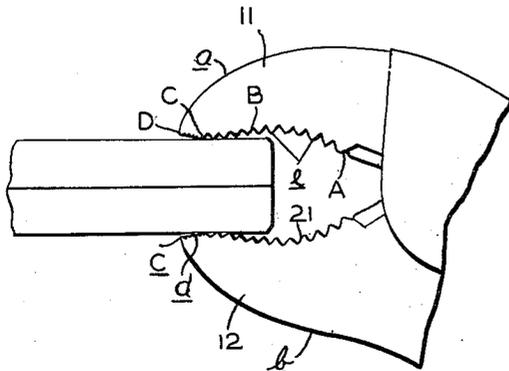
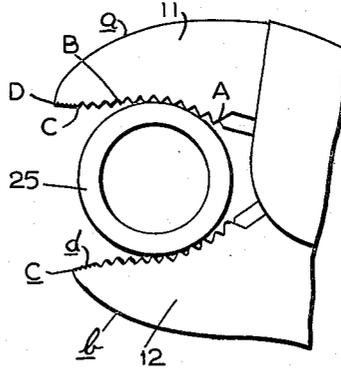


FIG 8.

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2,563,267

WRENCH JAWS

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1 Claim. (Cl. 81—186)

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This invention relates generally to the class of tools and is directed particularly to improvements in wrenches of the pivoted jaw type.

The present invention relates specifically to improvements in the cooperating faces of wrench jaws and has for its principal object to provide a wrench of the character stated, wherein the said cooperating faces of the jaws are of a novel geometrical form or contour whereby objects of polygonal contour and of varying widths through a relatively large range, can be securely gripped and held by reason of the fact that, due to the novel contour of the jaw faces, such bodies will be engaged at opposite sides over a wide area.

A further object of the invention is to provide in a wrench of the character stated, novelly formed jaw faces which are not only adapted to securely engage wide areas of opposite sides of bodies of polygonal contour but are designed for effective gripping operation upon bodies of circular contour and through a relatively wide range of diameters and to have with the curved surface of such bodies a relatively long extent of contact.

Still another object of the invention is to provide in a wrench of the character stated, cooperating jaw faces of novel form or contour wherein the jaws come together to form a relatively finely or sharply tapered nose and the faces of the jaws at the nose present opposing flat knurled surfaces, by means of which the nose of the tool can be used in small spaces to obtain a firm grip upon a small object which would be inaccessible to pliers or wrenches of the usual blunt nose type.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming a part of the specification, with the understanding, however, that the invention is not to be limited to the exact details of construction shown and described since obvious modifications will occur to a person skilled in the art.

In the drawings:

Figure 1 is a view in side elevation of a wrench showing the improved jaws embodying the present invention.

Figure 2 is a view on an enlarged scale of the wrench jaws, in side elevation, more clearly setting forth the curvatures involved in each jaw face.

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Figure 3 is a view illustrating the action of the jaws in gripping a small body here shown in the form of a nut.

Figure 4 is a view in side elevation of the jaws showing the action of the same in gripping a larger nut body disposed entirely between the jaw faces.

Figure 5 is a view in side elevation of the jaws showing the same size nut body as that shown in Figure 4 but gripped between the tips of the jaws.

Figure 6 is a view in side elevation of the wrench jaws showing the action in connection with the gripping of a large size nut.

Figure 7 is a view illustrating, in side elevation, the action of the jaws in gripping a circular body.

Figure 8 is a view in side elevation of the jaws showing the action of gripping two flat plates.

Figure 9 is a view in side elevation of the jaws in blank, before the teeth are cut, to more clearly illustrate the curvatures of the faces.

Referring now more particularly to the drawings the numeral 10 generally designates a wrench of the general character disclosed in Patent Number 2,280,005 of April 14, 1942, such wrench being of the form known as a toggle wrench wherein, by properly adjusting the parts to the work to be gripped, a toggle action is made effective when the handles are pressed together to lock the jaws in gripping relation with the object. In the wrench construction the fixed jaw is designated 11 and the movable jaw is designated 12. The fixed jaw is an integral part of the handle portion 13, in the rear end of which handle is threadably engaged the adjustment screw 14 against the forward end of which, not shown, an end of the toggle link 15 bears. This toggle link at its forward end is pivotally attached at 16 to the movable handle 17, which handle 17 is pivotally attached at 18 to the jaw 12 adjacent to the outer edge of the latter, the jaw at the remote side being pivotally secured to the fixed handle 13 at 19. A spring 20 is connected at one end with the movable jaw 12 intermediate the pivot points 18 and 19 and has its other end, which extends rearwardly from the jaws, attached to the handle 13. These features are a part of the toggle wrench structure in association with which the present invention is designed to be used. However, while, as stated, the present invention is designed for use in connection with a wrench of this specific type, it is to be

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understood that the invention is not limited to such use but may be employed where found applicable to other wrenches of the pivoted jaw type.

In carrying out the present invention the jaws 11 and 12 have the top and bottom edges *a* and *b* relatively sharply tapered to form the thin tapered nose *c*. The working face of each jaw, when viewed in side elevation or from the side of the jaw or nose of the wrench, presents a geometrical outline in the form of an elongated or drawn out ogee curvature. Such curvature extends throughout the major part of the length of the jaw face. The stated curved portion of each jaw face is designated 21.

The curve of each jaw face 21 is a wide arc between the points A and B. Between the points B and D the curve is involute, the faces at the forward ends of such curves coming together to form the nose. From the points C to D the portions of the involute curvatures are approaching straightness and also between these points the faces of the jaws are knurled as indicated at *d*.

The arcs between the points A and D of the jaws are in opposing relation so that it will be seen that the space between the jaws increases comparatively rapidly until it reaches its maximum, after which the decrease is very slow and gradual. These faces between the points A and C are transversely cut to form the teeth *e*.

In pivoted jaw wrenches of the type having flat or straight jaw faces, such faces are in parallel relation only at one position of separation. Accordingly it is only in this position that such jaws can engage firmly against opposite flat faces of a body of polygonal form such, for example, as a hex nut. If a larger or smaller nut is placed between the jaws of such a wrench the jaws will contact the nut only at the inner ends thereof, for a nut of larger size, or adjacent to the outer ends for a nut of smaller size.

By the provision of a wrench having jaw faces contoured in the manner herein disclosed, polygonal bodies over a wide range of widths or diameters may be grasped in such a manner that the opposite flat surfaces thereof will be engaged over substantially the entire area of such surfaces and accordingly there is obtained a firmer grip upon the body and the defacement of the body is reduced to a minimum.

Figures 3 to 8 illustrate the application of the present invention to bodies of different diameters and of different forms.

In Figure 3 application of the tool to a relatively small hexagonal nut is shown. In applying the tool to a nut of small size, the nut is placed substantially in the line of the maximum width of the space between the convex portions of the jaw faces, that is between the portions of the faces lying between points A and B. In this position it will be seen that the opposite flat sides of the nut 22 are engaged throughout their entire extent, by the teeth of the jaws.

In Figure 4 there is shown a nut 23 of larger size. This view, like the illustration given in Figure 3, shows how the jaws will fit a nut essentially parallel on the opposite faces of the nut and definitely contact the nut at the four points A', B', C' and D'.

In association with this illustration forming Figure 4, Figure 5 shows how the nut 23 or one of approximately the same size, may be grasped, where conditions do not warrant placing the wrench on a nut as in Figure 4. The nut 23, as shown, can be held at the tips of the jaws and the convex portions of the faces, lying between

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the points B and C or B and D, will strike the opposite faces of the nut.

On extremely large nuts such as the one shown in Figure 6 and designated 24, the results shown in Figures 3 and 4 will not obtain, but the convex portions between the points B and D of the jaws, will strike the opposite faces of the nut and here again relatively large portions of such faces will be engaged.

Figure 7 illustrates the adaptability of the jaw faces to objects of round cross section. In this figure the round object, designated 25, such as a rod, pipe or the like, is held by the jaws in the outwardly curved or arcuate portions lying between the points A and B and it will be seen that in grasping such a round object, with this curvature a great many teeth are placed in contact with the object. This holds true for any size round object up to the capacity of the wrench.

The toggle type wrench of the character herein disclosed, when properly adjusted to the object to be grasped, and then closed down tight on the object, has its jaws locked together in a vise like grip and for this reason a wrench of this type may be and is commonly used as a clamp or vise. For this reason the vise is particularly suitable for use in clamping together two or more flat objects as shown in Figure 8 where two flat objects or bodies 26 are shown. The reason for this is that in the use of jaws formed in accordance with the present invention the corners or edges 26' of the bodies 26 are in the clear and pressure is applied at approximately the points 26a by the convex portions of the jaw faces. Thus the pressure is put in the central area of the clamped objects or away from the edges 26'. By this means the flat faces of the objects are pressed tightly together whereas if use were made of a wrench of the type having straight jaw faces and the distance between the top and bottom surfaces of the objects 26 were greater than the distance between such jaw faces when the same are in parallel relation, the pressure of such faces would be applied solely to the corners 26' so that the opposing faces of the objects 26 would not be pressed together and in addition the corners of the objects would be mutilated.

Figure 9 is an illustration of the jaw blanks positioned together in opposing relation, showing more clearly the curvatures of each jaw before the teeth are cut. This illustration brings out more clearly the distinctness of the curves A—B, B—D, which each of the jaw faces has. From the point C to the tip D the area of the jaw face is knurled as previously described.

From the foregoing it is thought to be readily apparent that a wrench having jaw faces of the novel form herein disclosed is well adapted to the handling in a much more efficient and satisfactory manner, of objects of a larger variety of contours or forms than wrenches of the type having ordinary flat jaw faces or faces having a simple arcuate form.

I claim:

In a wrench having pivoted jaws, opposing acting toothed, gripping jaw faces each of which has an involute curvature extending from the outer end of the jaw inwardly through a portion of the length thereof and a relatively long outwardly bowed portion continuing in a relatively flat curve from the inner end of said involute curve, said involute curves presenting opposing convex working portions and approaching a condition of straightness at their outer ends which are convergent when the jaws are brought to-

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gether, each of the jaw faces at the converging ends thereof being knurled through a part of its length and the remaining part of each jaw face having the said gripping teeth transversely thereacross.

CHRISTIAN PETERSEN.

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