Aug. 7, 1934. R. B. CAMPBELL 1,968,872

INTERNAL WRENCH

Filed July 1, 1933

Fig. 1.

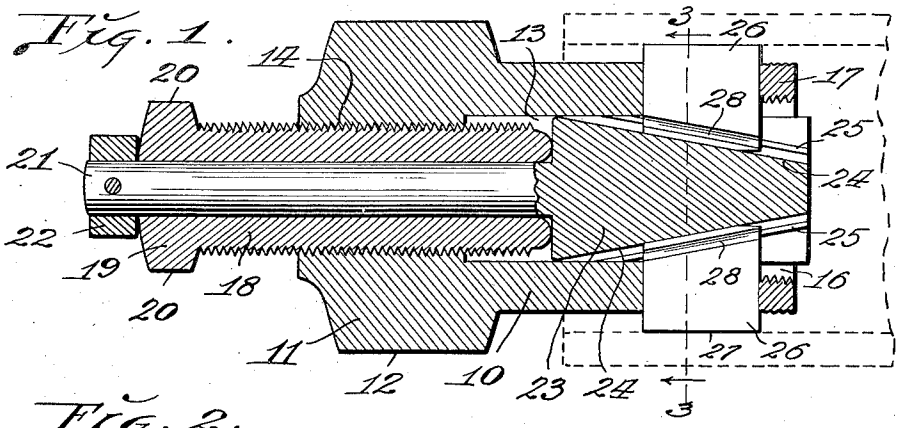


Fig. 2.

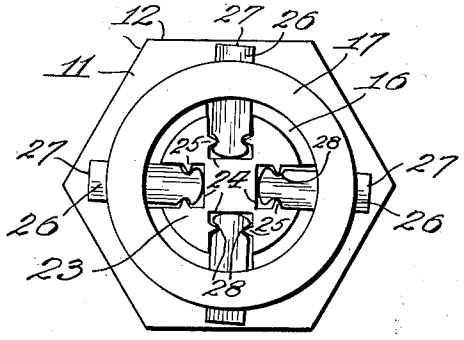


Fig. 3.

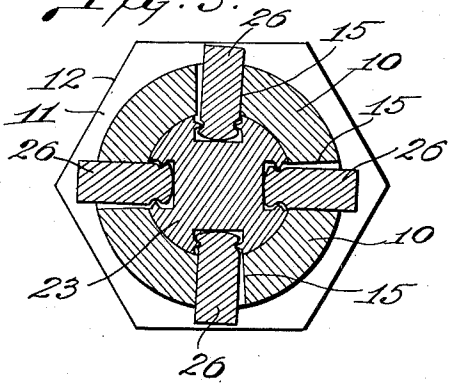


Fig. 4.

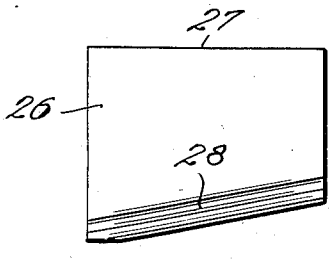
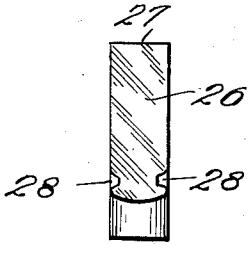


Fig. 5.



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Patented Aug. 7, 1934 1,968,872

UNITED STATES PATENT OFFICE

1,968,872

INTERNAL WRENCH

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Application July 1, 1933, Serial No. 678,639

2 Claims. (Cl. 81—72)

My invention relates to improvements in internal wrenches and has for its principal objects, to generally improve upon and simplify the construction of the existing forms of internal wrenches and to provide a wrench having dogs or jaws that are capable of being radially projected or retracted in order that they may be readily engaged with the internal face of a pipe, coupling or the like for the purpose of rotating the same while said pipe or coupling is being screwed into or out of a part or member to which it is connected.

Further objects of my invention are, to provide an internal wrench of the character referred to wherein the dogs or jaws have interengagement with the wrench member that is utilized for projecting and retracting said dogs or jaws so that the latter cannot become detached from the wrench after the same has been assembled for use and further, to construct the dogs or jaws and their carrier so that said dogs or jaws may be slightly tilted circumferentially with respect to the axis of the wrench in order that one edge of each dog or jaw will be positioned so as to engage and bite into the inner surface of the pipe or nipple that is being screwed or unscrewed.

A further object of my invention is, to provide an internal wrench of the character referred to that is relatively simple in construction, strong and durable and which comprises relatively few parts that are capable of being readily assembled or taken apart and the jaws or dogs of which wrench are capable of being easily and quickly adjusted so as to engage the inner surfaces of pipes, nipples and the like of varying internal diameters.

With the foregoing and other objects in view my invention consists in certain novel features of construction and arrangements of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is a longitudinal section taken through the center of an internal wrench constructed in accordance with my invention.

Fig. 2 is a front elevational view of the wrench.

Fig. 3 is a cross section taken on the line 3—3 of Fig. 1.

Fig. 4 is a side elevational view of one of the jaws or dogs.

Fig. 5 is an end view of one of the dogs or jaws.

Referring by numerals to the accompanying drawing which illustrates a preferred embodiment of my invention, 10 designates the main body of the wrench, which is preferably cylindrical in form and one end of said body is enlarged to form a head 11 and the peripheral face of this head is provided with a plurality of flat wrench receiving faces 12.

Formed in the forward portion of the body 10, is an axially disposed bore or chamber 13 and the rear end of this bore communicates with an axially disposed threaded opening 14 that is formed through head 11.

Formed in the forward portion of body 10 is a plurality of longitudinally disposed slots 15 and the side faces of each slot are preferably formed so that they diverge slightly toward the outer face of the body.

A short portion at the forward end of body 10 is reduced in diameter as designated by 16 and the peripheral face of this reduced portion is threaded for the reception of a ring nut 17, the external diameter of which is substantially equal to the external diameter of body 10 and the peripheral face of this ring nut is knurled or corrugated in order that it may be conveniently gripped and rotated.

The externally threaded body 18 of a sleeve or tubular member is screw-seated in the threaded opening 14 and the outer end of this body is enlarged to form a head 19 having wrench receiving faces 20.

Extending through the sleeve or tubular member 18 is a rod or shank 21 and detachably secured to the end thereof that projects beyond the rear end of sleeve 18, is a ring or collar 22.

Formed integral with the forward end of shank 21 is a cylindrical head 23 that occupies the bore or chamber 13 in the body of the tool and formed in said head is a plurality of longitudinally disposed slots 24, which gradually increase in depth toward the forward end of said head.

The inclined bottom faces of these slots are preferably flat and formed on the side faces of said slots adjacent to and parallel with the flat bottom faces thereof, are ribs 25 that project a short distance into the slots.

The dogs or jaws utilized in my improved wrench are formed of substantially rectangular blocks 26 of hardened metal, the thickness of which is slightly less than the width of the slots 24 in head 23 and the slots 15 in body 10 and the outer faces 27 of these dogs are disposed at right angles to the side faces thereof, thereby providing 90° corners along both of the outer side edges of said dogs.

The inner or bottom face of each dog is in-

clined lengthwise to correspond with the inclination of the bottoms of the slots 24 and said inner or bottom faces are rounded or made slightly convex in cross section in order that said bottom faces may readily rock on the flat bottom faces of the slots 24.

Formed in the side faces of the dogs 26 adjacent to and parallel with their inner or bottom faces, are grooves 28 which receive the ribs 25 that project from the side faces of slots 24 in head 23.

The engagement of the ribs 25 in the slots 28 retains the dogs upon the tapered head 23 and prevents the disengagement and loss of said dogs after the tool has been properly assembled for use.

The ring nut 17 mounted on the reduced threaded forward end of the body retains the dogs against longitudinal movement through slots 15 in the tool body.

After the parts of the wrench have been assembled as illustrated in Fig. 1 and with the inner ends of the dogs positioned in the slots 24 in head 23, said head may be moved forwardly or rearwardly through chamber 13 by screwing or unscrewing sleeve 18 through the rear portion of the tool body.

As the head 23 is moved forwardly within the body, the engagement of the inclined bottom faces of the grooves 24 with the correspondingly inclined inner faces of the dogs 26 will move said dogs radially outward and likewise as head 23 is moved rearwardly within the chamber 13 in body 10, the dogs 26 will be retracted or drawn inwardly due to the engagement of the ribs 25 in grooves 28.

In the use of the wrench, the forward end thereof with the dogs in retracted positions, is inserted in the end of the pipe or nipple to be rotated and sleeve 18 is now screwed into the rear portion of the tool body to move head 23 forwardly and such action projects the dogs 26 until their outer edges engage the inner surface of the pipe or nipple.

By means of a wrench or other suitable tool applied to the faces 12 of head 11, the wrench is now rotated and in so doing the transversely curved inner faces of the dogs 26 will rock on the flat bottom faces of grooves 24 so that said dogs will tilt slightly circumferentially of the tool, thereby causing the corresponding outer edges of said dogs to engage and bite into the inner surface of the pipe or nipple and continued rotary motion of the body of the tool will impart rotary motion to the engaged pipe or nipple so as to screw or unscrew the same with respect to the part to which it is connected.

Thus it will be seen that as a result of my improved construction of the dogs or jaws and the means of mounting the same in the head 23, it is not necessary to resort to any manipulations such as a reversal of position of the dogs or to interchange different forms of the dogs in order to accomplish the screwing or unscrewing of the pipe, nipple or other part that is engaged by the wrench.

The tilting of the dogs as herein explained is automatically effected following the movement imparted to the body of the tool and thus one set of dogs may be used for both screwing and unscrewing operations.

When ring nut 17 is removed from the forward end of body 10, the dogs 26 may be positioned within the slots in body 10 and the slots in head 23 or removed therefrom by a longitudinal movement of said dogs relative to said head and body.

Thus it will be seen that I have provided an internal wrench that is relatively simple in construction, inexpensive of manufacture and very effective in performing the functions for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of my improved internal wrench may be made and substituted for those herein shown and described without departing from the spirit of the invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In an internal wrench, the combination with a body provided with an axial chamber and with a plurality of radially disposed slots, of a sleeve projecting into the rear portion of the axial chamber in said body and having threaded engagement with the rear portion of said body, a member carried by said sleeve and projecting into the forward portion of the axial bore in said body, the projecting portion of said member having a plurality of slots having flat inclined bottoms, dogs arranged for sliding movement through the slots in said body the width of the slots in said body being slightly greater than the thickness of the dogs to permit the latter to tilt circumferentially of the body for a limited distance, the inner portions of which dogs occupy the slots in said member the bottom faces of which dogs are convex in cross section so as to rock transversely on the flat inclined bottoms of said slots and interengaging ribs and grooves between said dogs and slotted member.

2. In an internal wrench, the combination with a body provided with an axial chamber and with a plurality of radially disposed slots, of a sleeve projecting into the rear portion of the axial chamber in said body and having threaded engagement with the rear portion of said body, a member carried by said sleeve and projecting into the forward portion of the axial bore in said body, the projecting portions of said member having a plurality of slots having flat inclined bottoms, dogs arranged for sliding movement through the slots in said body the width of said slots being slightly greater than the thickness of the dogs so as to permit the latter to tilt circumferentially of the body for a limited distance, the inner portions of which dogs occupy the slots in said member the bottom faces of which dogs are convex in cross section so as to rock transversely on the flat inclined bottom faces of the slots, interengaging ribs and grooves between said dogs and slotted member, means removably mounted on the forward end of said body for retaining said dogs in the slots in said body and a collar removably mounted on the rear end of the member that extends through said sleeve for holding said member in operative relation with the sleeve and against longitudinal movement therethrough.

RODNEY B. CAMPBELL.