June 30, 1925. 1,544,168

W. E. NOLAN

GEARED DRILL BRACE

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Fig. 1.

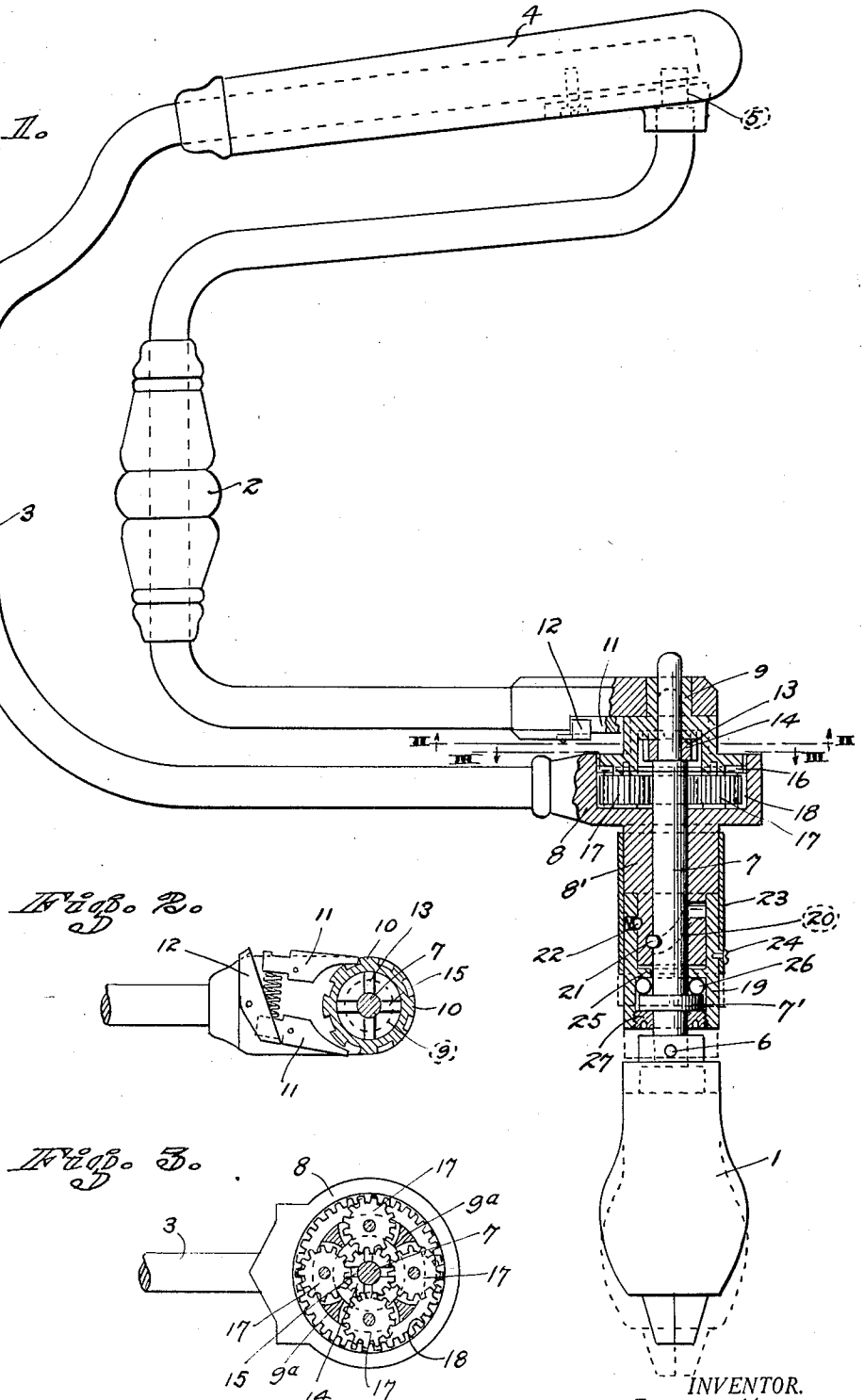


Fig. 2.

Fig. 3.

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WILLIAM EDWARD NOLAN, OF SAN FRANCISCO, CALIFORNIA.

GEARED DRILL BRACE.

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To all whom it may concern:

Be it known that I, WILLIAM EDWARD NOLAN, a citizen of the United States, and a resident of San Francisco, county of San Francisco, State of California, have invented a new and useful Geared Drill Brace, of which the following is a specification.

This invention relates to mechanics' drill braces and in particular to a special type of geared brace providing a choice of speeds for the drill.

The principal objects of my invention are to provide a better and quicker operated control for changing the gear ratio or speed rotation of the drill and also to provide an improved arrangement of thrust bearing members which will be effective at either slow or fast speed of rotation of the drill chuck spindle.

In the drawing accompanying this specification,

Figure 1 is a side view of my geared brace with a portion of the body and control mechanism shown in section;

Figure 2 is a sectional view of the ratchet head and body portion; as seen from the line 2—2 of Figure 1.

Figure 3 is a sectional view of the head and body as seen from along the line 3—3 of Figure 1.

In further detail, 1 represents the drill chuck of a conventional construction, 2 the revolvable operating handle or crank, 3 the auxiliary steadying handle supporting the breast plate 4 and in which the outer end of the operating handle is pivoted at 5.

The chuck is pinned at 6 to a spindle 7 revolvably extending through a body or head 8 secured to the lower end of the outer or steadying handle 3 and into a ratchet hub 9 revolvably carried at the lower end of the operating handle.

This ratchet head has pawl teeth 10 adapted to receive either or both pivoted ratchet pawls 11 controlled by a pivoted pawl lock 12 in the well known manner for providing a positive drive to the ratchet hub in either direction or in both directions.

On the under end of the ratchet hub is a rib or ribs 13 forming a jaw clutch, and secured to the upper portion of the spindle is a pinion 14 cross grooved at 15 to freely receive the ribs 13 so as to form a mating jaw clutch for driving the pinion from the ratchet hub.

The pinion is slidable up and down in the head and ratchet hub so that the pinion may be thrown in and out of clutching engagement with the ratchet hub, and the hub extends downward into a recess 16 in the head 8 and takes the form of a cage 9^A revolvably supporting several small pinions 17 meshing at their outer portions with an internal gear ring 18 formed in the recess of the head 8 so that upon each revolution of the cage the pinions will be carried around the fixed internal gear and thus revolve on their own pivots several times, depending on the ratio of the pinions to the internal gear.

The clutch pinion 14 fixed to spindle 7 is adapted to slide with the spindle downward into a central position meshing with all the pinions as shown in Figure 3 thus producing a high or multiplied speed of rotation to the drill chuck upon simply revolving the handle 2 in the same manner as for the direct drive when the pinion 14 is engaged with the clutch ribs 13.

To rotatively support the spindle 7 the head 8 has a neck 8′ extending downward and bored to fit the spindle and preferably reduced somewhat in diameter at its lower end as shown.

Surrounding this reduced end of neck 8′ is a special collar 19 having a spiral shaped slot 20 cut through one wall and through which it is secured to the reduced neck by a pin or screw 21 freely working in the slot so that upon rotation of the collar within limits of the slot the collar will be forced either up or down as guided by the slot, and the pin will seat in either end of the slot which is recessed slightly as shown so as to tend to hold it at either end, and the collar is further held in position at either end of the slot by a spring actuated friction button or ball 22 in the collar bearing on the reduced neck and adapted to snap into suitable depressions therein at opposite limits of the collar movement.

Surrounding the shifting collar 19 and covering the slot 20 is a dust cover or sleeve 23 secured to the collar by any means, such as a screw 24, and freely movable upon the neck 8′ so as not to interfere with the movement of the collar.

The collar has an internal flange 25 to take the thrust in drilling and the spindle 7 has a shoulder 7′ spaced from the flange by a row of thrust balls 26 to reduce the friction to a minimum.

Below the shoulder 7′ the collar 19 is

provided with a retaining nut 27 screwed in place and which cooperates with flange 25 to positively move the spindle and thereby the pinion 14 up or down to engage either the clutch or the high speed pinions when the collar is turned.

Figure 1 shows the spindle in upper position with pinion 14 engaged with the clutch for direct drive, and the dotted position of the drill chuck shows it as when the spindle is lowered to bring the high speed pinions into mesh.

From the foregoing the operation of the brace should be understood, the brace being held against the work by pressure of the hand or breast against the plate 4 and the outer member 3 steadied against turning, while the inner handle 2 is used like any brace to revolve the chuck spindle, but through the special ratchet head construction the chuck may be revolved either at a high or low speed with a given speed of rotation of the handle 2, for instance, when the collar 19 is revolved to lift the pinion 14 in engagement with the ribs 13 of the ratchet hub as described, the drill chuck is in direct gear and revolves once every turn of the handle, whereas when the spindle and gear 14 is lowered in the manner described, it falls between the planetary pinions 17 carried on the ratchet head and is then in high gear and is revolved at a much higher rate of speed in the same direction.

Thus either high or low speed of drill may be had with constant rotation of the brace handle by simply turning the control collar 19 either to the right or left a fractional turn.

I claim:

1. In a geared drill brace of the character described, a body, a chuck spindle revolvably supported therein and axially slidable from a direct drive to a geared position, means for sliding said spindle comprising a sleeve surrounding the spindle and body having thrust engagement with the spindle and means adapted for moving the sleeve axially with the spindle upon manually turning the sleeve.

2. In a geared drill brace of the character described, a body, a chuck spindle revolvably supported therein and axially slidable from a direct drive to a geared position, means for sliding said spindle comprising a sleeve surrounding the spindle and body having double thrust engagement with the spindle, an angularly disposed slot in said sleeve and a device extending from the body into the slot whereby upon manual turning of the sleeve the same will be moved axially and thereby carry the spindle from one position to the other.

3. A drill brace having a chuck secured to a spindle rotatably mounted on the brace head, means for engaging the spindle with the brace head for direct rotation therewith and gear means for transmitting a higher rotative speed to the chuck, and a device coaxial with the spindle adapted upon turning relative to the brace to selectively engage either of said means.

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