C. S. WRIGHT.

ROTARY DRILLING MACHINE.

APPLICATION FILED NOV. 3, 1919.

1,347,771.

Patented July 27, 1920.

2 SHEETS—SHEET 1.

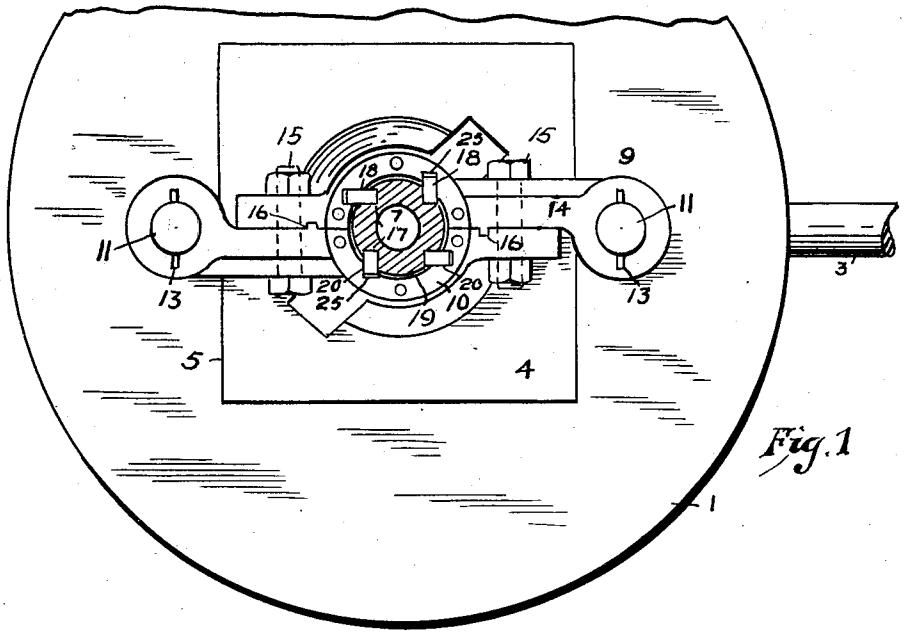


Fig. 1

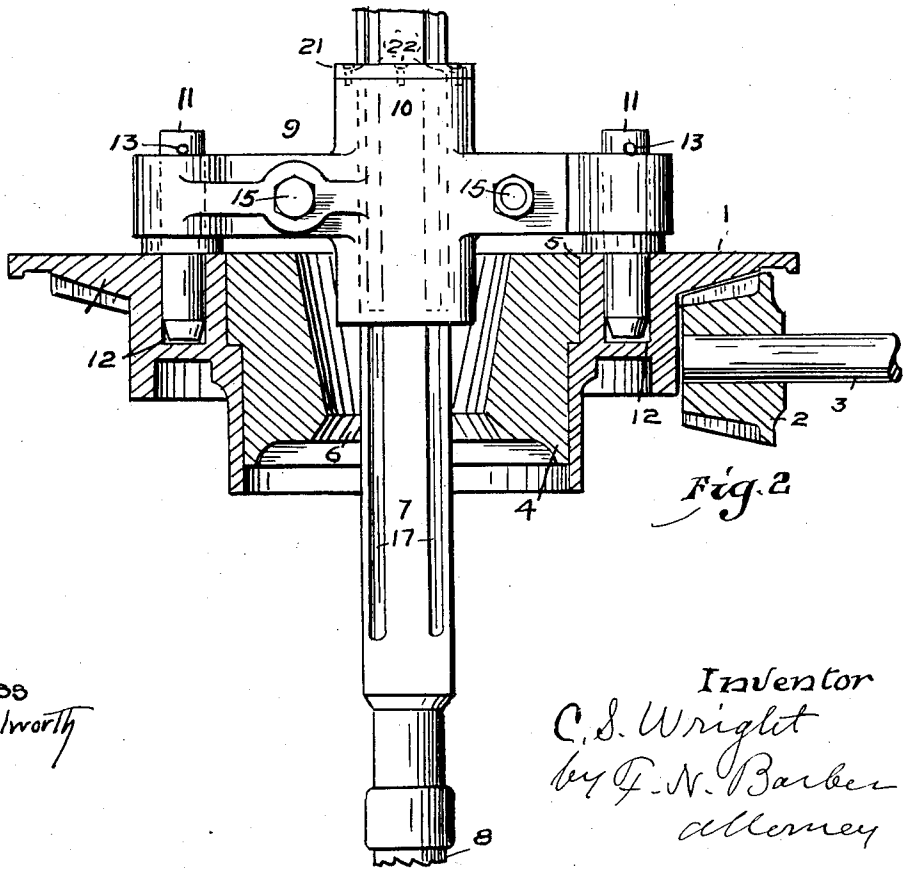


Fig. 2

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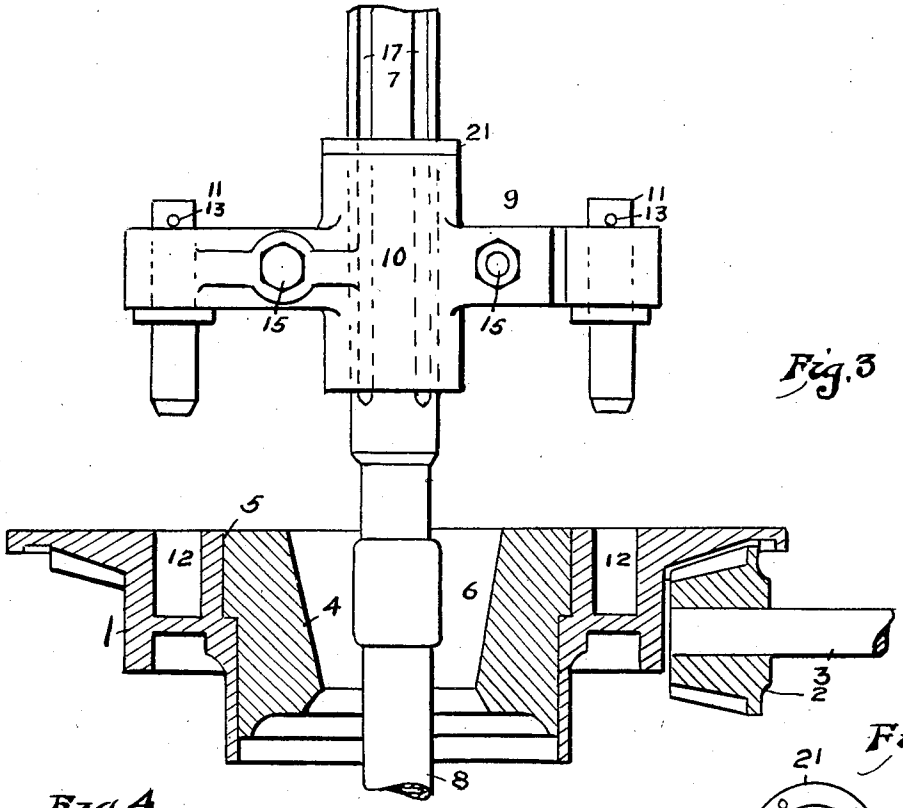


Fig. 3

Fig. 4

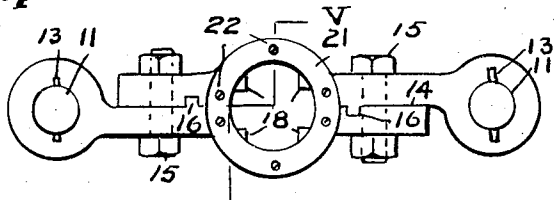


Fig. 6

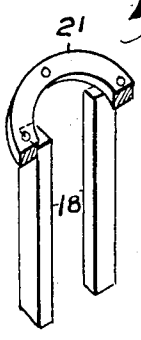
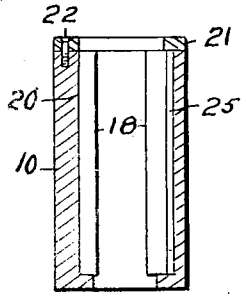


Fig. 5



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UNITED STATES PATENT OFFICE.

CLYDE S. WRIGHT, OF TOLEDO, OHIO, ASSIGNOR TO THE NATIONAL SUPPLY COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO.

ROTARY DRILLING-MACHINE.

1,347,771. Specification of Letters Patent. Patented July 27, 1920.

Application filed November 3, 1919. Serial No. 335,386.

To all whom it may concern:

Be it known that I, CLYDE S. WRIGHT, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented new and useful Improvements in Rotary Drilling-Machines, of which the following is a specification.

My invention relates broadly to rotary drilling machines, and, more particularly, to the means for connecting the rotary table of such a drilling machine to the drill-stem, and, still more particularly, to means whereby the driver for the drill-stem may, when the parts of the driver in frictional engagement with the drill-stem become badly worn, be supplied with fresh parts.

Referring to the accompanying drawings, Figure 1 is a plan view of a rotary drilling machine containing one form of my invention, the drill-stem being in horizontal section and the cap of the driver being omitted; Fig. 2, a view showing the rotary table in vertical section and the driver and drill-stem in side elevation; Fig. 3, a view similar to Fig. 2 but with the driver elevated above the table by the drill-stem; Fig. 4, a plan view of the driver; Fig. 5, a section on the line V—V of Fig. 4 with the inserts 18 exposed; and Fig. 6, a perspective view showing details of the inserts and retaining ring therefor.

On the drawings, 1 designates a rotary table for a well-drilling machine, the supporting structure therefor being omitted. A bevel-pinion 2 on the driving shaft 3 gears with bevel teeth on the underside of the table for rotating the latter in the usual way. The table is provided with the usual removable central bushing 4, and has a square top fitting into the square opening 5 in the table 1. The bushing has a central vertical opening 6 in which the drill-stem 7 works and through which the drill string 8 may pass.

The driver 9 is a means for connecting the table to the drill-stem so that the latter may reciprocate and yet be rotated by the table. It comprises a central hub portion 10 having a vertical opening fitting the drill-stem. It is preferably made of two separable parts, each having its end portion or arm provided with a pin 11 adapted to fit a hole 12 in the top of the table. The pins 11 are removable from holes in the arms and are prevented from dropping through the arms by the cross-pins 13 in the pins above the arms. The two parts of the driver meet in the plane 14 of the vertical center of the drill-stem and are secured together by the bolts 15 passing through both parts at each side of the drill-stem. The two parts of the driver having the interfitting slot-and-groove construction 16 to stiffen the driver and relieve the bolts of some strain.

The cross-section of the driver may have any preferred shape so that it will allow the drill-stem to move up and down and cause it to be turned by the driver. The section shown is cross-shaped, or it may be considered fluted or as circular with longitudinal grooves 17 therein. The central opening 19 in the driver has its cross-sectional shape corresponding to that of the drill-stem, that is, it is circular with the salient members or ribs 18 fitting the grooves 17. The ribs 18 are inserts placed in longitudinal grooves 20 in the driver and held in place by a ring made up of semi-circular end caps 21 secured to one end of the hub 10 by screws 22. The ends of the grooves 20 opposite the cap have the stop shoulders 24 to prevent the inserts from sliding lengthwise in the hub. The outer edges of the inserts rest against the rear walls of the slots in the hub or against the shims 25 or equivalent means placed behind the inserts to hold the latter in their outwardly adjusted position.

The grooves 17 stop before reaching the end of the drill-stem so that the lifting of the drill-stem may lift the driver upwardly and permit one or more sections of the string 8 to be removed therefrom or attached thereto in a manner so well known that a description thereof would be superfluous.

Whenever the inserts 18 become so worn that further adjustment of them is inadvisable, the end cap of the hub 10 is removed (the bolts 15 being first loosened, if necessary to release the inserts), the worn inserts are taken out of the driver, fresh ones inserted in their place, shims placed behind the inserts, if necessary, and the cap replaced.

I claim:

1. In a well-drilling machine, provided with a rotary table having a central open-

ing, and a drill-stem reciprocable in the opening and having external longitudinal grooves, the combination of a driver having an opening with a groove corresponding to each of the drill-stem grooves, a separate and distinct insert in each pair of corresponding grooves, means preventing travel of the inserts in the driver, and means connecting the driver to the table.

2. In a well-drilling machine, provided with a rotary table having a central opening, and a drill-stem reciprocable in the opening and having external longitudinal grooves, the combination of a driver having an opening with a groove corresponding to each of the drill-stem grooves, a separate and distinct insert in each pair of corresponding grooves, means preventing travel of the inserts in the driver, means connecting the driver to the table, an arm projecting from the driver and overhanging the table, and a removable pin connecting the arm and the table.

3. In a well-drilling machine, provided with a rotary table having a central opening, and a drill-stem reciprocable in the opening and having external longitudinal grooves, the combination of a driver having an opening with a groove corresponding to each of the drill-stem grooves, a separate and distinct insert in each pair of corresponding grooves, supporting stops for the inserts at the bottom of the grooves in the driver, and a removable ring carried by the driver and overlying the upper ends of the inserts to prevent the upward travel of the inserts in the driver.

4. In a well-drilling machine, provided with a rotary table and a drill-stem member, the combination of a driver member rotated by the table and having an opening fitting the drill-stem, one member having removable salient inserts fitting correspondingly shaped grooves in the other member, and a cap on the member carrying the inserts for preventing the inserts from traveling downwardly in the driver.

Signed at Toledo, Ohio, this 28th day of October, 1919.

CLYDE S. WRIGHT.