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CAM ACTUATED SIDE JAW WRENCH

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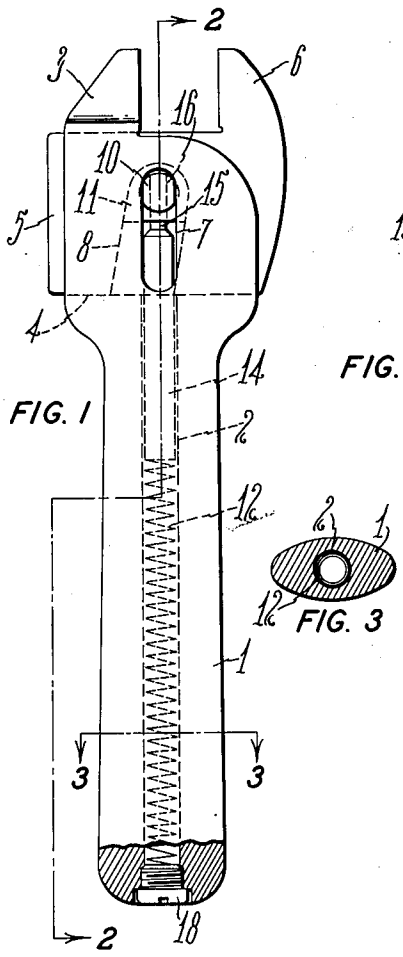


FIG. 1

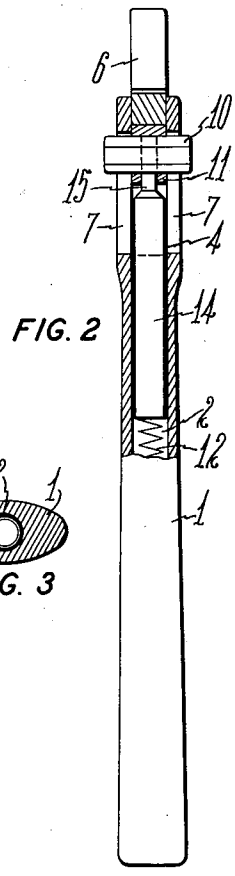


FIG. 2

FIG. 3

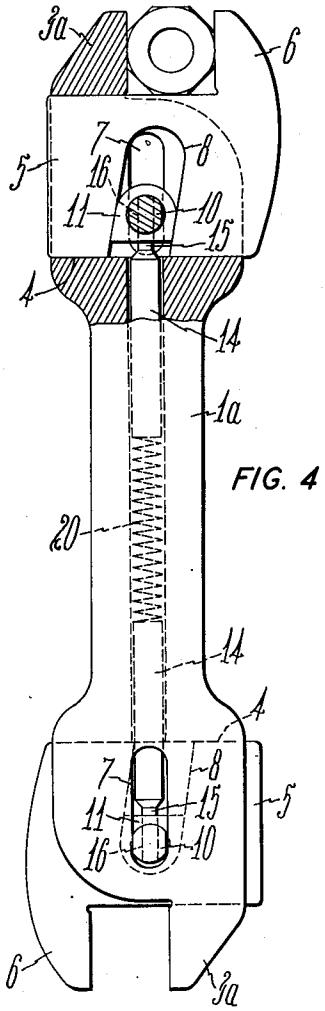


FIG. 4

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CAM ACTUATED SIDE JAW WRENCH

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3 Claims. (Cl. 81—128)

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This invention relates to wrenches and has for an object to provide a wrench of the open or spanner type but which is quickly adjustable to engage nuts or other objects of somewhat different external dimensions, but when so engaged automatically closes thereon with a vise-like grip, the grip being maintained while the wrench engages the nut or other article. This avoids the difficulty often experienced with wrenches of the open-end type when the space between the jaws is too small to permit engagement with a slightly oversized nut, or too large to properly engage with an undersized nut, the latter resulting in rounding the corners of the nut when used thereon.

It is also possible with a wrench of the present invention to maintain the head of the wrench sufficiently small to engage nuts in confined spaces which is one of the advantages of wrenches of the open or spanner type. At the same time the wrench of the present invention provides a sufficient range of adjustment to take nuts of two adjacent normal sizes. This increases the range of usefulness of a single wrench and by employing a double end wrench of the type of this invention, the wrench capacity is increased to four nut sizes in contrast to the two sizes of nuts ordinarily engageable with double-ended type wrenches.

For a complete understanding of this invention, reference may be had to the accompanying drawings in which

Figure 1 is a side elevation of a single ended wrench embodying the invention.

Figures 2 and 3 are sectional views on lines 2—2 and 3—3, respectively, of Figure 1.

Figure 4 is a view partly in side elevation and partly broken away and in section of a double ended wrench embodying the invention.

Referring first to Figures 1 to 3, inclusive, the wrench as shown comprises a handle 1 provided with a central bore 2. One end of this handle has formed integral therewith or fixed thereto a jaw member 3. Inwardly of the jaw member the handle is provided with a lateral slot, as at 4, for slidably receiving the shank portion 5 of a movable jaw member 6 which is so disposed that as it is moved through the slot 4 its jaw portion approaches or recedes from the fixed jaw member 3. The handle is also provided with a longitudinal slot 7 and the movable jaw member 6 is provided with a slot 8 shown as wider than the slot 7 and inclined with respect to the direction of the slot 7. This inclination is of a small angle, say, about 15°. A pin 10 extends through the handle slot 7 and the jaw member slot 8 and ex-

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tends outwardly of the handle to a slight extent as shown best in Figure 2 where it may be reached on one side or the other by a finger or thumb of the operator. When the pin is toward the outer end of the slot 7 of the handle, a shoe 11 carried thereby riding in the inclined slot 8 of the movable jaw member is in such position that the jaw 6 is closed toward the fixed jaw 3 to its maximum extent. By moving the pin 10 away from the jaw members 3 and 6, the shoe 11, riding in the inclined jaw member slot 8, causes the movable jaw member 6 to be moved away from the fixed jaw member 3, thus opening the jaws so that they may be engaged about an article such as a nut and then be closed thereagainst.

Means for closing the jaw members against the article comprises a light spring 12 housed within the bore 2 of the handle and reacting at one end against a rod 14 slidable in the socket 2 and at its other end against a threaded plug 18 seated in a threaded recess in the rear end of the handle 1. The rod 14 is provided with a reduced diameter outer extremity 15 which normally engages in a socket 16 in or through the pin 10. This engagement of the portion 15 within the pin 10 holds the pin assembled within the slots 7 and 8 but by moving the rod 14 inwardly from the head end of the wrench, the portion at 15 may be disengaged from the pin 10, allowing this pin to be pulled laterally out of position and freeing the movable jaw member 6 so that it may be removed from the wrench. This may be done readily by removing the plug 18 and the spring 12. This permits various movable jaw members to be associated with the one handle, and these various jaw members may have their jaw portions so related to their shank portions as to take various sizes of nuts between the movable and fixed jaw members.

By employing a small angle for the inclination of the movable jaw slot 8, the wrench becomes self-locking, that is, any force exerted between the wrench jaws tending to open them will not be effective to slide the pin 10 inwardly from the head end of the wrench, thus opening the wrench, but it may be opened readily by the user of the wrench by engaging a finger with the pin 10 and retracting it against the action of the spring 12.

By employing a slope of substantially 15°, which is less than the sticking angle, for the engagement between the pin or its shoe 11 and the movable jaw member, there is afforded a sufficient range of opening and closing motion of the movable jaw member without an undue length of

the slots to take slightly more than two adjacent sizes of nut. For example, such a wrench may have a capacity of, say 5/8" and 3/4" nuts, being openable to a 64th of an inch beyond the 3/4" to take a slightly oversized 3/4" nut and closable to a 64th" short of 5/8" to grip a slightly undersized 5/8" nut.

It will also be noted that the engagement of the jaws on the work is automatically effected by the action of the spring 12 so that there is no looseness of such engagement when the wrench is being used. This avoids any relative rocking between the wrench and the nut which is often found to occur where open type wrenches are employed and which results in rounding the edges of the nut. If this rounding becomes excessive the wrench may fail to hold the nut securely.

In Figure 4 a modification is shown in which a double end wrench is shown. In this construction the handle 1a is provided with a fixed jaw portion 3a at each end. Each end portion of the handle is also provided with a transverse slot for the reception of the shank 5 of a movable jaw member 6. Each movable jaw member is provided with the inclined slot 8 and at each end of the wrench the handle is provided with a longitudinal slot 7. A pin 10 extending through the slots is employed at each end of the wrench, each pin having its shoe 11 which engages the sides of the inclined slot 8. Each pin 10 is also provided with a socket 16 for receiving the reduced diameter portion 15 of a slidable rod 14. The spring for engaging these rods, herein shown as the spring 18, is positioned between the adjacent inner ends of the two rods 14. A movable jaw member 6 may be disassembled by moving the corresponding rod 14 out of engagement in the socket 16 of its actuating pin 10, the corresponding rod 14 being then withdrawn, after the removal of the movable jaw member 6, through the head end of the wrench.

From the foregoing description of certain embodiments of this invention, it should be evident to those skilled in the art that various changes and modifications may be made without departing from its spirit or scope.

I claim:

1. A wrench comprising a handle, a pair of jaw members, one of said jaw members being fixed to said handle, means slidably supporting the other of said jaw members for motion transverse to said handle for motion toward and from said one member, said handle having a slot longitudinally thereof, said other jaw member having a slot inclined lengthwise of said handle, a pin slidably guided in said handle slot, a shoe supported on said pin and slidably guided in said jaw member slot, an means yieldingly pressing said pin toward one end of said handle slot in a direction to close said jaw members.

2. A wrench comprising a handle, a pair of jaw members, one of said jaw members being fixed to said handle, means slidably supporting the other of said jaw members for motion transverse to said handle for motion toward and from said one member, said handle having a slot longitudinally thereof, said other jaw member having a slot inclined lengthwise of said handle, a pin slidably guided in said handle slot, a shoe supported on said pin and slidably guided in said jaw member slot, and said pin having a transverse socket therein, a rod slidably guided within said handle for motion lengthwise of said handle and having an end portion normally engaging in said pin socket and holding said pin assembled in said slot, and a spring engaging said rod and yieldingly pressing said rod and said pin toward one end of said slots in which position said slidable jaw member is closest to said fixed jaw member.

3. A wrench comprising a handle having a longitudinal bore, a jaw member fixedly carried at each end of said handle, a jaw member transversely slidably carried by said handle at each end and cooperating with the corresponding fixed jaw member to hold a work piece therebetween, said handle having a longitudinal slot adjacent to each end, each of said slidable jaw members having a slot inclined to said handle slots, a pin riding in each of said handle slots and in the corresponding slidable jaw member slot and providing for lateral motion of the corresponding slidable jaw member by longitudinal motion of the pin in the corresponding slots, the direction of inclination of said jaw member slots being such that motion of the corresponding pin toward the adjacent end of said handle moves said slidable jaw member toward the corresponding fixed jaw member, each of said pins having a transverse socket, a pair of rods slidably mounted within the bore of said handle and each having an end portion normally engageable in one of said pin sockets, and a spring within said bore and reacting against the inner ends of said rods.

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