July 15, 1952 A. F. PICKARD 2,603,325

SOCKET WRENCH HEAD

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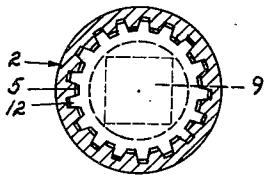


FIG. 4

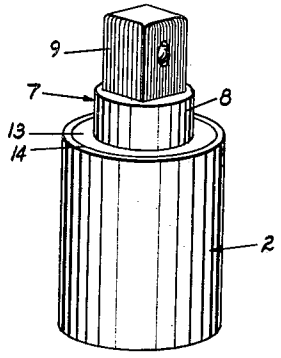


FIG. 1

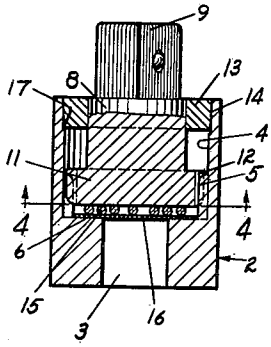


FIG. 3

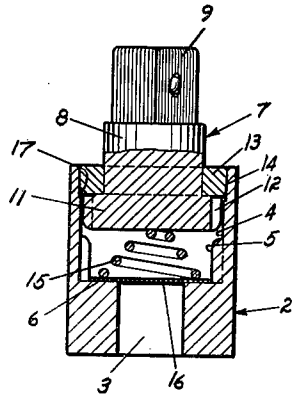


FIG. 2

INVENTOR
ALBERT F. PICKARD
BY Paul, Paul & Moore
ATTORNEYS

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SOCKET WRENCH HEAD

Albert F. Pickard, Minneapolis, Minn.

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2 Claims. (Cl. 192—67)

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This invention relates to new and useful improvements in socket wrenches, and more particularly to the ratchet head of such devices.

Most ratchet wrenches now in common use require the manipulation of a small lever or element to shift the position of the usual ratchet palls or dogs, when it is desired to manipulate the wrench for turning a nut or bolt off or on. Other ratchet wrenches require that the ratchet head be inverted with respect to the bolt or screw, when it is desired to change the direction of rotation of the bolt.

The novel ratchet head herein disclosed operates equally well in either direction of rotation and without the manipulation of any levers or other control elements, and without removing it from the work, a slight downward movement of the driving member being all that is necessary to operatively connect it with the driven or socket member, regardless of the direction of rotation.

An object of the present invention therefore is to provide a simple and inexpensive ratchet head for socket wrenches which comprises a minimum of parts, and all of said parts being so oriented that the ratchet head may be operated to rotate a bolt or nut in either direction without removing the ratchet head from the shank of the socket wrench or the wrench from the bolt or nut.

A further object is to provide a simplified form of ratchet head for socket wrenches comprising two major parts, one, which will hereinafter be referred to as the socket member, and the other the driving member. These two members are inseparably connected together, when in ordinary use, whereby the interengaging teeth of the two members are normally concealed within the body of the device. Thus, the ratchet head is not likely to become inoperative as a result of dirt and foreign matter accumulating between the teeth thereof, which frequently happens with conventional wrenches when carried in tool boxes which are not kept too clean.

A further object is to provide a ratchet head of the class described comprising a socket member or body provided with a quadrate opening or socket at one end adapted to receive the square shank of a conventional socket wrench set, and a plurality of inwardly directed teeth are provided on the wall of said body adapted to be engaged by a plurality of external teeth provided on a driving member having its major portion supported within the socket member and adapted for axial movement within the socket member, and resilient means being provided within the socket member for normally holding the driving member out of

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driving engagement with the teeth of the socket member, said resilient means being readily compressible to permit the driving member to be moved into driving engagement with the socket member, when the device is in use.

A further object is to provide a ratchet head comprising a hollow body or socket member having a bore extending inwardly from one end thereof and terminating at its inner end in an annular shoulder, and a plurality of inwardly directed teeth being provided on the wall of said bore adjacent to said shoulder, adapted to be engaged by a plurality of external teeth provided on one end of a driving member, said driving member being inseparably secured to the socket member and whereby it is adapted for axial movement therein so that its teeth may readily and conveniently be moved into driving engagement with the teeth of the socket member, when it is desired to rotate a nut or bolt in either direction.

Other objects of the invention reside in the simple compact construction of the ratchet head, as a whole, whereby the interengaging teeth thereof are completely concealed within the body of the head; in the provision of a ratchet head which may be used in conjunction with conventional socket wrench sets in lieu of the usual ratchet head now used with such sets; and in the provision of a ratchet head which readily lends itself for manufacture in quantity production at low cost, and which has all of its operating parts sealed within the body of the device, whereby said parts are not likely to be rendered inoperative as a result of foreign matter or particles becoming lodged between the teeth thereof.

Other objects of the invention will appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a perspective view of my improved ratchet head;

Figure 2 is a vertical sectional view showing the simple construction of the head and the driving member being shown in its normal position;

Figure 3 is a view similar to Figure 2 showing the driving member depressed to cause its teeth

to drivingly engage the internal teeth of the socket member; and

Figure 4 is a sectional plan view on the line 4—4 of Figure 3.

The novel ratchet head herein disclosed is shown comprising a socket member or body 2 which preferably is cylindrical in configuration, as best illustrated in Figure 1. The body 2 is provided at its lower end with a suitable socket 3 which preferably is square in cross section, and is adapted to receive the usual square end of the shank of a conventional socket wrench set. The upper end of the socket member 2 is provided with an enlarged bore 4, the wall of which is provided at its lower end with a plurality of inwardly directed spaced teeth 5 having their lower ends terminating at an annular shoulder 6, provided between the socket 3 and the bore 4.

The teeth 5 may readily be integrally formed with the wall of the bore 4 by well known methods such as broaching, or they may, in some cases, be formed independently of the wall 4 in the form of an annular member or ring, which ring may be suitably secured to the wall 4 by well known methods such as welding.

A driving member, generally designated by the numeral 7, is shown comprising a cylindrical body 8 having a square shank 9 at its upper end and an enlarged head 11 at its lower end provided with external teeth 12 adapted to mesh with the internal teeth 5 in the socket member 2, as clearly illustrated in Figure 3. The teeth 5 and 12 in the socket member 2 and drive member 7, respectively, are disposed in parallel relation to the axis of the member 2, whereby the teeth 12 may readily be moved into or out of driving engagement with the teeth 5 of the socket member by relative axial movement of the driving member 7 with respect to the socket member 2.

A suitable collar 13 is pressed into a counterbore 14 provided at the upper end of the bore 4 to form a guide for the driving member 7, and to prevent its accidental detachment from the socket member 2. The length of the bore between the upper ends of the internal teeth 5 of the member 2 and the lower face of the collar 13 is sufficient to receive the head 11 of the driving member 7, when the driving member is in its normal inoperative position, as shown in Figure 2. When thus positioned, the driving member 7 may be freely rotated in either direction with respect to the member 2, because of its teeth being out of interlocking engagement with the teeth of the socket member 2. A suitable spring, generally designated by the numeral 15, has its upper end engaging the bottom of the driving member 7 and its lower end seated upon a circular disk 16, which in turn is seated on the shoulder 6. The spring 15 normally supports the driving member 7 in the position shown in Figure 2. The disk 16, in addition to providing a seat for the spring, also serves to prevent foreign matter from entering the bore 4, as will be understood.

The novel ratchet head herein disclosed is extremely simple and inexpensive in construction. The socket member may readily be formed with conventional tools and readily lends itself to manufacture in quantity production. The same applies to the driving member 7 and collar 13. When the parts have been completed, they may readily be assembled by simply dropping the disk 16 and spring 15 into the bore 4 and then inserting the driving member 7, with the collar 13 positioned thereon, into the bore, after which the collar 13 is pressed into the upper enlarged

end of the bore until its lower end engages the small annular shoulder shown at 17 in Figures 2 and 3.

In the operation of the ratchet head, one end thereof is operatively connected to any conventional socket wrench handle, and its opposite end to a selected socket, as is well known, and the socket may then be applied to the bolt or nut to be tightened or loosened. When the device is thus operatively attached to a bolt or nut, the member 7 is pressed downwardly against the tension of the spring 13, whereby the external teeth 12 of the member 7 will engage and interlock with the internal teeth 5 of the member 2, whereby rotation of the member 7 will impart a similar rotation to the member 2, and therefore to the bolt or nut to which the wrench is applied.

In other words the ratchet head herein disclosed operates in either direction, and may be operated as any conventional ratchet wrench by depressing the member 7 during the work stroke of the wrench handle, and releasing the downward pressure on the wrench on the back stroke, whereupon the spring will move the member 7 out of driving engagement with the teeth 5 of the socket member 2. Thus the wrench handle may be operated by a back and forth swinging movement until the nut or bolt with which it is engaged has been driven home or released, as the case may be, without creating drag on the bolt or nut on the back stroke.

The inherent construction of the ratchet head is also such as to provide maximum strength, it being noted by reference to Figure 4, that the coacting teeth of the parts 2 and 7 are engaged with one another around the circumference thereof, thereby uniformly distributing the strains on all of said teeth. It is also to be understood that the ratchet head may be used in any desired position, depending upon the type of wrench handle utilized. For example, some of the older models of wrenches are provided with a squared socket in lieu of a shank 9, such as shown in Figure 1, and in such cases the shank 9 of the ratchet head may be inserted directly into the socket of the wrench handle, as will be understood.

It will be apparent to those skilled in the art that I have accomplished at least the principal objects of my invention, and it will also be apparent to those skilled in the art that the embodiments herein described may be variously changed and modified without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiments are illustrative only, and that my invention is not limited thereto.

I claim as my invention:

1. A ratchet head for socket wrenches comprising, in combination, a body member having an enlarged cylindrical bore extending inwardly from one end thereof and having a socket having a diameter substantially smaller than the diameter of said enlarged cylindrical bore extending inwardly from the other end thereof and opening into said cylindrical bore thus forming a shoulder, a plurality of inwardly extending teeth disposed annularly within said cylindrical bore and adjacent the shoulder formed by the juncture of said socket opening and said cylindrical opening, said teeth comprising a plurality of longitudinal ridges vertically disposed and having a longitudinal dimension substantially less than

the axial dimension of said bore, a cover disc covering the bottom of said socket opening, a driving member seated for axial movement within said bore, said driving member comprising a head having an axial dimension substantially less than the axial dimension of said bore, and having a plurality of outwardly extending ridged teeth disposed annularly therearound for cooperating with said inwardly extending teeth, a reduced cylindrical shaft and a shank adapted to be engaged by a driving handle, a compression spring interposed between said cover disc and the underside of said driving head, whereby said driving member is constantly urged in an axial direction whereby said outwardly extending teeth will be disengaged from said inwardly extending teeth, and a collar closing the end of said cylindrical aperture opposite said socket opening, said collar having an aperture therein serving as the bearing and guide for positioning said driving member for rotation and axial reciprocation therein.

2. A ratchet head for socket wrenches comprising, in combination, a body member having an enlarged cylindrical bore extending inwardly from one end thereof, means at the opposite end of said body for attaching it to a device to be rotated, a plurality of inwardly extending teeth disposed annularly within said cylindrical bore and adjacent the bottom thereof, said teeth comprising a plurality of longitudinal ridges vertically placed and having a length dimension substantially less than the actual dimension of said bore, a driving member seated for axial reciprocal

movement within said bore, said driving member comprising a head having an axial dimension substantially less than the axial dimension of said bore, and having a plurality of outwardly extending ridged teeth disposed annularly therearound for cooperating with said inwardly extending teeth, a reduced cylindrical shaft and a shank adapted to be engaged by a driving handle, a spring engaging the bottom of said cylindrical bore and the under side of said driving head, whereby said driving member is constantly urged in an axial direction whereby said outwardly extending teeth will be disengaged from said inwardly extending teeth, and a collar closing the end of said cylindrical aperture opposite said socket opening, said collar having an aperture therein serving as a bearing and guide for positioning said driving member for rotation and axial reciprocation therein.

ALBERT F. PICKARD.

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