July 10, 1956 C. T. BROWN 2,753,747

SOCKET WRENCH HAVING SCREW OR NUT-HOLDING MEANS

Filed May 11, 1954

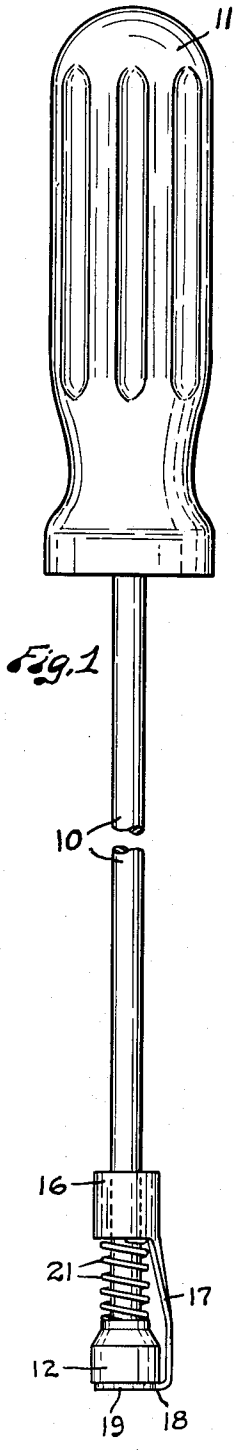

Fig. 1

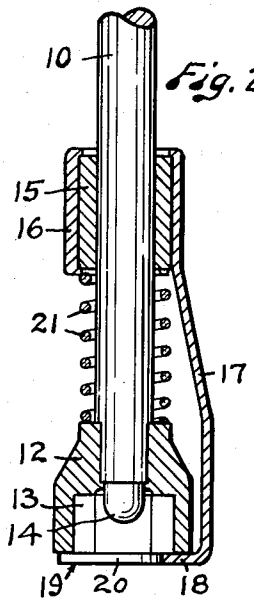

Fig. 2

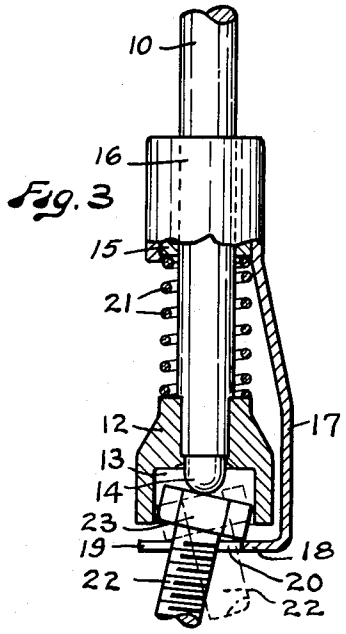

Fig. 3

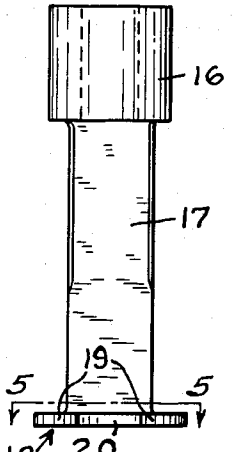

Fig. 4

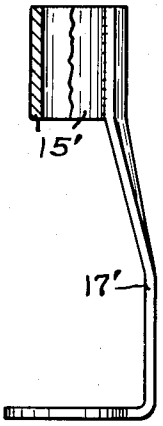

Fig. 6

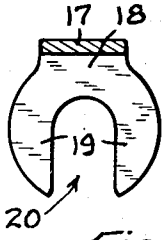

Fig. 5

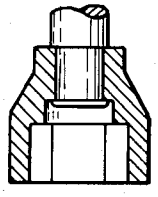

Fig. 7

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SOCKET WRENCH HAVING SCREW OR NUT-HOLDING MEANS

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3 Claims. (Cl. 81—125)

This invention relates to a socket wrench having screw and nut-holding means connected therewith.

An object of this invention is to provide a socket wrench which has spring-retracted holding means cooperating with the socket thereof to hold a screw or nut which is to be inserted in or removed from a location difficult of access thus relieving the operator of the necessity of manually holding the screw or nut and greatly facilitating the insertion or removal of the same.

Another object is to construct a socket wrench which provides for universal tilting movement of the head of a screw within the socket of the wrench and thereby makes possible smooth operation of the wrench while imparting rotation to a screw or nut which is not in alignment with the axis of the wrench.

Another object is to provide a socket wrench of screw driver type which is particularly well adapted for use in inserting sink-rim clamp screws used in places difficult of access in the installation of sinks.

Other objects are to provide a socket wrench which is simple and durable in construction, reliable and efficient in operation, not expensive to manufacture and one which is well adapted for use on screws and nuts in locations inaccessible to ordinary tools.

Other objects of the invention will be apparent from the following description taken in connection with the accompanying drawings.

Figure 1 is an elevation of a socket wrench constructed in accordance with this invention.

Fig. 2 is a sectional view on a larger scale than Fig. 1 and with parts in elevation, showing a fragment of the shank of this wrench together with the socket and spring-actuated holding means carried by said shank.

Fig. 3 is a view similar to Fig. 2 showing the wrench applied to a screw and with the screw tilted at an angle to the axis of the wrench.

Fig. 4 is a detached view in front elevation of a holding member used on the wrench.

Fig. 5 is a view partly in plan and partly in section taken on line 5—5 of Fig. 4.

Fig. 6 is a detached side elevation, with parts in section of a holding member of modified form.

Fig. 7 is a sectional view, with a fragment of a shank in elevation, and showing a socket of a type particularly adapted for use on nuts.

Like reference numerals indicate like parts throughout the several views.

This socket wrench comprises a shank **10** having a handle **11** rigidly mounted on one end and a socket member **12** rigidly mounted on the other end thereof. A recess or socket **13** to receive a screw head or a nut is provided in the socket member **12** in axial alignment with the shank **10**. An axially positioned rounded abutment or thrust member **14** protrudes from the bottom of the socket **13** into said socket and terminates a substantial distance from the outer end of the socket. One practical way of forming the abutment member **14** is to fit the socket member **12** over the outer end of the shank

10 and allow the shank to protrude into the socket **13**. When the tool is made this way the socket member may be rigidly secured to the shank **10** by pressing it onto the end of said shank and riveting or peening at the location where the shank protrudes into the socket **13**.

The device for holding the screw or nut is carried by the shank **10**. It comprises a sleeve **15** slidable on the shank **10**, a band **16** encircling said sleeve **15**, an arm **17** rigid with the band **16** and extending outwardly therefrom past the socket member **12** and a forked end portion or foot member **18** rigid with perpendicular to the arm **17**, said forked end portion or foot member having two spaced toes **19** with a U-shaped opening **20** between them. The foot member **18** and toes **19** extend across the outer end of the socket member **12**. A compression spring **21** is disposed on the shank **10** between the socket member **12** and the sleeve **15** and exerts a yielding pressure on the sleeve **15** which tends to draw the foot member **18** and its toes **19** against the end of the socket member **12**.

The sleeve **15** spaces the arm **17** away from the shank **10** so that there is ample clearance for the spring **21** between these parts. Preferably the upper and lower extremities of the band **16** are swaged inwardly over the ends of the sleeve **15**.

Fig. 6 shows a modified form of holding device in which an arm **17'** corresponding to the arm **17** is welded or soldered or otherwise secured to the exterior of a sleeve **15'** and the band **16** is dispensed with. This simplifies construction.

In using this socket wrench to insert a screw **22** in an inaccessible location, the screw-holding device is manually pushed outward against the pressure of the spring **21** far enough to allow a screw head **23** to be slipped into the space between the socket member **12** and the toes **19**, the shank of the screw being received in the U-shaped notch **20**. When the manually applied force compressing the spring **21** is released the screw head **23** will be pressed into the socket **13** and against the abutment member **14** and the screw **22** will be firmly held and unless said screw is tilted sidewise it will normally be held substantially in alignment with the shank **10**. The socket **13** is non-circular and will usually be hexagonal in shape because screws are commonly provided with hexagonal heads. Obviously the shape of the socket **13** may be varied to conform to screw heads of different shapes.

The socket **13** is slightly oversize as compared to the size of the screw head it is designed to fit and this allows the screw head to have a universal tilting movement within the socket **13** while the screw is being turned by rotation of the socket. Thus provision is made for imparting rotation to a screw which has its axis inclined relative to the axis of the shank **10**.

The provision of the abutment member **14** makes this socket wrench operate much more smoothly when it is operating with the screw inclined at a substantial angle relative to the shank **10**. This is because the thrust is exerted against the approximate center of the screw head through the centrally positioned rounded end of the abutment member **14** rather than being exerted against an off-center part of the screw head as it would be if the screw head rested against the flat bottom wall of the socket **13**. In practice it has been found that fairly smooth operation of the wrench is provided as long as the angle of the screw relative to the shank **10** is not in excess of fifteen degrees. Operation at angles greater than fifteen degrees is possible but is not as smooth as it is at the lesser angles.

The pull exerted by the spring **21** through the toes **19** against a screw head **23** will be borne by the centrally positioned abutment member **14** and the resistance offered by the spring **21** to the turning of a disaligned

screw will be less than it would be if the abutment member were omitted.

In the structure shown in Fig. 7 the abutment member is omitted and this allows more room for the end of a bolt when this wrench is being used to turn a nut, the structure of Fig. 7 being particularly adapted for use on nuts.

It will be understood that a washer or like device may be placed on the screw 22 before this wrench is engaged therewith and that the foot 18 and its toes 19 may be hooked over the washer or like device.

When a screw is threaded into any object by the use of this wrench the foot member 18 and toes 19 will be between the screw head 23 and the object into which the screw is threaded. Thus it will be seen that this wrench must be removed from the screw before the foot 18 and toes 19 are clamped between the screw head and the object. The wrench is easily removed from a screw, before the foot 18 and toes 19 are thus clamped, by pulling outward on the shank 10 so as to compress the spring 21 and free the screw head 23 from the socket 13 and then pressing sidewise on the shank 10 to release the foot 18 and toes 19 from engagement with the screw. Since in the installation of sinks it is desirable to leave the screws untightened and not jammed against the parts they hold, the foot 18 and toes 19 act as a gauge to prevent the screws from being jammed too tight. In instances where jamming of the screws or nuts against the members held thereby is required another wrench without any holding means is used for final tightening.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of this invention but it will be understood that changes in the same may be made within the scope of the following claims.

I claim:

1. In a socket wrench, a shank having a handle on one end thereof; a socket member rigid with the other end of said shank and having therein a non-circular screw-head receiving socket in axial alignment with the shank; an axial screw-head abutment member of a height substantially less than the depth of said socket protruding from the bottom of the socket into said socket and having a rounded outer end providing a rounded support and thrust member for tilting engagement by a screw head in said socket; a holding device slidably supported on said shank and having a forked end portion extending across the outer end of said socket member and fittting over a screw shank and engaging a screw head positioned in the socket; and a spring yieldingly engaging the holding device whereby the forked end portion thereof is urged toward the socket member.

2. A socket wrench for use on a screw having a hexagonal head, comprising a shank having a handle on one end thereof; a socket member rigid with the other end portion of said shank and axially aligned with the shank and having a hexagonal socket which is oversize relative to the heads of screws to be turned by the wrench providing for turning screws which are substantially inclined relative to the shank; an axial screw-head abutment member of a height substantially less than the depth of said socket protruding from the bottom of the socket into said socket and providing a support and thrust member for tilting engagement by the medial portion of a screw head in said socket; a holding device slidably supported on said shank and having a forked end portion extending across the outer end of said socket member and positioned to fit over a screw shank and engage a screw head positioned in the socket; and a spring yieldingly urging the holding device toward the handle of the wrench.

3. In a tool for holding and turning a screw, a shank having a handle on one end thereof; a socket member rigid with the other end of said shank and having therein a screw-head-receiving socket in axial alignment with said shank; a sleeve slidable on said shank; an arm attached to said sleeve and extending past said socket member; a forked foot having two spaced toe members extending substantially at right angles from the outer end portion of said arm across the outer end of said socket; an axial screw-head-engaging member protruding from the bottom of said socket into the socket and positioned to receive the thrust of a screw head in the socket; and a compression spring on said shank between said socket member and said sleeve yieldingly urging said toe members toward said socket.

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