

Dec. 2, 1952

R. A. KAPLAN

2,620,051

WRENCH

Filed July 24, 1948

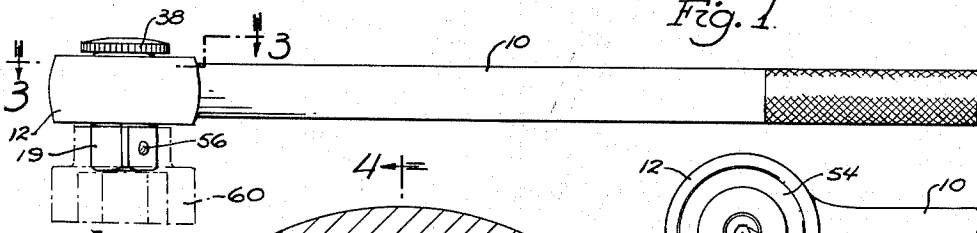


Fig. 1.

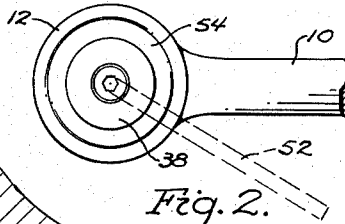


Fig. 2.

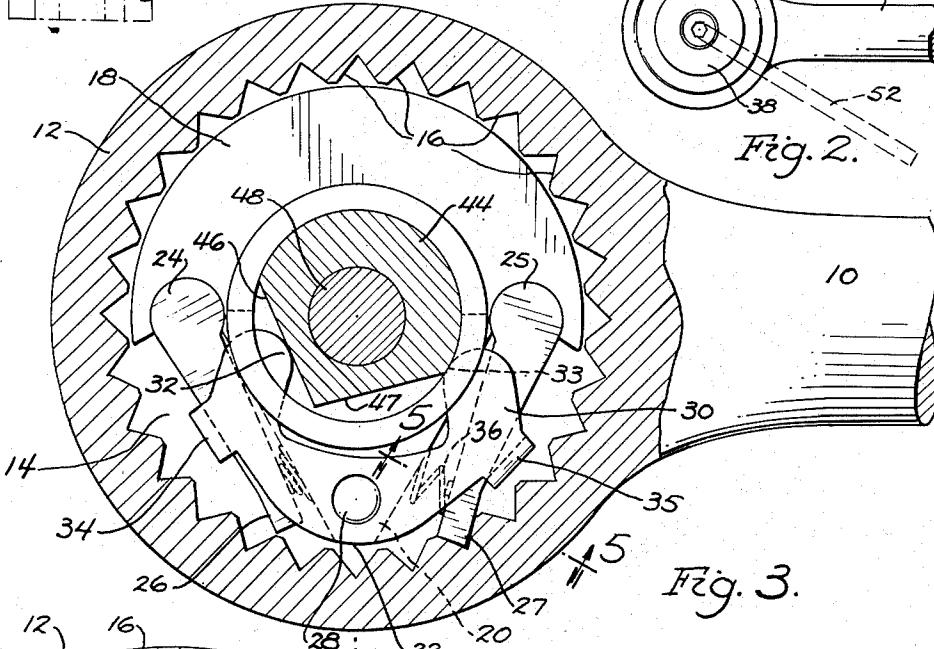


Fig. 3.

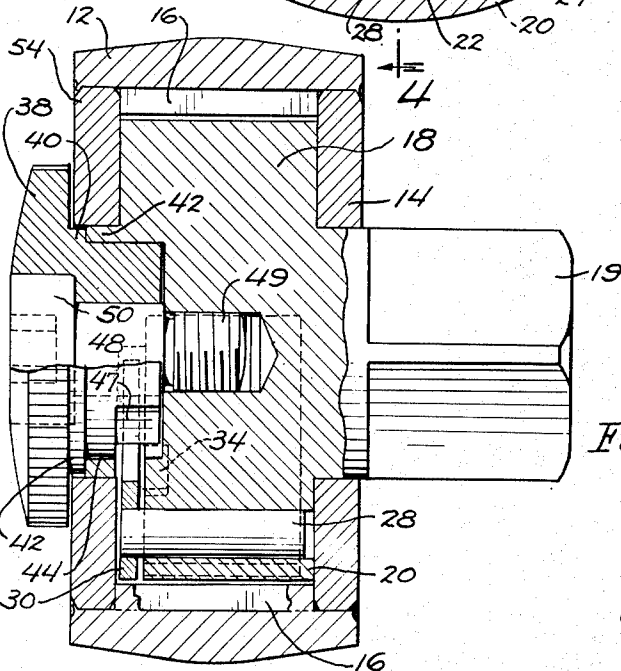


Fig. 4.

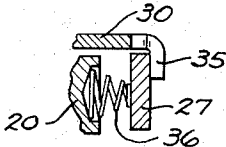


Fig. 5.

INVENTOR.

Reuben A. Kaplan

BY

BY
A R McCrady

ATTORNEY.

UNITED STATES PATENT OFFICE

2,620,051

WRENCH

Reuben A. Kaplan, Owatonna, Minn.

Application July 24, 1948, Serial No. 40,445

2 Claims. (Cl. 192—43.1)

1

This invention relates to ratchet wrenches, and particularly to a wrench of the type comprising a head having a cylindrical barrel and a core rotatable therein which may be utilized for turning wrench sockets or other driven members.

An object of the invention is to provide a wrench comprising improved mechanism for reversing the direction of the core so that the driven member may be rotated in either direction.

A further object of the invention is to provide a wrench which is capable of transmitting great torque without breakage of or damage to the parts thereof.

A further object of the invention is to provide a wrench which is simple in construction, easily manufactured, and efficient and durable in use.

Further objects and advantages of the invention will be apparent from the following description, in which:

Fig. 1 is a view in longitudinal elevation of a wrench embodying the invention.

Fig. 2 is a plan view of the head of the wrench.

Fig. 3 is an enlarged sectional view of the same, taken on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 3.

It is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

The wrench shown in the drawing comprises a handle 10 formed with a head which includes a generally cylindrical barrel 12 having therein a rotatable core, described hereinafter. At one end of the barrel 12 an apertured disk 14 is secured as by welding to the inner surface or bore of the barrel. The inner surface of the barrel is provided at its midsection with ratchet teeth 16 having truncated crests as indicated in Fig. 3. At the ends of the teeth the inner surface of the barrel is counterbored to cylindrical form having a diameter at least as great as the root diameter of the teeth 16, to receive the disk 14 and a retaining plate to be described.

The rotatable core of the head comprises a block 18 of generally cylindrical form shaped to rotate with sufficient clearance within the cylinder defined by the flatted crests of teeth 16. Formed integral with the block 18 is a stud 19 of

2

rectangular cross section designed to engage and rotate a wrench socket or other driven member, as described hereinafter. At one side, the block 18 is cut away to form a wedge-shaped boss 20 having a truncated tip 22 the outer surface of which lies within the cylinder defined by the crests of teeth 16. At the base of the boss 20 are formed opposite cylindrical sockets into which fit the cylindrical butts 24, 25 of two pawls 26, 27, the free ends or blades of which are designed to engage teeth 16. As indicated in Fig. 4, the pawls are of substantially the same width as teeth 16, and their upper ends or butts are enlarged to give ample bearing area in their respective sockets.

Pivoted to the boss 20 by a pin 28 is a switch bracket 30. The bracket 30 has two opposite arms which terminate in rounded ends 32, 33 which act as cam followers as explained hereinafter. The arms are also provided with ears 34, 35 which act, upon the bracket being rocked to one or the other of its two extreme positions, to force one of the pawls 26, 27 into proximity with one face of boss 20 and out of the path of the teeth 16, while permitting the other pawl to be moved by a compression spring 36 outwardly to a position wherein it will engage the teeth 16, as best shown in Fig. 3. Each of the springs 36 is set in a small socket formed in boss 20 as shown in Fig. 5.

In order to actuate the bracket 30 and thus reverse the direction of rotation of the block 18 and stud 19, a knurled reversing knob 38 is rotatably mounted at the side of barrel 12 opposite to the stud 19. The knob 38 is formed with an annular shoulder 40 which fits rotatably against an annular flange 42 formed on block 18. The knob 38 is also formed with an inner extension 44 which fits rotatably within a bore formed in block 18. The extension 44 is of generally cylindrical form, but is machined to form two flat cam faces 46, 47 designed to engage one or the other of the ends 32, 33 of bracket 30 as the knob 38 is rotated.

The knob 38 is held in place by a stud 48, the shank of which extends through an axial bore formed in the knob. The stud 48 has a threaded end 49 of reduced diameter which engages a threaded bore in block 18, and an enlarged head 50 which is rotatable in a counterbore in knob 38 and which is formed with a hexagonal socket to receive a small wrench 52 as indicated in dotted lines in Fig. 2. In assembling the parts just described, the stud 48 is turned inwardly until its shank firmly seats in the block 18, which leaves the knob 38 free to rotate.

In order to retain the rotary core in the barrel of the wrench, a retaining plate 54 is mounted within the barrel 12 opposite the disk 14 and is

3

retained permanently in place by spinning the metal of the barrel over it as indicated in Fig. 4. The disk 54 is formed with a central aperture of such size as to rotatably embrace the flange 42 and thus to exclude dirt from the core.

The stud 19 may be of any suitable construction, but as shown comprises a ball 56, urged outwardly in a transverse bore of the stud by a compression spring, not shown, to enable it to releasably retain a wrench socket 60 which is formed with a recess to receive the stud, in known manner.

With the parts in the positions indicated in Fig. 3, it will be seen that counterclockwise torque applied by handle 10 is transmitted through barrel 12 and teeth 16 to the pawl 27—25, which is thus put under compression and exerts a force in the counterclockwise direction upon the core 18 at such distance from the center of the core that a high torque may be transmitted to the stud 19 without unduly straining the parts. By reason of the construction above described, the wrench may be subjected to heavy duty without failure of the parts.

Although the invention has been described with reference to a particular embodiment thereof, it may be embodied in other forms within the skill of artisans in this art, and is therefore not limited except in accordance with the terms of the following claims.

I claim:

1. A wrench comprising a head having a bore extending therethrough and provided with teeth defining a cylinder, a core rotatable in said cylinder and having a generally cylindrical portion recessed throughout its length to form a radially tapering boss, a pair of oppositely disposed pawls each having a cylindrical end rotatable in a socket in said core and its other end movable into engaging and non-engaging positions relative to said teeth, springs urging the pawls into engagement with the teeth, and a reversing mechanism comprising a cam member coaxially rotatable in said portion and having a cam surface including

4

a circular portion and two plane surfaces intersecting each other at an obtuse angle, a bracket pivoted to said boss and having two arms each positioned to selectively contact one of said plane surfaces or said circular portion, and elements on each of said arms for drawing one of said pawls out of engagement with the teeth when the corresponding arm is in contact with one of said plane surfaces.

2. Wrench mechanism comprising a driving head having a bore extending therethrough and provided with internally extending teeth defining a cylinder, a core rotatable in said cylinder and having a generally cylindrical portion cut away to form a radially extending boss, a pair of spring pressed pawls having their inner ends pivotally mounted in sockets at opposite sides of said boss and thin outer ends movable into and out of engagement with said teeth to form therewith a ratchet, and a reversing mechanism comprising a cam rotatable in said portion and having a cam surface including a circular portion and two intersecting plane surfaces, a bracket pivoted to said boss to be moved by said cam and having two arms each positioned to selectively contact one of said plane surfaces or said circular portion, and elements on each of said arms for drawing one of said pawls out of engagement with the teeth upon contact of the corresponding arm with one of said plane surfaces.

REUBEN A. KAPLAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,903,514	Merriman	Apr. 11, 1933
2,020,883	Gagne	Nov. 12, 1935
2,233,091	Becker	Feb. 25, 1941
2,395,681	Odlum et al.	Feb. 26, 1946
2,407,558	Kress	Sept. 10, 1946