Feb. 21, 1956 M. H. GOLDWATER ET AL 2,735,324

FRICTION ACTION RATCHET WRENCH

Filed Sept. 11, 1953

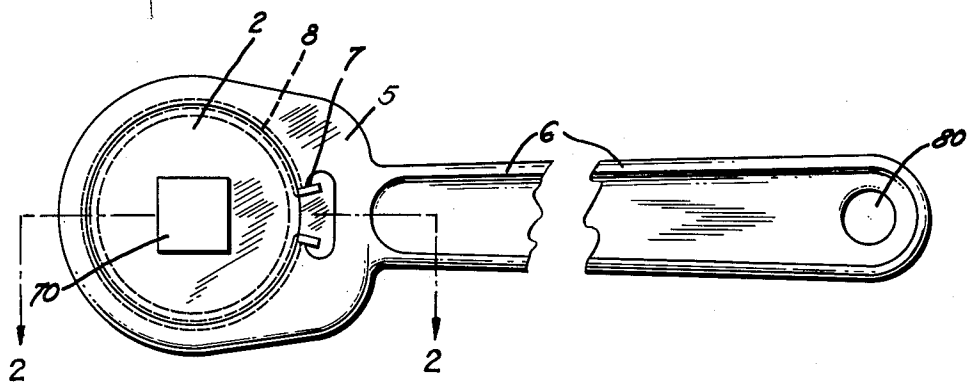

Fig. 1.

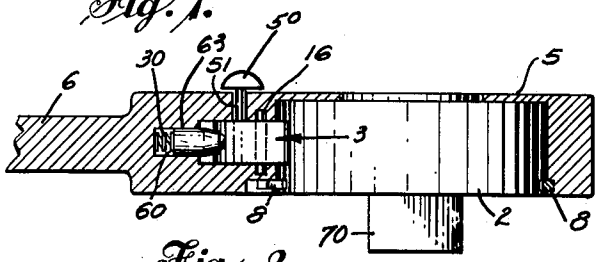

Fig. 2.

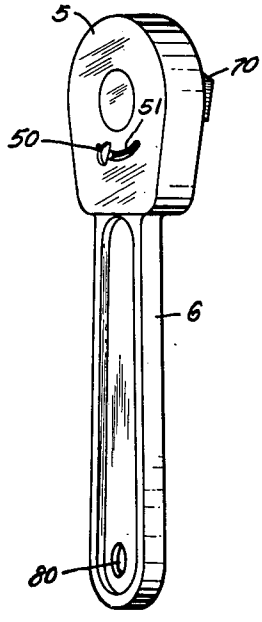

Fig. 4.

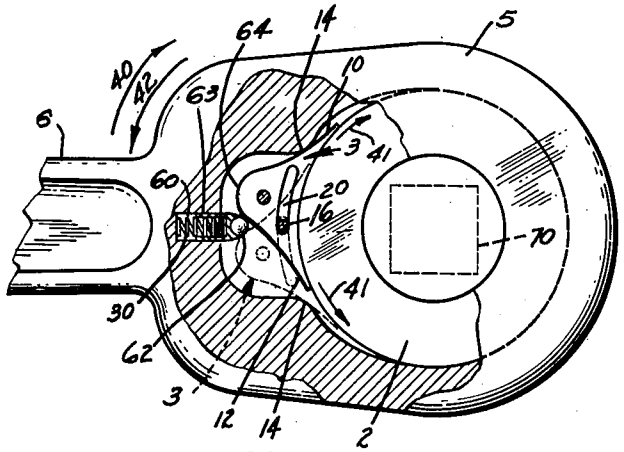

Fig. 3.

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United States Patent Office 2,735,324
Patented Feb. 21, 1956

2,735,324

FRICTION ACTION RATCHET WRENCH

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Application September 11, 1953, Serial No. 379,488

2 Claims. (Cl. 81—60)

This invention relates to ratchet wrenches and more particularly it is an object of this invention to provide a friction pawl mechanism in such a wrench in substitution for the usual pawl and ratchet teeth.

The teeth of a ratchet wrench are costly to manufacture and wear out unduly easy. Many attempts have been made to construct a ratchet wrench in which a frictional grip between the handle and the rotating disc is provided. These attempts have used mechanisms similar to brake band and brake drum assemblies.

Such attempts have been unsuccessful because the bands wear too readily. Nevertheless, much money has been spent in such research because the frictional grip on the disc would be much superior to teeth.

It is our intention to provide a frictional grip through the provision of a pawl so constructed as to wedge between the adjacent portions of the handle of the wrench and the disc.

A further object of our invention is to provide a wedge-action pawl which will grip the disc in less time than is required for a pawl of the ordinary type to pass up the incline side of teeth and to slip into a gripping position. In this way, we provide a wrench which does not have the looseness and waste motion in it.

A further object is to provide a wrench of greater strength through the elimination of the relatively weak teeth.

A further object is to provide a wrench eliminating many of the small parts necessary in wrenches of a conventional type.

A particular object is to provide a wrench which can be more economically manufactured than other wrenches for this purpose.

A particular object is to provide a wrench having at least one pawl provided with two wedge portions on opposite sides of the pawl, the pawl being slidable so as to use a selected wedge portion in accordance with the way the wrench is turned.

A particular object is to provide a wrench having a wedge-action pawl, the wedge of which automatically moves into place and out of place in accordance with the way the handle is turned, and more particularly with the assistance of a spring adapted to assist the pawl to attain a wedging contact.

A further object is to provide a pawl formed of a material adapted to provide much friction and yet withstand wear adequately, such as the material being used in gears which is of a fibrous nature, in place of metal, which could also be used if desired.

Other and further objects and advantages of the present invention will be apparent from the following detailed description, drawings and claims, the scope of the invention not being limited to the drawings themselves as the drawings are only for the purpose of illustrating a way in which the principles of this invention can be applied.

Other embodiments of the invention utilizing the same or equivalent principles may be used and structural changes may be made as described or desired by those

skilled in the art without departing from the present invention and the purview of the appended claims.

Figure 1 is a view of the wrench from the underside, showing the square socket for accommodating bolt engaging studs.

Figure 2 is a cross sectional view taken along the line 2—2 of Figure 1.

Figure 3 is a top view with portions broken away.

Figure 4 is a perspective view of the tool.

The head 5 and handle 6 are conventional parts of the usual socket type wrench, the outer end of the handle 6 being provided with an aperture 80. The spring ring 8 has bent ends 7 which ends are adapted for gripping by a tool. This spring ring 8 fits when taut into an annular groove in the rotating disc and allows the disc to be fitted into the space provided for it in the head 5. When the disc is inverted in place the spring ring is released and springs into an annular groove in the head, thus holding the disc in place in the head. This mechanism is all old.

The wrench of this invention differs from a conventional wrench in that the center rotating disc 2 has no teeth.

Also, it differs in that there is no pawl for gripping teeth but instead a wedge member 3 is provided which is called a friction pawl. This wedge member has wedging surfaces on each end at 10 and 12 which are adapted to wedge between the rotary disc 2 and the respective surfaces 14 of the head 5. The wedge-pawl 3 is adapted to slide in the direction of the arrows 41 and upon a guide post 16. The post 16 is fixed to the head 5 and extends through a slot 20 in the wedge-pawl 3.

The wedging point 10 of the pawl 3 is forced between the point 14 and the disc 2 by a spring 30. Once the wedge-portion is engaging both the disc 2 and the point 14 then further motion of the handle of the wrench in the direction of the arrow 40 will cause the wedge to be more and more tightly received whereby the disc 2 is as securely held as though it had teeth gripped by a conventional pawl.

When it is desired to release the wedge-pawl 3, then a motion of the handle in the direction of the arrow 42 will cause the pawl to come out of position.

The pawl is brought from the position shown in Figure 3 to a position such that its opposite wedge portion 12 is disposed between the point 14 and the disc 2 by motion of the wrench in the direction of the arrow 42 at a time when the disc portion 2 is held stationary by being on a nut or the like. This position is shown in dotted lines in Figure 3. The over center spring 30, by pressure against the cam surface 64 of the pawl 3, will cause the pawl 3 to assume the dotted line position shown in Figure 3 and the wedge portion 12 will be forced into contact with the adjacent point 14 and the disc 2.

It will probably be necessary to shift the pawl manually from one shoulder 14 to the opposite shoulder 16 and this can be done by means of a shift arm 50 protruding outwardly from and sliding along the slot 51 in the side of the head 5 at a point where it can be reached with the fingers for pushing it in a desired direction to move the pawl.

The spring 30 is essentially an "over the center spring." To make it stay in place the means shown in Figure 2 may be desirable. In Figure 2 a recess is provided at 60 for receiving the spring and the spring is guided by the walls of the recess 60. The outer end of the spring 30 fits into a sleeve 63 which carries a ball 62 which the compressed spring forces against the cam portion 64 of the friction pawl 3. The spring 30 will thus be seen to have an effect of holding the wedge toward whatever side of the cam surface 64 the spring is opposite. The shift arm 50 is manually operated to place the pawl in a selected position and the spring 30 operates to hold the pawl in the selected position.

In Figure 2 a side view of the pawl is shown and upwardly from the top thereof extends the control arm **50**. The pin **16** extends through the slot **20** in the pawl of Figure 3 for holding the pawl in place and permitting it to slide. Dotted lines are shown at **70** in Figure 3 to indicate the position of a square plug extending from the opposite sides of disc **2** for insertion of sockets.

We claim:

1. In a ratchet wrench of the type described, a head portion provided with a concentric annular recess for supporting a ratchet-head cylinder, an integral handle extended rearwardly from the head portion, said cylinder having a smooth periphery and being provided with means for supporting a wrench socket extended axially from one face thereof, an offset recess disposed rearwardly of the annular recess and joined thereto by rounded shoulder portions symmetrically disposed with respect to the handle axis, a triangularly-shaped pawl slidably supported in said offset recess, said pawl having a gripping surface concentric with the periphery of the cylinder, laterally extended wedge-shaped projections for cooperation with the respective shoulder portions, and a rounded apex for cooperation with a spring-pressed biasing means, manually operated means for positioning the pawl at a selected

side of the handle axis, whereby the biasing means will cause the corresponding wedge-shaped projections to wedge between the cylinder periphery and the contiguous shoulder portion, thereby locking the cylinder to the head for turning the workpiece in a preselected direction.

2. The combination of claim 1, wherein the pawl is provided with an elongated concentric slot in which a fixed pin support is disposed, for guiding the pawl in its slidable movement either side of the handle axis, and wherein the biasing means cooperates with the rounded surface of the apex portion of the pawl, for wedging the pawl in its present direction of slidable movement.

References Cited in the file of this patent

UNITED STATES PATENTS

745,281	Hume	Nov. 24, 1903
1,372,453	Radford	Mar. 22, 1921
1,655,865	Hooper	Jan. 10, 1928
1,983,123	Dodge	Dec. 4, 1934
2,139,650	Anderson et al.	Dec. 13, 1938

FOREIGN PATENTS

674,029	Germany	Apr. 3, 1939