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J. M. SCHULTZ
BOLT-RETAINING SOCKET WRENCH

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Fig. 1

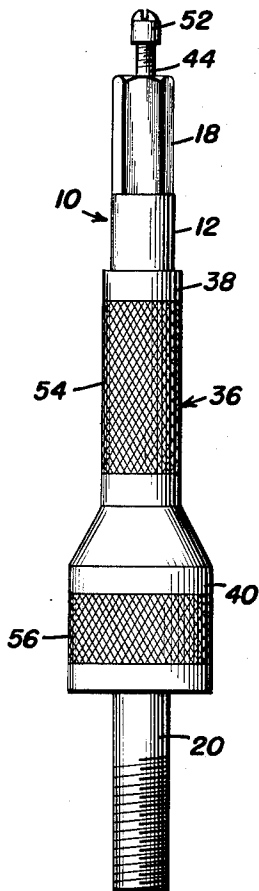


Fig. 3

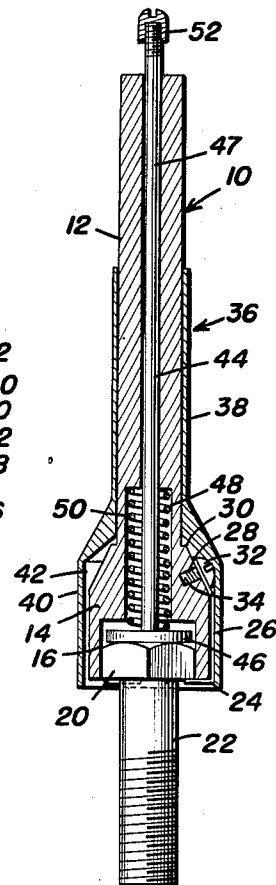


Fig. 4

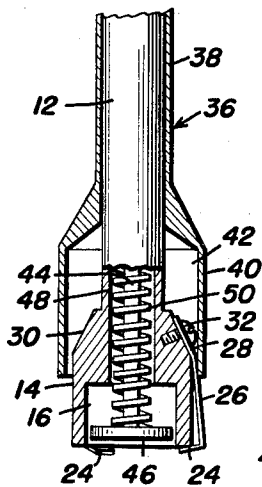
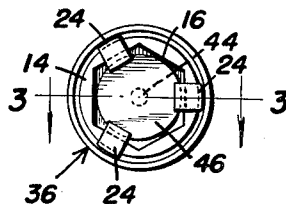


Fig. 2



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BOLT-RETAINING SOCKET WRENCH

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1 Claim. (Cl. 81—54)

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This invention relates in general to socket wrenches, and more particularly to socket wrenches having means thereon for retaining bolts and other similar fasteners therein while being applied or removed.

The primary object of my invention is to provide a bolt retaining socket wrench having an elongated wrench member having thereon a polygonal socket for retaining a bolt head, an improved arrangement and construction of spring fingers for engaging under the bolt head to retain the same in the socket, said spring fingers being moved into retaining position by a slidable collar on the wrench; novel, simply constructed means for urging the bolt head into engagement with said fingers in the form of a pin slidable in the wrench member and having a spring loaded enlargement in the socket for engagement of the bolt head, and stop means carried by the pin exteriorly of the wrench member for engagement with the wrench member to limit movement of the pin and enlargement under the urge of the spring so as to retain the enlargement in the socket.

With these objects definitely in view, this invention resides in certain novel features of construction, combination and arrangement of elements and portions as will be hereinafter described in detail in the specification, particularly pointed out in the appended claim, and illustrated in the accompanying drawings which form a material part of this specification, and in which:

Figure 1 is an elevational view of the bolt retaining socket wrench, which is the subject of this invention, the socket wrench being illustrated as having a conventional bolt retained therein;

Figure 2 is a bottom plan view of the socket wrench of Figure 1 with the bolt being omitted, the arrangement of the spring fingers, the socket wrench member on which they are retained, and the spring finger actuating collar being illustrated with the spring fingers in their bolt retaining position;

Figure 3 is a longitudinal vertical sectional view taken substantially on the plane indicated by the section line 3—3 of Figure 2 and showing the general construction of the interior of the socket wrench, the wrench having a bolt retained therein by the spring fingers and the collar being in its lowermost position and urging the spring fingers toward the center of the socket; and

Figure 4 is a partial longitudinal vertical sectional view through the collar of the socket

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wrench, the wrench member disposed within the collar being partially broken away and shown in section in order to show the relationship of a pin slidably mounted therein with respect to the socket of the wrench member, the various portions of the wrench being in position for receiving the head of a bolt or a nut.

Similar characters of reference designate similar or identical elements and portions throughout the specification and throughout the different views of the drawings.

Referring now to the accompanying drawings in particular, it will be seen that the bolt retaining socket wrench includes a wrench member 10 which has a circular cross sectional stem portion 12 and an enlarged lower end 14 integral with the stem portion 12. The enlarged lower end 14 is provided with a hexagonal cross sectional socket 16 for receiving the head of a bolt or a nut. The upper end of the stem portion 12 is also hexagonal in cross section as at 18 in order to provide a portion which may be easily gripped by other wrenches.

Referring now to Figure 3 in particular, it will be seen that the head 20 of a bolt 22 is mounted within the socket 16 and retained therein by spring fingers 24. The spring fingers 24 are integral with upwardly extending arm portions 26 which have inturned upper end portions 28 secured to a sloping exterior surface 30 of the wrench member 10 by a conventional fastener 32 threadedly engaged within a threaded recess 34 in the enlarged lower portion 14 of the wrench member 10.

As is best illustrated in Figure 2, the spring fingers 24 are three in number and are equally spaced around the socket 16. It will also be noted that the spring fingers 24 extend radially from the center of the wrench member 10.

Referring now to Figure 4 in particular, it will be seen that the arm portions 26 of the spring fingers 24 normally slope outwardly from the exterior of the enlarged lower end portion 14 and the spring fingers 24 are disposed out of alignment with the socket 16. In order that the spring fingers 24 may be conveniently moved into bolt retaining position, the wrench member 10 is provided with a collar 36 which is slidably mounted thereon. The collar 36 includes an upper tubular portion 38 engaging over the stem portion 12 of the wrench member 10, and an enlarged lower end portion 40 having a cylindrical socket 42 adapted to enclose the enlarged end portion 14 of the wrench member 10 and its associated spring fingers 24. In order that the

collar 36 may move the spring fingers 24 into bolt retaining position, the diameter of the socket 42 is equal to the diameter of the enlarged end portion 14 plus twice the thickness of the arm portions 26. When so constructed, the collar 36 urges the arm portions 26 into engagement with the exterior of the enlarged lower end portion 14 and moves the spring fingers 24 inwardly as it moves downwardly on the wrench member 10.

In order that the head 20 of the bolt 22 may be held rigidly within the socket 16 and against the spring fingers 24, the wrench member 10 is provided with a pin 44 slidably mounted within a centrally located longitudinal bore 47 through the wrench member 10. The pin 44 is provided with an enlarged head 46 at its lower end, the enlarged head 46 being disposed within the socket 16 and engaging the head 20 of the bolt 22 and urging same against the spring fingers 24. In order that the enlarged head 46 may compressively engage the head 20 of the bolt 22, the wrench member 10 is provided with an enlarged bore 48 communicating with the socket 16 and concentric with the bore 47. Disposed within the enlarged bore 48 and surrounding the lower portion of the pin 44 is a coil compression spring 50 which is compressed between the upper end of its bore and the enlarged head 46. The upper end of the pin 44 is threaded and has mounted thereon a retaining cap 52 for preventing movement of the pin 44 out of the lower end of the wrench member 10.

In normal use of the bolt retaining socket wrench, which is the subject of this invention, the socket wrench has its collar 36 moved to the position illustrated in Figure 4. Then the socket 16 is positioned over the head 20 of the bolt 22 and the collar 36 moves downwardly to the position illustrated in Figure 3 thereby retaining the head 20 of the bolt 22 within the socket 16. The bolt 22 is then applied or removed by rotating the wrench member 10 while holding the entire wrench assembly in its correct position by gripping the collar 36. It will be noted by referring to Figure 1 that the collar 36 has a knurled surface on both its stem and enlarged lower end, the knurled surfaces being referred to by the reference numerals 54 and 56, respectively. The wrench member 10 may be turned either by hand or by engaging a suitable wrench (not shown) with the hexagonal upper end 18 of the wrench member 10 in order to turn same.

While the socket 16 and the upper end 18 have been illustrated and described as being hexagonal in cross section, it is not intended to so limit the invention. It will be readily apparent that the socket 16 and the upper end 18 may be of any polygonal cross section in order to accommodate bolts and wrenches of various shapes.

It is readily apparent that with the above described socket wrench a bolt may be screwed into position or removed from a confined place without danger of dropping the bolt. Also, the rotatable mounting of the collar 36 on the wrench member 10 permits the convenient support of a bolt while the collar is held stationary and the wrench is being rotated for starting the bolt in a threaded bore in a confined place.

The operation of this device will be understood from the foregoing description of the details thereof, taken in connection with the above recited objects and drawings. Further description would appear to be unnecessary.

Minor modifications of the device, varying in minor details from the embodiment of the device illustrated and described here, may be resorted to without departure from the function and scope of this invention, as defined in the appended claim.

Having described the invention, what is claimed as new is:

A bolt retaining socket wrench comprising an elongated wrench member having a polygonal cross sectional socket in its lower end; spring fingers adapted to retain a bolt partially within said socket, means for urging said spring fingers into bolt retaining position, means for urging the retained portion of the bolt into engagement with said spring fingers, said means for urging said spring fingers into position including a collar slidably mounted on said wrench member and partially enclosing said spring fingers, said collar forming a handle for said wrench member, said wrench member being rotatably mounted within said collar, said means for urging the bolt into engagement with said spring fingers including a central longitudinal bore through said wrench member communicating with said socket, a pin slidably mounted within said bore, said pin having an enlarged head mounted within said socket, and stop means carried by said pin externally of said wrench member for limiting downward movement of said pin through said bore.

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