

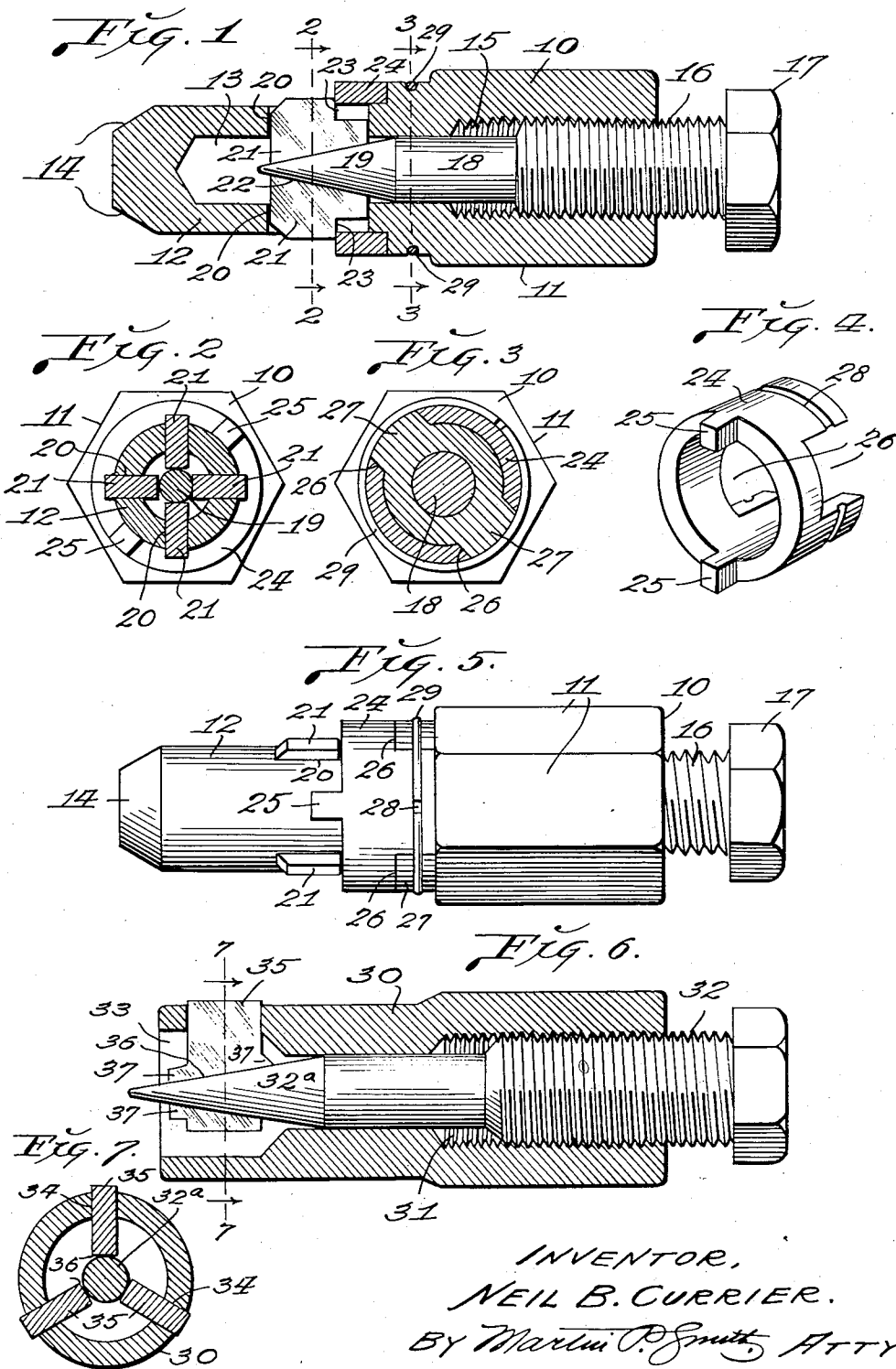
Feb. 26, 1935.

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1,992,474

INTERNAL WRENCH

Filed March 6, 1934



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UNITED STATES PATENT OFFICE

1,992,474

INTERNAL WRENCH

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Application March 6, 1934, Serial No. 714,282

5 Claims. (Cl. 81-72)

My invention relates to an internal wrench and has for its principal object, the provision of a relatively simple, practical and inexpensive wrench that may be conveniently employed for engaging and rotating relatively short tubular members or plugs so as to screw the same into or out of parts in which they are seated.

A further object of my invention is, to provide an improved tool in the nature of an internal wrench that is especially designed for the screwing and unscrewing of condenser tube ferrules and which latter are usually provided in their outer ends with notches or recesses for the accommodation of the tool that is used in rotating the ferrules so as to screw the same into or out of the condenser head.

The tool contemplated by my invention, includes a body member slotted for the reception of a plurality of radially disposed dogs, which latter are moved radially outward by a mandrel that is screw-seated in the body and the dogs being retained in assembled relation with the body by a collar that is secured to the body.

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 cross section taken on the line 2-2 of Fig. 1.

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

Fig. 4 is a perspective view of the collar that is mounted on the body of the tool for retaining the dogs therein and which collar is provided with lugs for engaging the recesses in condenser tube ferrules.

Fig. 5 is an elevational view of the wrench.

Fig. 6 is a longitudinal section taken through the center of a modified form of the wrench.

Fig. 7 is a cross section taken on the line 7-7 of Fig. 6.

Referring by numerals to the accompanying drawing and particularly to the construction illustrated in Figs. 1 to 4 inclusive, 10 designates the body of the wrench which is provided with externally arranged wrench receiving faces 11 and the forward portion 12 of the body is slightly smaller in diameter than the rear portion.

A bore 13 extends axially through the body 10 and said bore terminating in the forward portion of the extension 12 of reduced diameter. The forward end of extension 12 is tapered as designated by 14 in order that the forward portion of the wrench may be readily inserted in the

tubes or recessed members that are to be engaged and manipulated by the wrench.

That portion of the bore 13 within the body 10 is slightly larger in diameter than the forward portion of said bore and said enlarged portion is internally threaded as designated by 15 for the threaded rear portion 16 of a mandrel and formed on the rear end of the latter is a head 17 having wrench receiving faces.

The forward portion 18 of the mandrel has a sliding fit in the rear portion of bore 13 and the forward end of the portion 18 is tapered as designated by 19.

Formed through the wall of member 12 surrounding the intermediate portion of the bore 13 therethrough is a plurality of radially disposed slots 20 and arranged for sliding movement therethrough are radially disposed dogs 21 of hardened metal. The inner edges 22 of these dogs are inclined to correspond with the taper of the forward portion 19 of the mandrel and the rear outer corners of said dogs are cut away to form notches 23.

Mounted on the reduced forward portion 12 of the body of the wrench immediately in front of the main body 10, having the wrench receiving faces, is a collar 24, the forward portion of which overlies the notched rear corners of the dogs 21, thus retaining said dogs in position upon the body of the wrench and at the same time permitting said dogs to move radially outward as the mandrel is moved forwardly into the body of said wrench.

Formed integral with the forward end of collar 24, are forwardly projecting lugs 25 that are adapted to enter the notches or recesses that are formed in the outer ends of conventional condenser tube ferrules.

The rear portion of collar 24 is provided with notches 26 for the reception of lugs 27 that are formed integral with the body of the wrench immediately in front of the rear portion 10 thereof.

The lugs 27 project into the notches 26, providing interengagement between the wrench body and collar, which effectually holds the collar against rotation on said wrench body. To retain the collar against lengthwise movement on the wrench body when properly applied thereto, the external faces of the collar 24 and lugs 27 are provided with a circumferential groove 28 that is occupied by a snap ring 29 of resilient wire.

In assembling the parts of my improved internal wrench, the dogs 21 are placed in the slots 20 and moved inward until their outer edges are positioned below the outer surface of the forward portion 12 of the wrench body, after which the collar or retaining ring 24 is posi-

tioned on the rear portion of body member 12 with the lugs 27 occupying the notches 26.

The snap ring 29 is now positioned in the groove 28 to retain the collar in position upon the body and when so positioned that portion of the collar that overlies the notched rear corners of the dogs prevents said dogs from moving outwardly so as to become disengaged from the wrench body.

The mandrel is now screwed into the rear portion of the wrench body with the tapered forward end 19 of said mandrel in engagement with the inclined inner edges of the dogs 21.

When the wrench is utilized for screwing or unscrewing nipples, short pipe sections or recessed plugs the forward portion 12 of the wrench body is inserted in the nipple or pipe so that the outer edges of the dogs are positioned within said nipple or pipe and the mandrel is now screwed forwardly through the wrench body so that the engagement of the tapered forward end 19 of said mandrel with the inner edges of the dogs move the same radially outward until they have gripping engagement with the inner surface of the nipple or tube and by means of a wrench or like tool applied to the wrench faces 11 on the body 10, the latter is rotated so as to screw or unscrew the engaged nipple or pipe section.

When the wrench is utilized for screwing or unscrewing condenser tube ferrules, the forward portion of the tube is inserted into the ferrule so that the lugs 25 on collar 24 engage in the notches in the outer end of the ferrule after which the mandrel is screwed into the body of the wrench to move the dogs outward so that they engage the inner face of the ferrule.

The wrench is now rotated and the engaged ferrule may be readily screwed into or out of the condenser head.

The strains impressed on the condenser ferrule while the same is being rotated, are transmitted to the body of the wrench through the lugs 27 that occupy the notches 26 in the collar 24.

In the modified form of wrench illustrated in Figs. 6 and 7, the wrench body 30 is provided with an axial bore 31, the rear portion of which is internally threaded for the reception of the threaded rear portion of a mandrel 32 and the forward portion of the bore through the wrench body is enlarged to form a chamber 32^a.

Formed through the wall of the body surrounding the chamber 30, are radially disposed slots 34 preferably three in number, and arranged for sliding movement through said slots, are dogs 35 of hardened metal.

The inner edges 36 of said dogs are inclined for engagement with the tapered forward portion 37 of the mandrel and projecting from the front and rear edges of the dogs at their inner ends, are lugs 37. These lugs serve as stops to limit the outward movement of the dogs through the slots 34 and consequently retain said dogs in assembled relation with the wrench body.

In placing the dogs in the wrench body, the same are entered through chamber 33 and then moved outward through the slots 34 and when the mandrel is screwed into the wrench body, the tapered forward end 32^a of said mandrel engages the inclined inner edges of the dogs.

When this form of internal wrench is used, the forward end of the wrench body is inserted in the nipple or tube that is to be rotated and the mandrel is now screwed forwardly in the

body to move the dogs radially outward into gripping engagement with the tube or nipple and the wrench is now rotated to effect the desired result.

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.

In addition to serving as a wrench for screwing and unscrewing nipples, short pipe sections and the like, my improved wrench may also be utilized for the screwing and unscrewing of condenser tube ferrules, which latter are provided in their outer ends with notches for the reception of a manipulating tool.

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 my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. An internal wrench, comprising a body having an axial bore and with radially disposed slots in the forward portion of said body, a mandrel positioned in the bore in said body and having threaded engagement with said body, dogs arranged for sliding movement through the slots in said body, the inner edges of which dogs engage the forward end of said mandrel, a collar detachably mounted on the intermediate portion of said body, which collar overlies the rear portions of said dogs and lugs projecting from the forward end of said collar.

2. An internal wrench as set forth in claim 1, with readily removable means for retaining said collar in position upon the wrench body and said collar and wrench body having interengaging parts to resist relative rotative strains.

3. An internal wrench, comprising a body having an axial bore, a collar removably mounted on the intermediate portion of said body, lugs projecting from the forward end of said collar, interengaging lugs and notches between said collar and body, means for securing said collar against longitudinal movement on said body, the body in front of said collar being provided with radially disposed slots, dogs loosely seated in said slots the forward portion of which collar overlies the rear portion of the dogs so as to provide a retaining means therefor and a mandrel occupying the bore in said body and having threaded engagement with said body for moving the dogs outward through said slots.

4. An internal wrench, comprising a body having an axial bore and radially disposed slots that are formed through the forward portion of said body, dogs arranged for sliding movement in said slots, a mandrel positioned in the bore in said body and having threaded engagement therewith, the forward portion of which mandrel engages the inner edges of said dogs, a collar removably positioned on the body, which collar overlies the rear portions of said dogs and lugs projecting from the forward end of said collar and means for holding said collar against rotary movement on the wrench body.

5. An internal wrench as set forth in claim 4, and means holding said collar against longitudinal movement on said body.