May 15, 1923.

1,455,147

W. J. O'NEILL

WRENCH AND THE LIKE

Filed Oct. 25, 1920

Fig. 1.

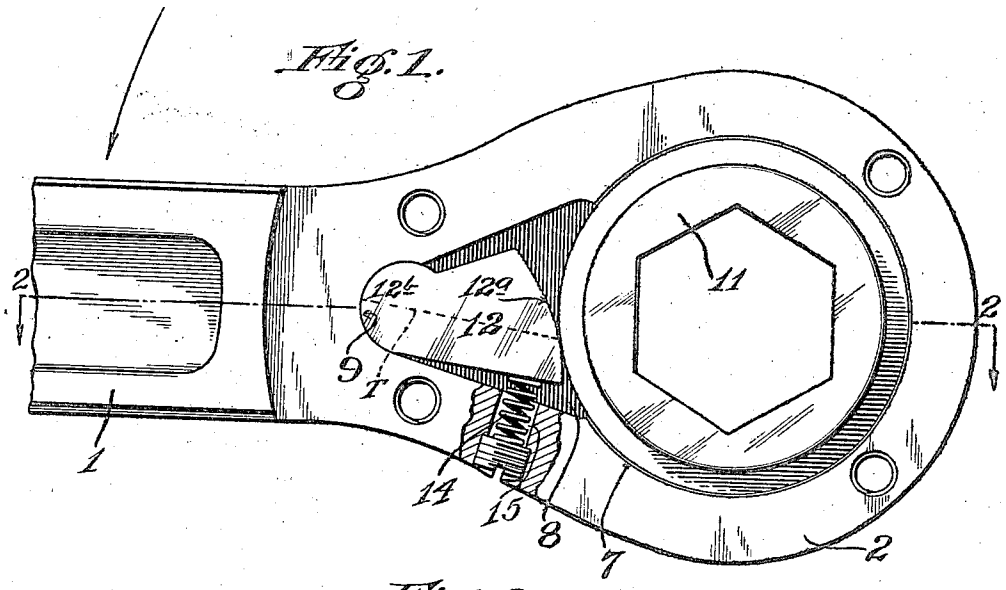


Fig. 2.

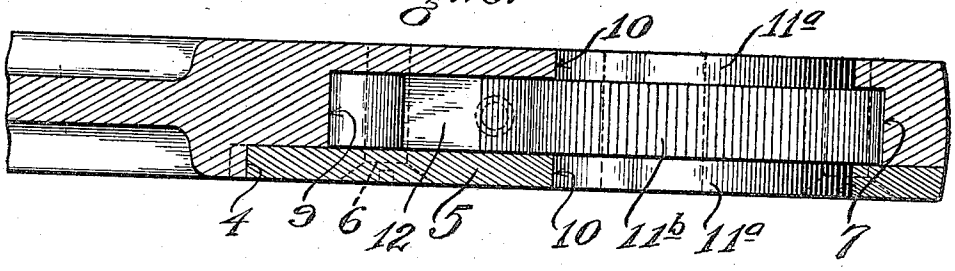
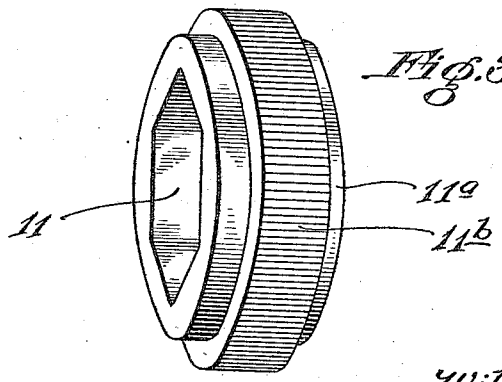


Fig. 3.



WITNESSES:

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INVENTOR

William J. O'Neill.

BY

Cromwell, Greist & Warden

HIS ATTORNEYS

Patented May 15, 1923. 1,455,147

UNITED STATES PATENT OFFICE.

WILLIAM J. O'NEILL, OF OAK PARK, ILLINOIS, ASSIGNOR TO EDGAR C. GUTHARD, OF CHICAGO, ILLINOIS.

WRENCH AND THE LIKE.

Application filed October 25, 1920. Serial No. 419,169.

To all whom it may concern:

Be it known that I, WILLIAM J. O'NEILL, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Wrench and the like, of which the following is a specification.

This invention relates generally to hand tools, and particularly to certain improvements in tools adaptable for use as wrenches, bit-stocks, hand-levers and the like, wherein it is desirable to convert oscillatory movement into uni-directional rotary movement.

The general purpose of the invention is the provision of an improved construction for hand tools which may be incorporated in a structure having maximum strength for minimum size, whereby the instrument is adapted for use in small clearances, and the provision of a tool which may be manufactured at minimum cost, is designed to withstand the hardest usage without disablement or destructive wear of the working parts, and which permits the substitution of parts to meet various contingences, such as interchanging of nut or bit sockets, and the like.

A more particular purpose of the invention is the provision of a tool of the class described wherein the stresses induced in the movable parts during use of the tool are transmitted directly through solid parts to substantial abutments or seats, without inducing strains or stresses upon any mountings or portions which would be injured thereby.

Another particular object of the invention is the provision of a tool construction which permits of the effective feed or operation of a rotary member irrespective of how short may be the permitted movement of the operating handle.

Another particular object of the invention is the provision of a construction for a tool of the sort described wherein there is complete and automatic compensation for wear on operating parts, whereby the possibility of the working members becoming loose and inoperative is positively inhibited.

Another specific, and quite important object of the invention is the provision of a wrench construction, and the like, which may be incorporated in a neat, compact, sightly and workman-like form.

Still other and further objects of the invention will be pointed out in the following description or obvious from the drawings forming a part of this specification, or will be indicated in the appended claims.

In the drawings—

Fig. 1 a fragmentary top view of a wrench embodying my improved construction, the cover plate being removed;

Fig. 2 represents a longitudinal section taken substantially on line 2—2 of Fig. 1, and

Fig. 3 is a perspective view of the rotary or driven element.

It will be understood that, while these drawings show what I now regard as the preferred embodiment of the invention, such disclosure is made for the purpose of illustrating the essential features and operation of the invention, and is not to be construed as limiting what I claim, short of the true and comprehensive scope of the invention, for I realize that its essential principles may be embodied and utilized in forms, structures and devices differing in many particulars from the illustrative form disclosed.

Referring to the drawings by means of the reference characters applied, it will be seen that I have here disclosed a tool in the form of a wrench having a handle portion 1 adapted for manual operation and carrying a suitably shaped head portion 2. These may be formed integrally as a unitary body portion, by any suitable operation such as drop forging. The head portion 2 is recessed or reduced from the face plane of the handle portion 1 to provide a seat portion 4 to which a face plate 5 is fitted, and adapted to be retained preferably by screws or other suitable fastenings 6. The head portion is further recessed to provide a wheel seat 7 and a communicating dog seat 8. The former is generally circular in outline, and the latter of general polygonal form merging at its forward limit with the wheel seat, and at its rearward axial limit providing a rocker abutment 9 of arcuate form, preferably substantially on the axis of the lever. The side of the head portion opposite the face plate seat is formed to over-hang the perimeter of the wheel seat, and it together with the face plate, are formed with alined journal openings 10 substantially concentric with the wheel seat.

The operating portions constitute a driven

member 11 in the nature of a wheel, and a dog 12. The former has journal portions 11^a adapted to register in the journal openings 10 of the face plate and head member, and a bearing portion 11^b preferably of greater diameter than the journal portions, so as to underlie the face plate and the body portion about the journal openings. The bearing portion 11^b has a peripheral friction face preferably of cylindrical form which, depending on the size and nature of the tool, may be suitably nurled or otherwise roughened to provide a friction surface. The dog 12 is of general sectoral form, affording at its forward end a convexly curved engaging face 12^a, and at its rearward extremity an arcuate rocker journal portion 12^b. The latter is formed relative to the rocker seat 9 so as to have accurate bearing engagement therewith, and the axial length of the dog is such that its curved bearing face 12^a will be in tangent contact with the face of the bearing member 11^b of the wheel. The face of the dog is on an arc which is eccentric with respect to the center on which the dog oscillates, and may be suitably knurled, serrated or roughened to provide elements for effective engagement with the wheel face. The point of engagement with the dog upon the periphery of the wheel is to one side of the axis on which lie the center of the wheel and center of oscillation of the dog, and is indicated by the terminus of the dotted line T, and the dog is held in effective engagement with the wheel by means of a spring 14 retained in a seat 15 in the body portion. The wheel may be provided with a transverse axially extending opening of polygonal form for engagement with a nut, tool or other operated member, or may be otherwise suitably formed for such engagement.

In the operation of the device, the driven member being engaged with the object it is intended to rotate unidirectionally such as a nut, the handle is swung in its normal plane in the direction of the curved arrow shown in Fig. 1. Due to the form and frictional engagement of the dog 12 with the bearing surface of the wheel, the latter is wedged firmly for rotation with the movement of the handle, thereby transmitting rotary movement to the engaged object. The reaction stress is transmitted from the wheel longitudinally of the dog against the rocker seat 9, substantially on the axis indicated by the dotted line by T. The desired or permitted extent of the movement having been effected, it is then swung back in opposite direction, whereupon the dog travels freely over the friction face of the bearing member, leaving the wheel stationary. Upon reversal of the movement of the handle again to the direction indicated by curved arrow the dog takes immediate bite on the friction surface of the wheel, so as to carry the latter upon the continued movement of the handle. In this fashion the intended object may be rotated as desired. Obviously the tool may be used either to seat a screw or to back one off, depending upon which side of the tool is toward the screw. It will be observed that by virtue of this construction many distinctive advantages are secured. All the parts may be formed and finished by simple and inexpensive operation; the wheel is strongly supported and accurately guided; no fragile or small mountings, such as pivot pins and the like, are subjected to stresses, the stress of holding the wheel being transmitted directly through the trunnions and the stout body portion of the dog to the comparatively broad and solid bearings and the abutment formed by the rocker 9 upon the handle itself. Due to the fact that the dog will take frictional hold of the wheel at any point, a definite degree of angular movement of the handle is not required in order to feed the wheel. As a result the tool may be effectively operated in a minimum clearance. Moreover, due to the fact that the dog may take operative engagement at any point on the periphery of the wheel and due to the fact that its operating face is extensive in a plane or cylindrical surface tangent to the bearing surface of the wheel, it is always in position for effective engagement, and is so maintained, irrespective of wear on its bearing surface or on the bearing surface of the wheel, by the constant compression of the spring 14.

It is obvious that the invention lends itself to a variety of uses, and that it is particularly adapted to be embodied in a very flat or thin structure, thus permitting its use effectively in small lateral clearances and constituting an especially sightly and workman-like tool. By the simple operation of removing the face plate 5 all working parts are exposed and may be quickly removed and replaced when so desired.

I claim:

1. A tool comprising a lever provided with a head portion having a transverse aperture forming a wheel seat, a wheel rotatably mounted in said seat and having retaining bearing on parts of the head portion about the aperture, said wheel having a cylindrical peripheral friction surface, said head portion affording a dog seat adjacent the wheel seat and having a wall providing a rocker bearing, a dog mounted in said dog seat and having a journal portion in bearing engagement with the rocker bearing and an oscillatory body portion having an eccentric convexly arcuate surface in rocking engagement with the periphery of the wheel, and yielding pressure means effective to permit oscillation of the dog and maintain it in engagement with the wheel.

2. A tool comprising a lever having a

handle portion and a head portion provided with a wheel seat and a dog seat extending from the wheel seat toward the handle, and the end wall of the dog seat, affording a rocker bearing substantially on the longitudinal axis of the lever, a wheel rotatably mounted in the wheel seat and having a peripheral friction surface and a work engaging portion, a dog mounted for oscillatory movement in the dog seat and having a journal portion for engagement with the rocker bearing and an arcuate friction surface for rocking engagement with the periphery of the wheel, and yielding means for pressing the dog into engagement with the wheel.

3. A tool of the class described comprising a lever formed with a wheel seat and a dog seat, a wheel rotatably mounted in the wheel seat and having a peripheral bearing surface and an axial engaging portion, the dog seat affording a rocker bearing, a dog mounted in the dog seat for oscillatory movement in a direction transversely of the lever axis, said dog having a bearing portion seated against the rocker bearing and a convex arcuate terminal portion having rocking engagement with the periphery of the wheel, said terminal portion and bearing surface being provided with interengaging elements, and yielding means for maintaining the dog in engagement with the wheel.

4. A tool of the class described comprising the combination of a lever, a wheel rotatably mounted thereon and arranged for attachment to an object whereby it may constitute a center of oscillation for the lever, a dog mounted on the lever for oscillatory movement and having one end abutting a solid bearing portion of the lever and its other end of eccentric convexly arcuate form in rocking engagement with the periphery of the wheel, and yielding means for maintaining the dog in engagement with the wheel.

5. A tool of the class described comprising a lever having a wheel rotatably mounted thereon and arranged for engagement with an object to be rotated, a dog mounted on the lever for oscillatory movement and having one end formed to afford a bearing on which the dog oscillates, the other end of the dog affording a convexly arcuate margin extending eccentrically rotative to the center on which the dog oscillates and arranged for rocking engagement with the periphery of the wheel, said margin of the dog and the periphery of the wheel being provided with interengaging elements, and a spring for pressing said margin of the dog into contact with the wheel.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

WILLIAM J. O'NEILL.

Witnesses:

FRANCES K. GILLESPIE,

C. S. BUTLER.