

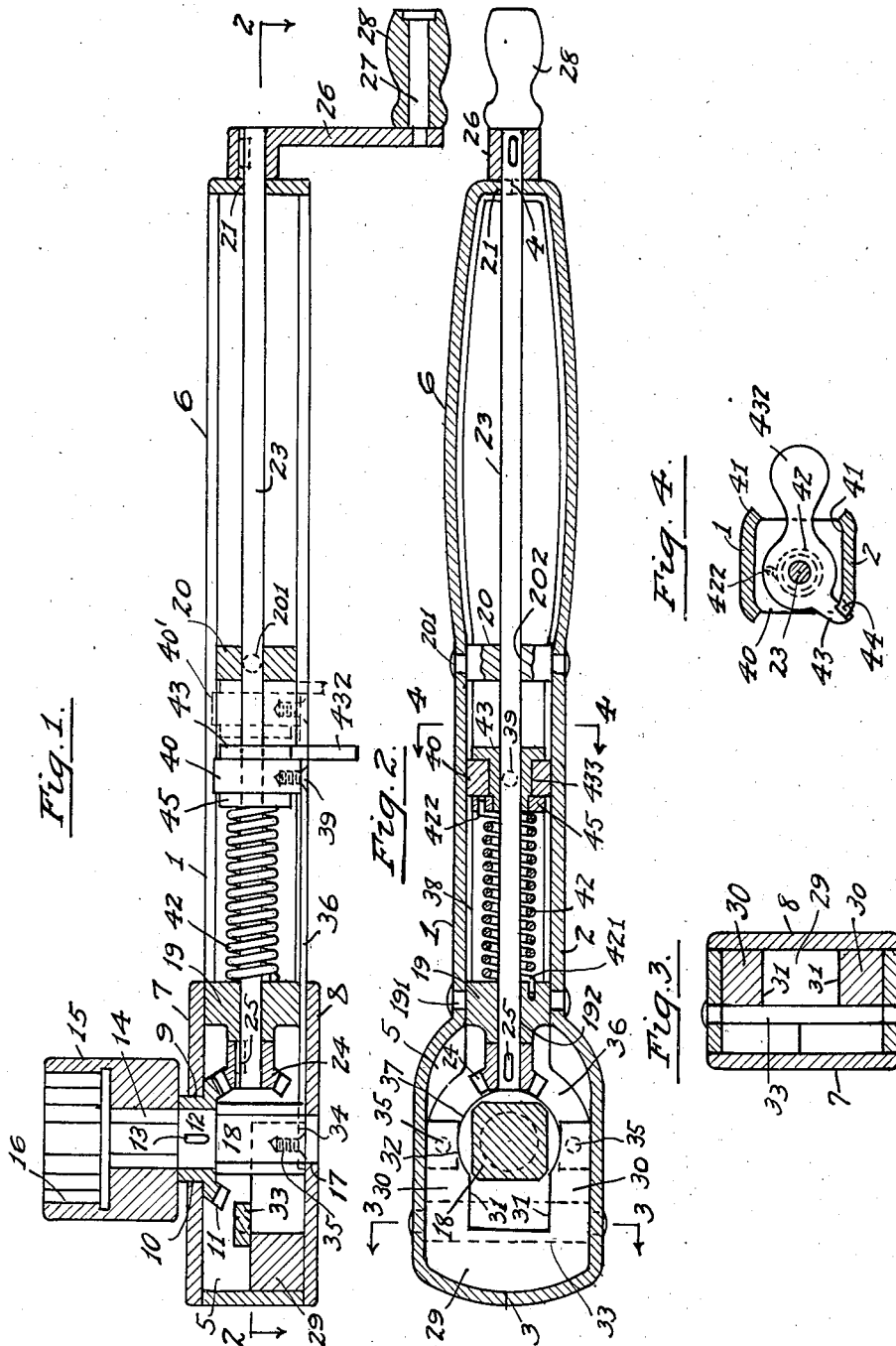
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GEARED WRENCH

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GEARED WRENCH

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My invention relates to geared wrenches, and its principal object is to provide a wrench which is particularly adapted for use in very close or tight places where wrenches of the usual type cannot be conveniently employed such, for example, as in removing and replacing a drain plug in the crank case or oil pan of an automobile. These drain plugs, while very difficult of access, require frequent attention and cause considerable loss of time in filling stations and garages where the operation of oil changing is performed.

According to the present invention, I have provided a wrench by means of which the operator can screw and unscrew a drain plug very quickly and without rotary movement of the wrench handle, while at the same time such movement may be applied in the initial operation of removing the plug and in the final movement of replacing the same in such manner as to exert the requisite turning force at these points.

With these and other objects in view, the invention consists in the improved construction, arrangement, and combination of parts which will be hereinafter fully described, reference being had to the accompanying drawing, which illustrates a preferred embodiment thereof, in which drawing—

Figure 1 is a vertical section of my improved wrench taken upon the longitudinal axis of the same.

Figure 2 is a sectional plan view taken on line 2—2 of Figure 1.

Figure 3 is a transverse section on line 3—3 of Figure 2, and

Figure 4 is a similar section on line 4—4 of Figure 2.

Like characters designate corresponding parts throughout the several views.

1, 2 are a pair of frame members, preferably stamped from sheet steel and butt welded at 3, 4 to form a unitary structure which serves as a housing for the working parts of the wrench. One end of the housing so formed has a substantially rectangular box-shaped portion 5, while the other end 6 is so shaped as to provide a convenient handle for the wrench. The space 5 is enclosed by upper and lower plates or covers 7, 8 secured in position by welding or other means during the assembling operation. Within the cover 7 is a circular opening 9 in which is rotatably mounted the hub 10 of a bevel gear 11, which gear is bored to receive a vertical shaft 12 to which it is rotatively secured by the key 13. The shaft 12 is formed at its upper end 14 of hexagonal or other polygonal shape adapted to receive

the lower portion of a socket 15, the upper portion of which is provided with a larger polygonal opening 16 of such size as to engage the head of the oil plug or other member to be operated upon. The lower portion of the shaft 12 is journaled in a bearing 17 in the cover 8, and intermediate of this bearing and the underside of the bevel gear 11 is a squared portion 18, the purpose of which will be explained hereinafter.

The narrower portion of the housing, intermediate of the handle 6 and the space 5, is provided with transverse braces 19, 20 secured to the members 1 and 2 by journaled portions 191, 201, respectively, which pass through openings in the said members and are riveted over upon the outside thereof as shown clearly in Figure 2. Journaled in bearings 192, 202 in the braces 19, 20 and also in a bearing 21 in the outer end of the handle 6 is a central shaft 23 which carries at one end a bevel pinion 24 adapted to mesh with the bevel gear 11 and rotatively secured to this shaft by a key 25, while upon the other end of the said shaft is keyed a crank 26 having a crank pin 27 and a handle 28 by which the shaft may be rotated.

Slidably mounted within the lower portion of the space 5 is a block 29 having therewithin a pair of jaws 30, the inner faces 31 of which are adapted to engage the squared portion 18 of the shaft 12, but are normally held out of engagement therewith as shown in Figures 1 and 2, so that the said shaft can rotate freely, the jaws being cut away in arcuate form as indicated at 32 to permit this. The underside of the block 29 rests upon the inner face of the cover 8, while the upper side is engaged by a bar 33 which maintains the block in sliding contact with the said cover. Secured within a notch 34 in the underside of the block 29 by means of screws 35 is a flat plate 36 which extends in the direction of the handle 6. The plate 36 is cut away as indicated at 37 to provide clearance for the squared portion 18 of the shaft 12 and beyond this cut-away portion is narrowed as indicated at 38 so as to slide freely between the members 1 and 2, the extreme end of this narrowed portion being secured by a screw 39 to a block 40.

It will be observed by reference to Figure 4 that the members 1, 2 are of slightly channeled cross section having inwardly turned flanges 41 and the block 40 is so shaped as to fit slidably between these flanges while at the same time it is bored to receive the journaled portion 433 of a pawl 43, the said journaled portion being secured in position endwise by means of a washer

45. The pawl 43 is rotatably fitted to the shaft 23 and its upper end is adapted to engage in a notch 44 in the member 2. Intermediate of the brace 19 and the block 40 and surrounding the shaft 23 is a helical spring 42, one end of which abuts upon the brace 19 while the other end abuts upon the block 40 so as to normally force the block 40 into the position shown in dotted lines at 40' in Figure 1. The ends of the spring 42 are bent over at 421 and 422 so as to engage in openings in the brace 19 and in the washer 45, respectively, so that the spring is capable of exerting torsional force tending to rotate the washer 45 and with it the pawl 43, whereby the latter is caused to engage the notch 44 in the member 2. The washer 45 is rotatively secured to the pawl by any suitable means, not shown, and the arrangement in general is such that by pushing upon the lower tail 432 of the pawl 43 it, together with the block 40, may be forced against the endwise action of the spring 42 into the position shown in full lines in Figures 1 and 2, at which time the pawl engages the notch 44 and the parts are so maintained until released by a radial movement of the tail 432 against the torsional action of the spring.

In operation, when it is desired to remove a plug, the wrench is so placed that the socket 15 engages the same, and the pawl 43 is released, allowing the block 29 to come into engagement with the squared portion 18 of the shaft 12. The handle of the wrench is then moved radially so as to slacken off the initial compressive force of the plug, after which the block 29 is moved to disengage the shaft 12 and the plug is rapidly unscrewed by rotation of the crank 26. When reinserting the plug, the same is rotated through the greater part of the required movement by means of the crank 26 and the pawl 43 is then released, allowing the block 29 to engage the shaft 12 to permit of the final tightening action by radial movement of the wrench as a whole.

It will be understood from the foregoing description and by reference to the drawing that I have provided a wrench which is simple in construction and economical to manufacture by modern production methods, and while I have herein described a preferred form thereof, it will be understood that the details may be varied to suit any particular requirement without departing from the spirit of my invention as defined in the appended claims.

Having thus described my said invention, what I claim and desire to secure by Letters Patent of the United States is:

1. A wrench of the character described comprising, a housing formed from a pair of sheet metal strips arranged at one end in close parallel spaced relation adapted to form a handle

and having at the other end an enlarged portion adapted to form a gear box; upper and lower plates secured to said strips; a bevel gear journaled in said upper plate; a vertical shaft keyed within said bevel gear and journaled in said lower plate, and having thereupon an external socket adapted to engage an element to be turned; a longitudinal shaft journaled in said handle and having crank means upon the outside thereof; a bevel pinion upon said longitudinal shaft extending into said gear box and meshing with said bevel gear; and means for locking said vertical shaft and preventing rotation of the same relative to said housing, said means comprising a squared portion upon said vertical shaft, a yoke having parallel internal surfaces adapted to engage said squared portion of said shaft, means for moving said yoke in and out of engagement with said squared portion of said shaft, resilient means normally urging said yoke into engagement, and trigger means for holding the same out of engagement with said squared portion of said shaft.

2. A wrench comprising a housing formed at one end as a handle and having at the other end a transverse shaft provided with a socket adapted to engage an element to be turned, a bevel gear upon said shaft, a longitudinal shaft extending through said handle and having crank means upon the outer end thereof, a bevel pinion upon said longitudinal shaft meshing with said bevel gear, a polygonal portion upon said transverse shaft, a member slidable longitudinally upon said housing and adapted to engage said polygonal portion of said transverse shaft and prevent rotation of the same relative to said housing, a spring normally urging said member into engagement with said shaft, and locking means for holding said member out of engagement against the action of said spring.

3. A wrench comprising a housing formed at one end as a handle and having at the other end a transverse shaft provided with a socket adapted to engage an element to be turned, a bevel gear upon said shaft, a longitudinal shaft extending through said handle and having crank means upon the outer end thereof, a bevel pinion upon said longitudinal shaft meshing with said bevel gear, a polygonal portion upon said transverse shaft, a member slidable longitudinally upon said housing and adapted to engage said polygonal portion of said transverse shaft and prevent rotation of the same relative to said housing, a spring normally urging said member into engagement with said shaft, locking means for holding said member out of engagement against the action of said spring, and trigger means for rendering said locking means inoperative.

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