

Dec. 21, 1943.

F. M. BOHLER

2,337,368

WRENCH

Filed Sept. 19, 1941

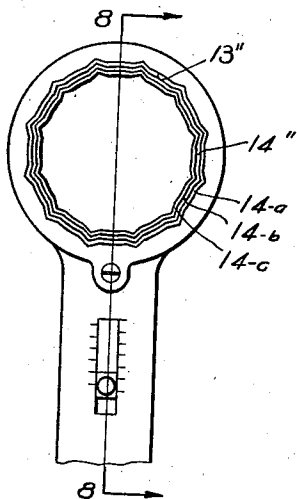


FIG. 7-

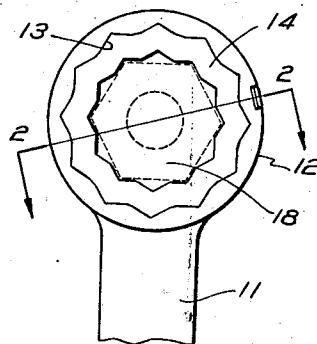


FIG. 1-

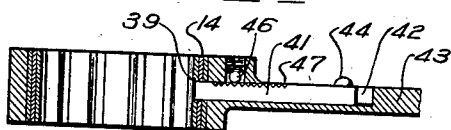


FIG. 8-

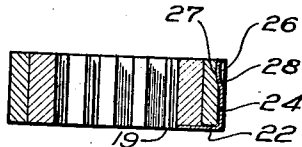


FIG. 2-

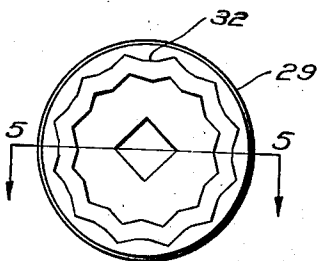


FIG. 4-

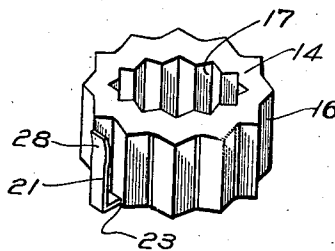


FIG. 3-

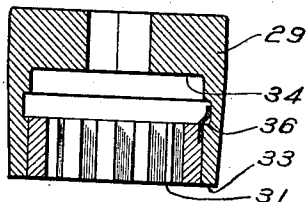


FIG. 5-

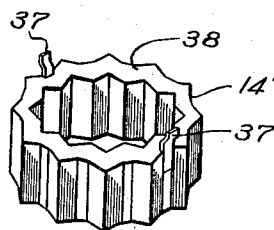


FIG. 6-

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2,337,368

WRENCH

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Application September 19, 1941, Serial No. 411,533

3 Claims. (Cl. 81-185)

The invention relates to wrenches of the type commonly denoted as box wrenches and socket wrenches and more specifically to such wrenches used in combination with insert members for reducing the size of the wrench opening to accommodate various sizes of smaller polygonal shaped nuts, bolt heads or the like.

An object of the invention is to provide in combination with a wrench of the character described, a plurality of insert members which may be quickly and easily mounted in place in the wrench opening so as to accommodate a single wrench to a plurality of different sized nuts or bolt heads or the like.

Another object of the invention is to provide a combination of wrench and insert members of the character above in which the insert members will be held in place and not subject to falling out of the wrench during movement of the latter to and from the work.

A further object of the invention is to provide in a combination of the above character, a snap fastening means for detachably holding the inserts in the wrench opening and which means is substantially concealed and entirely removed from interfering contact with the work during the normal use of the wrench.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a plan view of a wrench and insert member constructed in accordance with the present invention.

Figure 2 is a cross-sectional view of the combination illustrated in Figure 1 and is taken substantially on the plane of line 2-2 of Figure 1.

Figure 3 is a perspective view of the insert member.

Figure 4 is a plan view of a modified form of the invention showing the adaptation of the invention to a socket type wrench.

Figure 5 is a longitudinal sectional view of the combination illustrated in Figure 4 and is taken substantially on the plane of line 5-5 of Figure 4.

Figure 6 is a perspective view of the insert

member used in the combination illustrated in Figure 4 and 5.

Figure 7 is a plan view of a further modified form of the invention.

Figure 8 is a cross-sectional view of the form of the invention illustrated in Figure 7 and is taken substantially on the plane of line 8-8 of Figure 7.

The present invention consists briefly in the combination of a wrench body having a polygonal shaped opening therein of the conventional box or socket type and a plurality of insert members each having a polygonal exterior periphery slidable axially into place in said wrench opening and having a polygonal internal periphery for engaging nuts or bolt heads of a smaller size than said wrench opening whereby a single wrench with a plurality of insert members may be used for engaging a plurality of different size nuts or bolt heads, etc., and wherein the insert members are detachably secured in place in the wrench opening whereby the members may be quickly and readily added to or removed from the wrench.

In the form of the invention illustrated in Figures 1 to 3, I have disclosed a box type wrench having an enlarged wrench head 12 formed with a polygonal wrench opening 13 therein. The peripheral form of the wrench opening 13 is here of the standard 12-point type, especially adapted for engagement with a hexagonal nut or bolt or the like. Adapted for mounting within the wrench opening 13 is an insert member 14 of sleeve form having a 12-point polygonal outer periphery 16 adapted to fit within the opening 13 and to slide axially through the opening which as here shown, extends completely through the head 12 of the wrench as in a conventional box type wrench. The insert member 14 is provided with an internal axial opening 17 having a 12-point polygonal form adapted to engage a hexagonal nut or bolt head 18 or the like of smaller dimension than the internal opening 13 in the wrench head. Thus with the use of the insert 14, the wrench may be used with two different sizes of nuts or bolt heads, one being the size of the wrench opening 13 and the other the size of the opening 17 in the insert member. Preferably and in accordance with the present invention, a plurality of insert members 14 are supplied for a given size wrench opening wherein the exterior dimension of each of the inserts is the same while the dimensions of the internal openings in the inserts vary to engage the usual range of nuts or bolt heads.

As an important feature of the present invention, means is provided for detachably holding the insert member in the wrench opening so as to prevent loss of the former from the wrench upon movement to and from the work. As will be best seen in Figures 2 and 3, I provide at one of the end faces 19 of the insert member a spring clip 21 which is preferably formed with a base portion 22 fixed within a slot or recess 23 in the end face 19, and is formed with a right angularly extending portion 24 which extends in spaced substantially parallel relation to the outer peripheral side of the insert member. The wrench head 12, as will be seen in Figures 1 and 2, is formed with an axially extending slot or recess 26 in the outer periphery thereof which is adapted to slidably receive the clip portion 24, and is preferably formed with an indentation 27 in the base thereof for resilient holding of a pressed-out portion 28 in the free end of the clip whereby the latter springs into place with snap action upon movement of the insert axially into the wrench opening to proper position. Preferably the axial dimension of the insert member is substantially equal to that of the wrench head 12, whereby with the insert in place, the end walls of the latter will lie substantially flush with the end walls of the head, as seen in Figure 2.

A modified form of the invention has been illustrated in Figures 4 to 6 wherein the insert member is particularly adapted for use with a socket wrench 29. As will be seen from Figure 5, the socket wrench is formed with a nut receiving opening 31 of a 12-point polygonal form defined by a plurality of axially extending teeth 32 projecting into the wrench opening in circumferentially spaced relation to each other. Preferably these teeth extend to the open end 33 of the wrench but not to the base 34 of the wrench opening whereby the inner ends 36 of the teeth are exposed in the wrench opening. The insert member 14', as will be seen from Figure 6, is formed substantially the same as in the first embodiment with inner and outer polygonal peripheral surfaces adapted for engagement with the inner wall of the wrench and with a nut or the like as above explained. The insert member 14' is insertible into the wrench opening by axial sliding as in the first embodiment, and is detachably held therein by means of a pair of spring clips 37 here mounted on diametrically opposed sides of the insert at the inner end 38 thereof and circumferentially located at the base of the undulations in the periphery defining the 12-point confirmation as aforesaid, thus lying in axial alignment with the teeth 32 of the wrench body. As will be seen from Figures 5 and 6, the clips 37 extend outwardly somewhat from the body of the insert so that the same will be sprung upon insertion into the wrench body by the crown of the teeth engaged thereby and will be released with snap action as the clips slide past the inner ends 36 of the teeth to thereby detachably lock the insert member in place.

A further modified form of the invention is illustrated in Figures 7 and 8 of the invention wherein a plurality of relatively thin walled insert members 14'' are constructed of varying size to nest one within the other with the largest of such members sliding into place in the wrench opening 13', as in the previous embodiments. In this form of the invention the smallest reduction in size of the wrench is effected by inserting the largest insert member 14a and thereafter further reductions in size may be effected by in-

serting subsequent smaller members 14b and 14c. Preferably, these insert members are made with a wall thickness of $\frac{1}{16}$ inch whereby a $\frac{1}{8}$ inch reduction in wrench size is effected with the addition of each nesting insert member. Due to the relative thinness of the wall of these sections, it is preferable to avoid the use of clip members of the type disclosed in connection with the first two embodiments of the invention. Rather I prefer to provide each of the sections with a transverse opening 39 approximately centrally thereof which when in position in the wrench opening, will be aligned with the opening in the other insert members, and to hold the sections in place by sliding a detent 41 into and through these section openings 39. As will be seen in Figure 8, the detent 41 is of elongated form slidably carried in an opening 42 in the wrench handle 43 and extending through the wrench head to the wrench opening 13'', the outer portion of the opening 42 being exposed at the side of the handle for engagement with a knob 44 or the like adjacent the outer end of the detent. Preferably a resilient catch is used for holding the detent in a plurality of adjusted positions corresponding to its engagement with one or more of the sections 13''. As here shown, this means consists of a spring pressed ball 46 mounted in the wrench head and resiliently urged into engagement with a series of rack teeth 47 provided on the adjacent side of the detent.

I claim:

1. In combination with a wrench head having a polygonal sided nut engaging enclosure, an insert member having a polygonal outer peripheral wall and a polygonal internal peripheral wall, said outer wall having a dimension slidable axially into fitted relation in said enclosure, said wrench head having an axially extending slot in the outer periphery thereof, and a spring clip carried by said member and slidably engaging in said slot for detachably holding said member in position in said enclosure.

2. In combination with a wrench head having a polygonal sided nut engaging enclosure, an insert member having a polygonal outer peripheral wall and a polygonal internal peripheral wall, said outer wall having a dimension slidable axially into fitted relation in said enclosure, said outer wrench head having an axially extending slot in the outer periphery thereof formed with an indentation, a spring clip carried by said member and slidable through said slot and resiliently engageable in said indentation to detachably secure said member in said enclosure.

3. In combination with a wrench head having a polygonal side nut engaging bore and an outer peripheral wall, an insert member having a polygonal outer peripheral wall and a polygonal internal peripheral wall, said outer wall of said member having a dimension arranging same for sliding axially into fitted relation in said bore, and cooperating means on said member and on said outer periphery of said head for holding the member in the head against axial displacement and including a spring clip carried by said member arranged for positioning on said exterior periphery of said head when the member is operatively positioned within the head, the said outer peripheral wall of the wrench being recessed for the reception of the clip to permit the clip to be operatively positioned therein without protruding substantially from said periphery.

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