May 10, 1927. 1,628,467

S. MANDL

WRENCH

Filed Dec. 22, 1924

Fig. 1.

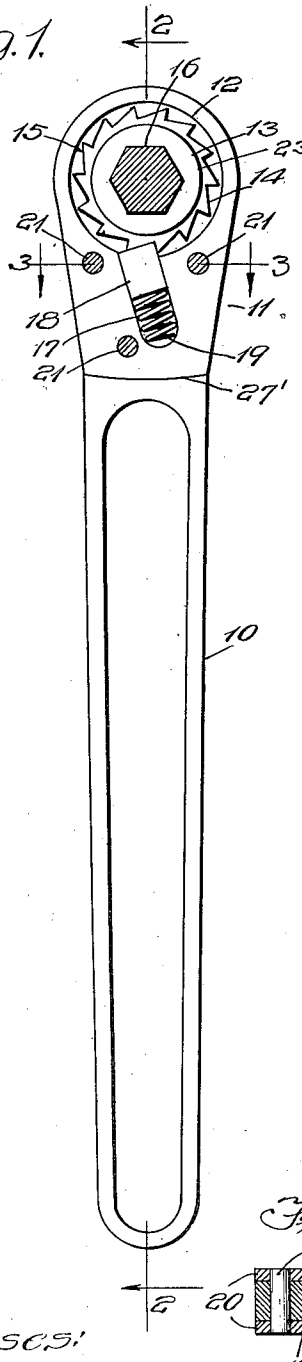


Fig. 2.

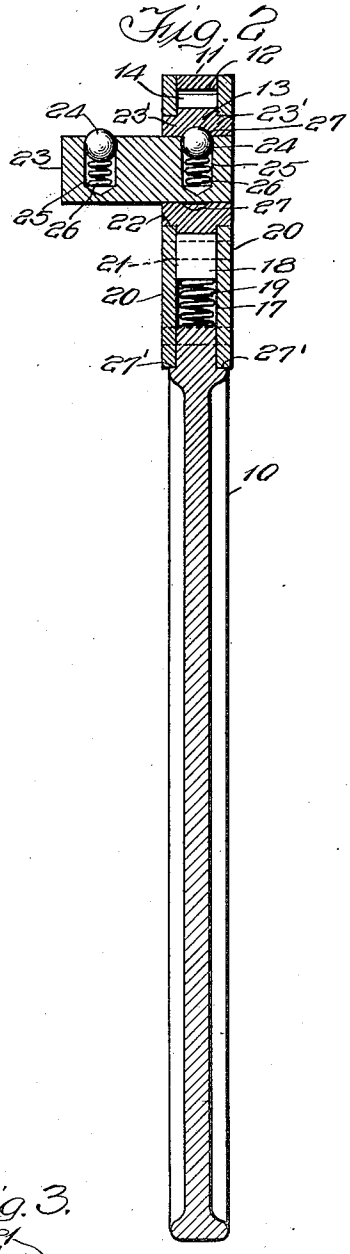
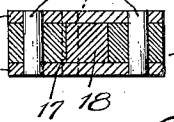


Fig. 3.



Witnesses:
W. P. Kilroy
Harry R. L. White.

Inventor:
Sigmund Mandl
By Brown, Bottcher & Stevens
Attys

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UNITED STATES PATENT OFFICE.

SIGMUND MANDL, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO HUSKY WRENCH CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

WRENCH.

Application filed December 22, 1924. Serial No. 757,312.

This invention relates to wrenches, and more particularly to ratchet wrenches of the type disclosed and claimed in my co-pending application, Serial No. 689,912, filed February 21, 1924.

In manufacturing ratchet wrenches of the above noted type, it was found difficult and expensive to form the body portion, so that one integral side thereof could be used as a bearing for the ratchet wheel.

Now, I propose, according to the present invention, to manufacture the entire body of the wrench, comprising the handle and the above referred to body portion, of a simple and inexpensive drop-forging. This will permit me to machine cheaply and easily the housing for the ratchet wheel as well as facilitate the slotting out of the recess for the pawl.

However, this construction will greatly weaken the body portion of the wrench due to the inherent weakness in design. In order to overcome this weakness in design and at the same time to provide bearings for the ratchet wheel, I employ a pair of side or bearing plates riveted to the body portion of the wrench which re-enforce the body portion at its place of weakness. Incidentally, my improved wrench is much more compact as well as of much better appearance than my former type of ratchet wrench.

Now by constructing ratchet wrenches in accordance with the present invention, it is found in practice that the radial dimension of the body portion and its side plates can be materially reduced, thereby enabling the wrench to be used in corners and other narrow or small places, particularly where the wrench has to be brought adjacent a wall or the like.

The aim or object of the present invention is to provide an improved ratchet wrench of such a design that the above described undesirable features are necessarily obviated and to provide a wrench of simple, compact and inexpensive construction embodied with the above described desirable features.

Other objects and advantages of the invention will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate one embodiment thereof, and in which,

Fig. 1 is a front view of the wrench with the cover plate removed embodying the features of the invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1; and

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Referring now to the drawings in detail, in which like reference numerals designate similar parts throughout the several views, 10 denotes a handle which may, if desired, be cored as shown in Figs. 1 and 2 to lessen the weight of the wrench. Formed on the end of the handle 10 is a body portion 11, the width of which is slightly greater than that of the handle 10. It should be noted, however, that the thickness of this body portion 11 is the same as the thickness of the handle 10, which necessarily facilitates its manufacture. Centrally disposed in the body portion 11 and as near as practical to the end thereof, is a circular aperture or bore 12 which may be easily formed in drop-forging dies and machined or reamed out. Positioned in the aperture 12 is a revolvable member 13 having a set of ratchet teeth 14 formed on its peripheral portion, thus constituting a ratchet wheel, hereinafter referred to generally by reference character 15. Formed in the circular member 13 is a hexagonal aperture 16 the purpose of which will be more fully described hereinafter.

A rectangular recess or slot 17 is located in the body portion 11 and is disposed adjacent to the bore 12 and the revolvable member 13. A rectangular pawl 18 is mounted in the recess 17 and is normally pressed outwardly by a compression spring 19 seated in the recess 17 intermediate the inner end of the pawl 18 and the bottom of the recess 17, and between side plates 20.

The pawl 18 is adapted to reciprocate along a straight line which is at right angles to the line of pressure of the ratchet wheel 15 when in locked position. This arrangement permits the force exerted by the ratchet wheel 15 when in locked position to be transmitted transversely through the pawl 18, to the body 11 which necessarily results in the pawl 18 being reinforced from deleterious forces. Furthermore, it should be noted that the end of the pawl 18 is adapted to fit snugly in each of the teeth 14 of the ratchet wheel 15 and hence may respond rapidly and accurately to the movement of the ratchet wheel 15.

The body portion 11 is provided with two bearing or side plates 20 which may be attached thereto in any suitable manner such as by three rivets 21 (Fig. 3). The plates 20 are provided with circular apertures 22 which form bearings for the hub-like portions 23′ (Fig. 2) of the revolvable member 13. The parts of the wrench are preferably finished and cyanide hardened after assembly.

The ratchet wheel 15 of the revolvable member 13 may engage the work in any suitable or desired manner. For example, a plug 23 of a hexagonal or other polygonal cross section may be slidably fitted in the correspondingly shaped aperture 16 of the member 13. This plug 23 is provided with a pair of circular elements or bearings 24 mounted in recesses 25 in the side of the plug 23 and are pressed outwardly by a pair of springs 26 also positioned in the recesses 25.

It is, of course, apparent that the plug 23 may project from either side of the wrench as desired. Either of the elements 24, when in the aperture 16, are adapted to engage an annular groove 27 in the member 13 and through the medium of the spring 26 to maintain the plug 23 in proper position. By exerting slight pressure on either end of the plug 23, the spring 26 associated with the element 24 in the groove 27 will be compressed by the said element 24 and the plug 23 may be readily removed from the aperture 16.

The primary advantage of my invention lies in the fact that the side plates 20 when riveted in position on the body portion 11 greatly strengthens the wrench. It is obvious that when the ratchet wheel 15 and the pawl 18 are in a locked position, the portion of the wrench subjected to the greatest stresses and strains will be that adjacent to and surrounding the recesses 17 in which the pawl 18 is mounted. Ordinarily, these stresses and strains might have been sufficient to crack the body portion 11. In my improved wrench above described, these plates 20 tend to hold the body portion 11 and the associated mechanism in a compact unit and to resist or counteract any of the above noted deleterious stresses and strains thereby greatly increasing the longevity of the wrench.

It will be noted that the side plates 20 seat against shoulders 27′ which not only assist in locating the plates properly, but form re-enforcing means which operate with the rivets to re-enforce the weak section of the wrench. The handle 10 and the body portion 11 being of such a simple design may be made of a simple and inexpensive drop-forging and all the other parts being also of a simple character may be made by automatic machinery.

Practically, this is of importance, inasmuch as it facilitates the manufacture of the wrench, thereby enabling its production on a cheaper basis than heretofore.

It is to be understood that although only one embodiment of my invention has been disclosed, that the invention is to be limited only in so far as defined by the scope and spirit of the appended claims.

I claim:

1. A wrench comprising a flat integral body part having one end circular and its other end formed into a handle, said circular end having a concentric cylindrical pocket extending entirely transversely therethrough, a ratchet wheel within said pocket having an axially extending wrench opening, said body between its ratchet pocket and handle having a slot extending transversely through the entire thickness of said body part and opening into said pocket, a rectangular pawl longitudinally movable in said slot but confined against transverse movement therein, a spring in said slot pressing said pawl into cooperation with the teeth of said ratchet wheel, and separable side plates for said body part closing the sides of said pawl slot and confining said ratchet wheel in said pocket, said plates being secured to the body part alongside of said slot in order to strengthen the body part at such point.

2. In a wrench, the combination of a body portion having a handle, a ratchet having a plurality of teeth, there being a pawl slot extending entirely transversely through the body portion of the wrench between the ratchet and the handle, said pawl slot separating the body portion into side portions on opposite sides of the pawl slot, a generally rectangular pawl mounted in said slot and engaging the ratchet, a pair of separable plates mounted upon opposite sides of the body portion over the open sides of the pawl slot and confining said pawl in said slot, said plates bridging the sides of the body portion separated by the pawl slot, and fastening devices on opposite sides of the pawl slot for securing the plates to the body portion and for tying the body portion together on opposite sides of the pawl slot through said plates.

3. In a ratchet wrench, the combination of a body portion comprising a handle having a head at one end, said head having a ratchet pocket extending entirely transversely therethrough, a ratchet mounted in said pocket, said body between its ratchet pocket and handle having a generally longitudinal angular pawl slot extending transversely through the entire thickness of the body portion and opening into the ratchet pocket, the periphery of the outer end of the head conforming with the ratchet pocket and forming a thin imperforate wall serv-

ing only to confine the ratchet, said pawl slot separating the body portion adjacent the handle part into side portions on opposite sides of the pawl slot, a generally rectangular pawl mounted in the pawl slot and removable laterally from either side of the wrench, a spring in said slot pressing said pawl into cooperation with the teeth of said ratchet and a pair of separable plates mounted over the lateral open side of the pawl slot, each of said plates having imperforate ring-like portions surrounding the pawl confining wall at the outer end of the head and retaining the pawl and ratchet against displacement, said plates bridging the sides of the body portion separated by the pawl slot and fastening devices inwardly only of the outer thin wall of the head and adjacent parts of the plates and on opposite sides of the pawl slot for tying the body portion on opposite sides of the pawl slot together through the plates and for securing the plates to the head.

In witness whereof, I hereunto subscribe my name this 12th day of December, 1924.

SIGMUND MANDL.