Feb. 6, 1923. 1,444,343

I. A. GOODWIN

REDUCTION GEARING FOR DRILLS

Filed May 10, 1921

Fig. 1

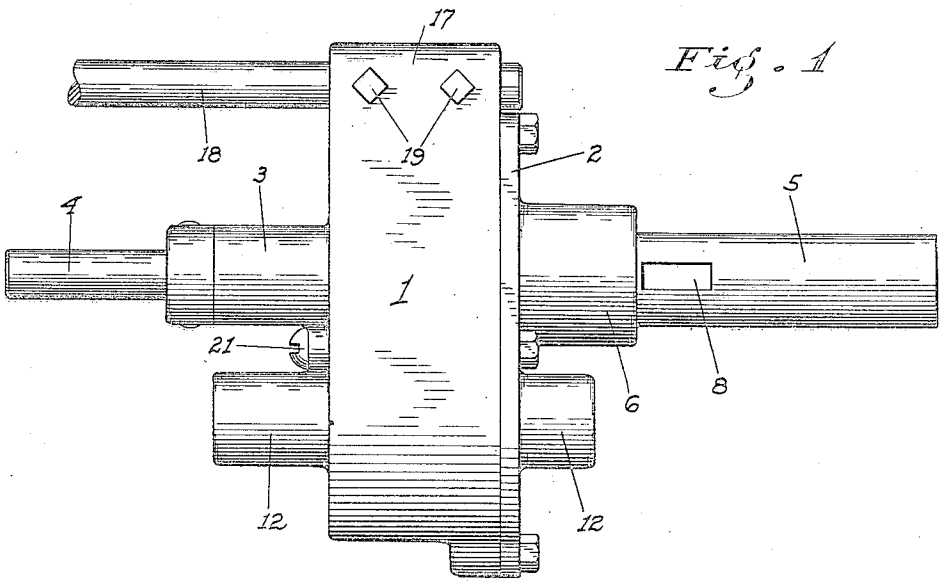
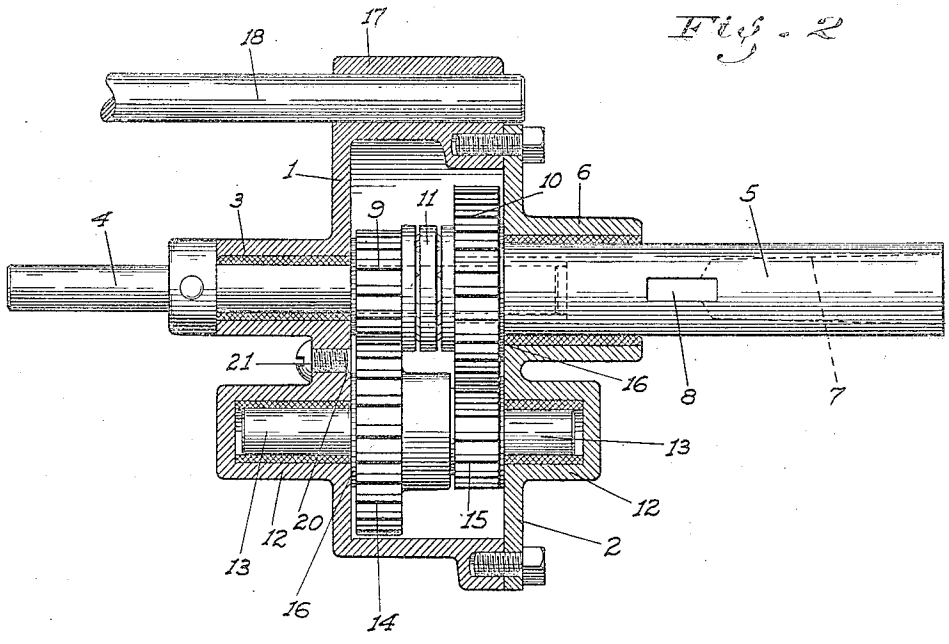


Fig. 2



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UNITED STATES PATENT OFFICE.

IRVIN A. GOODWIN, OF RIPON, CALIFORNIA.

REDUCTION GEARING FOR DRILLS.

Application filed May 10, 1921. Serial No. 468,296.

To all whom it may concern:

Be it known that I, IRVIN A. GOODWIN, a citizen of the United States, residing at Ripon, county of San Joaquin, State of California, have invented certain new and useful Improvements in Reduction Gearing for Drills; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in speed-reduction mechanisms for use in connection with drills, and particularly electric drills which are arranged to run at only one, and that a very high, speed.

The normal speed of such machines is well suited for small drills, up to about the half-inch size, but as the size of the drill increases the rotative or cutting speed thereof must be decreased.

As far as I know, no provision is made in the present form of electrically operated drill-turning devices for reducing the speed. At the same time, it is often desirable to use a larger drill than those for which the apparatus is intended, without having to make use of the ordinary stationary and variable speed machine-drill.

The principal object of my invention therefore, is to provide a small, compact device which is adapted to be fixed to the drill chuck at one end and to the larger sized drill-bit to be used at the other, and provided with suitable reduction gearing whereby the speed of the bit will be considerably less than that of the chuck.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claim.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Fig. 1 is a side elevation of the device.

Fig. 2 is a sectional view thereof.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a hollow casing provided with a cover 2 on one end removably secured thereto but adapted to make an oil-tight fit therewith. Journaled in a boss 3 projecting from the end of the casing is a shaft 4, held against longitudinal movement, which shaft projects from the casing and is of a size to adapt it to be secured in the chuck provided with the electric driving member, and which usually engages the drill-bits direct.

The inner end of the shaft is turnably seated in a larger shaft 5 journaled in and projecting through a bearing boss 6 on the cap 2, the outer end of the shaft 6 being taper-bored as at 7 to receive the standard taper shanks provided of a common size on all drills over half-inch, within certain limits. A drift-hole 8 is provided through the shaft at the inner end of the hole 7, as is customary. Both shafts of course extend in continuous alinement with each other.

Fixed on the shaft 4 within the casing is a pinion 9, while a larger gear 10, is fixed on the adjacent end of the shaft 5, these gears having a suitable form of thrust bearing 11 therebetween, preferably of the ball type.

Journaled in the casing and cap in blind bosses 12 thereon and in parallel alinement with the shafts 4 and 5 is a countershaft 13, fixed on which are a gear and pinion 14 and 15 meshing with the pinion and gear 9 and 10 respectively. To hold the pinions and gears from contact with the casing and cap fiber or similar gaskets 16 are provided.

In order to hold the casing against rotation, I provide a bored boss 17 thereon adapted to receive a rigid bar 18 which is fixed to the driving-body of the drill in any desired manner, and is adjustably clamped in the boss by means of set screws 19 therein, so that the spacing of the casing from the drill-body may be adjusted.

The casing is intended to be filled with oil, which may be inserted or drained as may be required, through a hole 20 fitted with a screw-plug 21 without removing the cap, which is only taken off for inspection or removal of the parts in the casing.

The pinions and gears may be made of any desired size ratio, but I have shown each meshing pair as being of a 2 to 1 ratio, thus reducing the speed of the driven shaft 5 four times below that of the drive shaft 4.

It will of course be readily seen that by

reducing the speed, the torque is proportionately increased, following a well known law of mechanics.

While I have shown and described the shaft 5 as being intended to serve as a drill socket for taper-shank drills, a chuck may instead be mounted on said shaft, to accommodate various sizes of drill-shanks.

I have here shown and described the device as being particularly designed and intended for use in connection with electric drills, but it is evident that the apparatus may be used in other fields of service.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claim.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent, is:—

A reduction gear device for drills comprising a casing, a shaft journaled therein and projecting therefrom to adapt it for connection to the drill-chuck, another shaft journaled in said casing and projecting therefrom to enable a drill-bit to be secured therewith, means in the casing and connecting the shafts whereby the latter will rotate at a lesser speed than the former, and a rigid bar adjustably fixed to the casing and adapted to be secured to a rigid member of the chuck-driving mechanism.

In testimony whereof I affix my signature.

IRVIN A. GOODWIN.