Oct. 15, 1968 A. A. PETERSON 3,405,595

DEVICES FOR CLOSING WRENCH SOCKETS

Filed Oct. 27, 1966

Fig. 1.

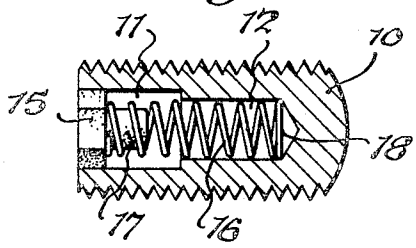


Fig. 4.

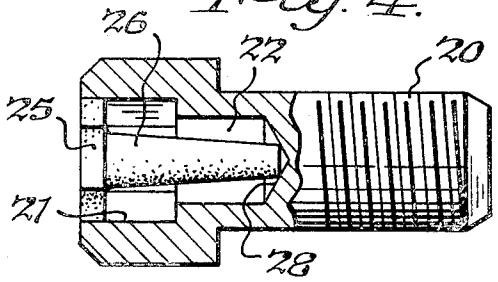


Fig. 2.

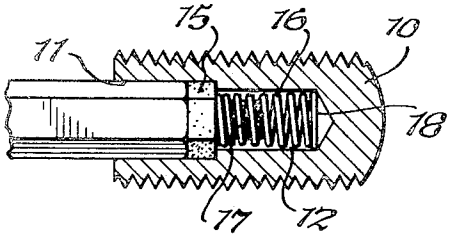


Fig. 5.

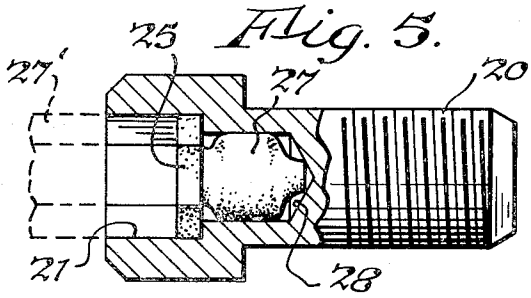


Fig. 3.

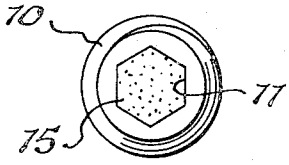


Fig. 6.

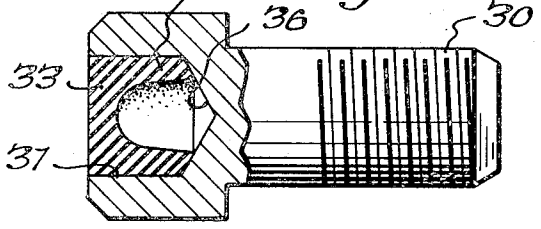
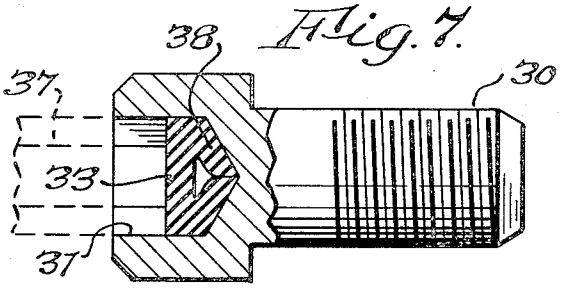


Fig. 7.



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DEVICES FOR CLOSING WRENCH SOCKETS

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ABSTRACT OF THE DISCLOSURE

The disclosure relates to a simple and inexpensive means for closing wrench sockets formed in the outer ends of screws, bolts or the like, to exclude foreign matter from such sockets.

Such closing devices are very desirable for the reason that the wrench sockets are apt to become filled with chips or other foreign material so that the wrench sockets must be cleared of such foreign material before a wrench can be inserted into the wrench socket, which requires time and delay in the operation of the machine or apparatus in which the screw may be employed.

It is one of the objects of this invention to provide a closure device which can be readily inserted into the end of a wrench socket and be retained therein, and which will be maintained in a position with the outer face thereof substantially flush with the outer end of the screw or bolt, but which can be pressed into the socket by a wrench of usual construction.

A further object is to provide a closure device of this type having a plug which is actuated by resilient means to be positioned within the socket with the outer surface thereof approximately flush with the outer end of the closure device, and in which the resilient means are permanently secured to the plug so that these two parts constitute a unit which can be readily inserted into a wrench socket.

In the accompanying drawings:

FIG. 1 is a central, sectional elevatoin of a screw having a wrench socket and having a closure device embodying this invention arranged therein.

FIG. 2 is a similar sectional view showing the position of the closure device when a wrench is inserted into the socket of the screw.

FIG. 3 is an end view thereof.

FIG. 4 is a view, partly in section, of a screw having a closure device of modified form applied to the wrench socket.

FIG. 5 is a view similar to FIG. 4 showing the closure device when a wrench is positioned in the socket of a screw.

FIG. 6 is a similar sectional view showing a closure device of another modified construction positioned in a wrench socket.

FIG. 7 is a view similar to FIG. 6 but showing the position of the closure device when compressed by means of a wrench inserted into the wrench socket.

Referring in the first place to FIGS. 1–3, **10** represents a screw provided at the outer end thereof with a wrench socket **11** which may be of any non-circular shape to cooperate with a wrench for turning the screw, the particular wrench socket in the construction shown being of hexagonal shape. This screw is also provided with an inward extension **12** of the socket **11** which is substantially concentric with the socket and which may be made by drilling a hole in the screw beyond the inner end of the wrench socket.

My improved closure for the wrench socket includes a plug **15** which may be made of elastomeric material, metal or other material and of a size such that its periphery fits into the wrench socket **11** and is slidable therein. The outer face of the plug is intended to lie normally approximately flush with the outer end of the screw. The inner end of the plug is prvoided with suitable elastic means secured to the plug and compressible so that when a wrench is inserted into the wrench socket, as shown in FIG. 2, the plug may be moved into the interior of the wrench socket. In the particular construction shown in FIGS. 1–3, the resilient means acting on the plug is in the form of a coil spring **16** having one end thereof secured or connected with the inner end of the plug, and for this purpose the plug is provided with a stem or extension **17**, preferably formed integral therewith and of a diameter to fit snugly into the interior of the spring **16**. The spring extends into the inward extension **12** of the screw, and the inner end of the spring is suitably secured on the inner end of this extension **12** in any suitable manner. In the construction shown, the coil **8** at the inner end of the spring is made slightly larger in diameter than the interior diameter of the extension **12** of the socket so that when the spring is forced into the socket, it will frictionally hold the spring in the socket extension. It is obvious of course that other means for securing the inner end of the spring in this extension **17** of the socket may be used. The spring is also made of such dimensions that when fully extended, as shown in FIG. 1, it will move the plug **15** outwardly in the socket, so that its outer face is approximately flush with the outer end of the screw **10**.

The closure device can be easily inserted into a screw by merely positioning the spring within the socket and then pushing the plug inwardly, whereupon the inner end of the spring will be frictionally held in the inner end of the extension **12** of the socket. When the pressure on the plug is released, the spring will push the plug outwardly into position in which the outer face of the plug is substantially flush with the outer face ofthe screw end. This is accomplished by selecting a spring which is of such length that when fully extended, it will push the plug into the desired position, and thus effectively keep foreign matter out of the socket.

In FIGS. 4 and 5 I have shown a modification of the construction shown in FIGS. 1–3 and includes a screw **20** with a wrench socket **21** and a hole **22** in the screw extending beyond the end of the non-circular part of the wrench socket. The closure device includes a plug **25** made of elastomeric material. In this construction the plug is formed integral with an elongated stem **26** which extends into the hole **22**. This stem will yield when pressure is applied to the plug **25** and will occupy some of the space within the extension **22** of the wrench socket, for example, as shown in FIG. 5, in which this stem is compressed into any suitable form, such for example as shown at **27**. The compressed stem may of course assume any other shape and will readily resume its initial form, as shown in FIG. 4, when pressure of the wrench **27'** is removed. The stem **26** is also made of such proportions that it will move the plug **25** outwardly to a position in which the outer face of the plug is approximately flush with the outer face of the screw **20**. The extension **22** of the wrench socket is preferably made by drilling, thus forming a tapering or substantially conical end **28** at the inner end of the extension of the wrench socket, and this tapering or conical end serves to keep the inner end of the extension **26** central within the screw so that the plug **25** will be properly positioned when moved into its outer position. The plug **25** is also made of rubber or other elastomeric material and is made of such size as to fit snugly in the socket so that friction between the plug and the socket wall will prevent inadvertent removal of the closing device from the socket.

In FIGS. 6 and 7 I have illustrated another form of wrench socket closure in which a screw **30**, similar to the screw showin in FIGS. 4 and 5 is provided with a wrench socket **31**, and a plug **33** is provided with its outer face formed be approximately flush with the outer end of the screw and having resilient means for moving the plug outwardly into its operative position. This resilient means is in the form of a hollow, cylindrical extension **34** of the plug. Both the plug and the cylindrical extension can be made of a suitable elastomeric material such, for example, as rubber, neoprene or the like. The inner end of the wrench socket is provided with a substantially conical surface **36** with the outer portion of which the cylindrical part **34** of the plug contacts. When pressure is applied to the plug by means of a wrench **37**, the cylindrical portion of the closure device is pressed inwardly toward the conical end of the socket, as shown at **38**, FIG. 7. This cylindrical part will of course tend to resume its original position as shown on FIG. 6, and in so doing, will force the plug **33** outwardly into position to close the wrench socket.

The plugs **33** and **25** are made of such size as to have a slight frictional engagement with the inner surface of the socket, enough to hold them in the sockets.

The closing devices disclosed herein have the advantage that they are of unitary construction, in that all parts are mounted on the plug and can be easily placed in operative position by merely pushing them into the socket, so that they are yieldingly held in the socket.

These closing devices have the further advantage that if inadvertently a wrench is left in a socket, the spring action of the socket-closing device will push the wrench out of the socket, and thus eliminate a possible hazard, in which the wrench might possibly be thrown outwardly. If for example the wrench were left in a screw or bolt on a movable part of a machine or implement, the wrench might be thrown outwardly with the possibility of injuring an operator or damaging a machine or implement.

It will be understood that various changes in the details, materials and arrangements of parts which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. A screw having a wrench socket in its outer end,

a closure for said socket having a plug of elastomeric material and having its periphery conforming closely to the interior of said socket,

and resilient means constituting an elastomeric extension of said plug and formed to fit into said socket and which presses said plug outwardly with its outer which occupies less space than that of the interior of said socket to permit said extension to become deformed when said plug is pressed into said socket and which presses said plug outwardly with its outer face substantially flush with the outer end of said screw when pressure on said plug is released.

said socket having a substantially conical inner end which engages said extension to center the same in said socket.

2. A screw with a sealed wrench socket comprising:

(a) a screw with a threaded outer periphery and a non-circular wrench socket at its upper end;

(b) a cylindrical recess at the inner end of said socket having a smooth, uninterrupted wall, and being approximately equal in length to that of said wrench socket;

(c) a plug member slidably disposed within and having the peripheral shape of said socket, the outer surface thereof being disposed adjacent the upper end of said socket;

(d) a coil spring which extends from the end of said cylindrical recess up through said socket to the back of said plug;

(e) the diameter of said spring being slightly smaller than that of said recess to permit a sliding contact with the recess wall, said recess accommodating the entire spring length when the plug is pressed to the bottom of said socket;

(f) the lower part of said spring having an enlarged diameter so that it is frictionally locked with the bottom of said recess to hold the spring firmly in position; and

(g) said plug having a relatively long cylindrical extension on the back thereof frictionally locked within the upper end of said coil spring, whereby the plug is supported by the spring to provide axial reciprocable movement of the plug along the length of the socket.

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