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1,876,126

ROTARY DRILLING MACHINE

Filed May 28, 1930

2 Sheets-Sheet 1

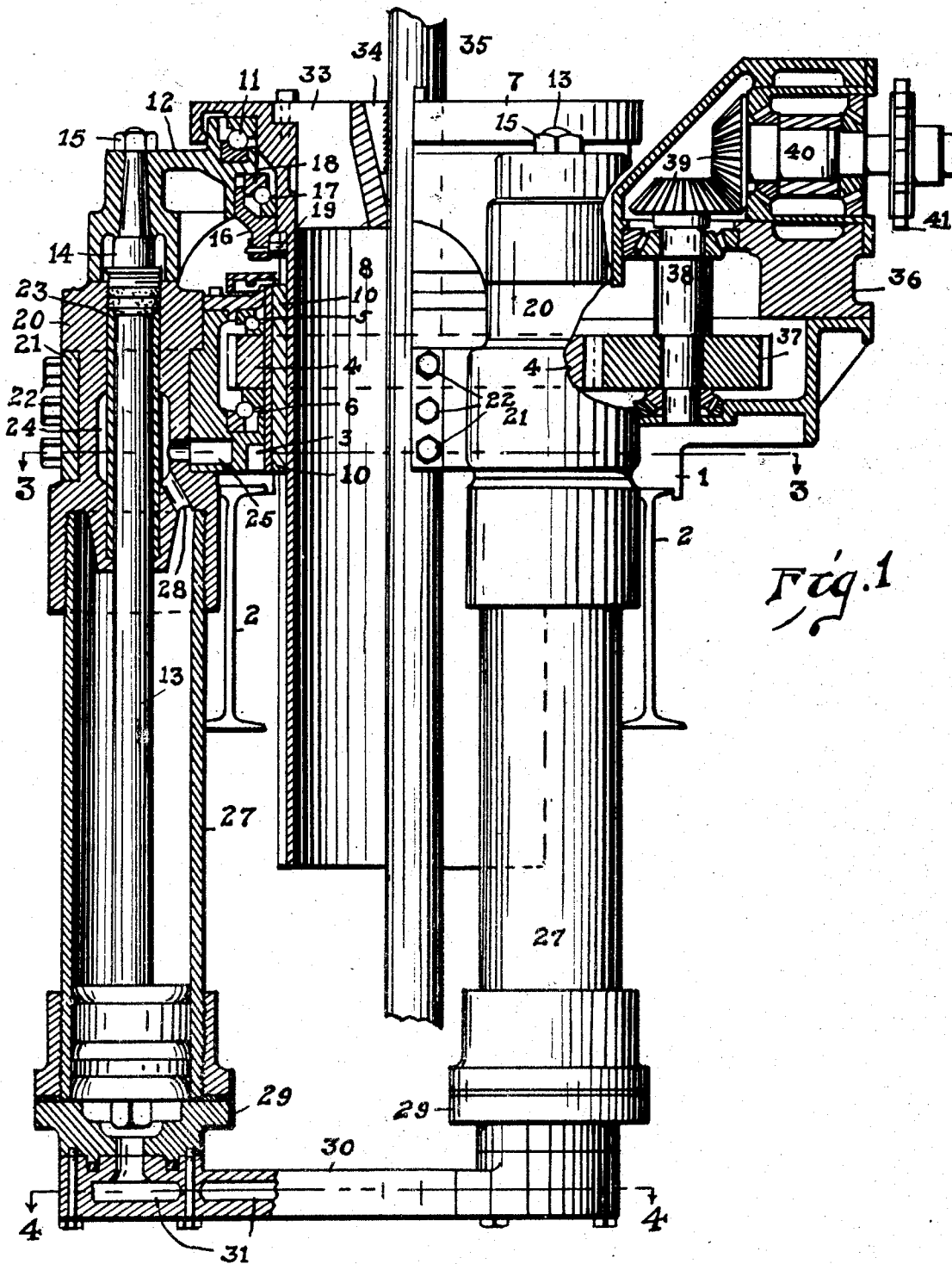


Fig. 1

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Fig. 2

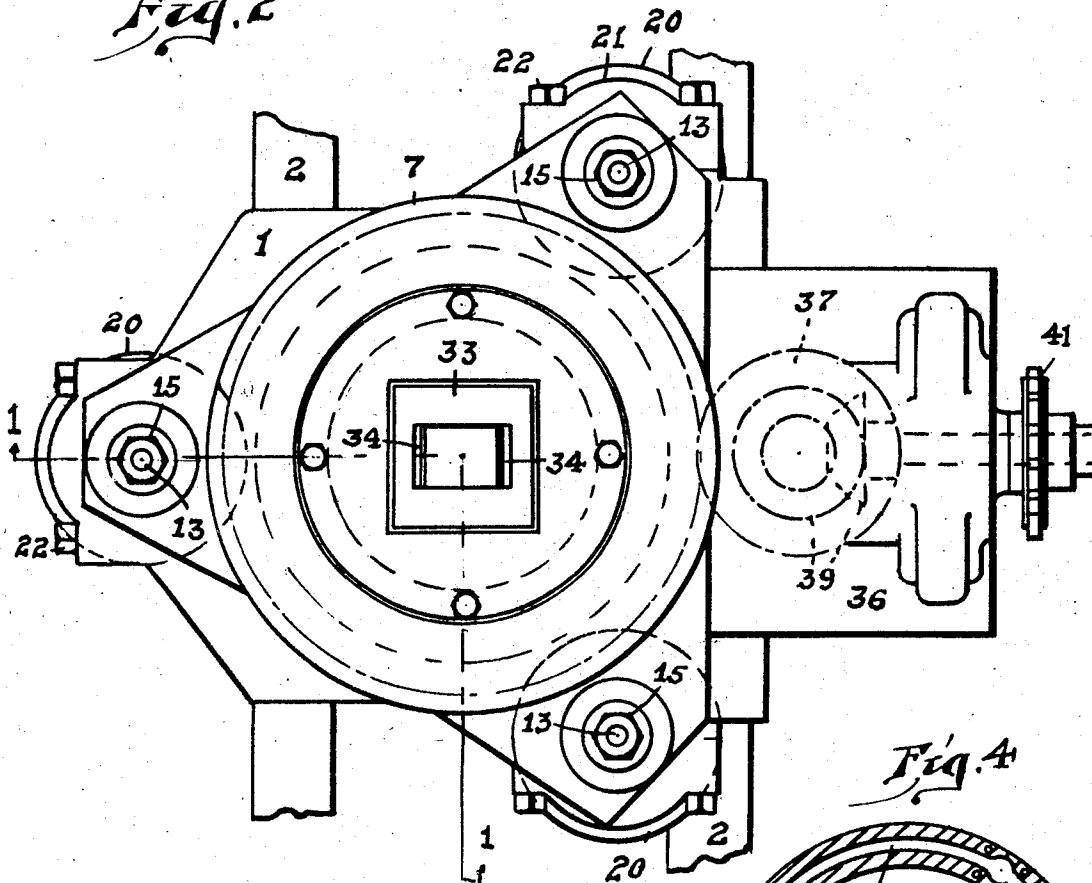


Fig. 3

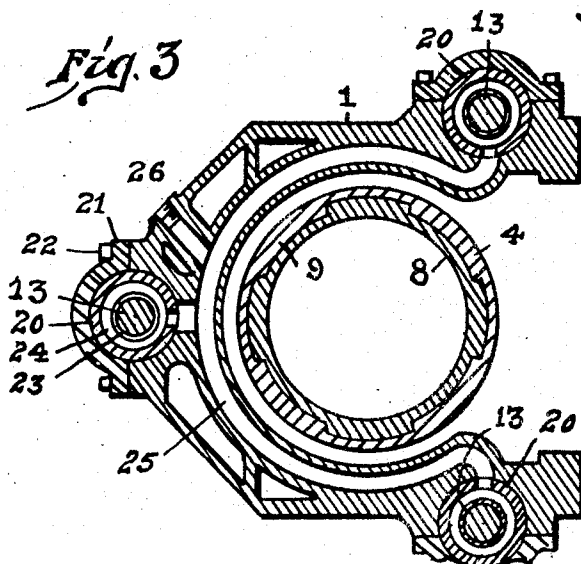
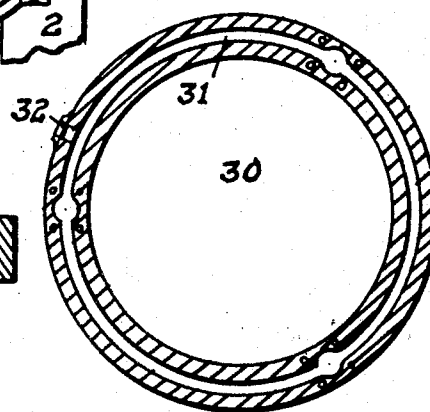


Fig. 4



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UNITED STATES PATENT OFFICE

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ROTARY DRILLING MACHINE

Application filed May 28, 1930. Serial No. 456,395.

Our invention relates to rotary drilling machines with hydraulic feed.

One object of this invention is to provide a rotary drilling machine whose rotary table is provided with a pendent sleeve positioned within the base of the machine and driven rotarily by a gear wheel in the base and on the sleeve. Another object is to provide features whereby the drill rod may be simultaneously sustained and rotated and at the same time vertical movement imparted to the drill rod. Other objects will be better understood after description of the apparatus has been made.

Referring to the accompanying drawings, Fig. 1 is a combination view, the left hand half showing our invention in central vertical section while the right hand half shows the same in side elevation, a portion of the right hand half being broken away. Fig. 2 is a plan view of our drilling apparatus. Figs. 3 and 4 are respectively cross sections on the lines 3—3 and 4—4 on Fig. 1.

On the drawings, 1 designates the base of the drilling machine and is supported on the I-beams 2. The base has the vertical opening 3 which receives the horizontal pinion 4 rotatable between the ball bearings 5 and 6 supported by the base 1 in any desired practical manner. The rotary table 7 has a depending sleeve 8 which is concentric with the pinion 4 and is connected thereto by vertical ribs fitting in vertical grooves, the gear and the sleeve each being provided with the said ribs and grooves. The ribs on the gear are marked 9 and on the sleeve 10. Thus, the gear 4 can rotate the sleeve while the sleeve may be moved vertically in the gear.

The table 7 is supported on the ball bearing 11 carried by the horizontal spider 12 which supports the three pendent vertical piston rods 13. As shown in Fig. 1 each piston rod has near its upper end the shoulder 14 engaging the under face of the spider. The upper ends of the piston rods extend through the spider and are secured thereto by nuts 15. The sleeve 8 has above the gear 4 the ring 16 screwed thereon and supporting the ball bearing 17. The upper face 18 of this bearing is engaged by the un-

der face of the spider 12. The ball bearings 11 and 17 respectively receive the down and up thrusts which the table 7 may have applied thereto. The ring 16 is prevented from rotation by a dowel 19 which is passed through the lower part of the ring and projects into one of the said grooves in the sleeve.

The base 1 carries three vertical cylinders 20 clamped thereto by the bridge pieces 21 which are secured to the base by bolts 22. The cylinders 20 contain the liners 23, there being between each liner and its surrounding cylinder an annular passage 24 which is connected to the horizontal passage 25 in the base. This passage 25 has connection with the annular passage 24 in each cylinder as is clearly shown in Fig. 3. The passage 25 receives and discharges fluid through the port 26 connected to a suitable source of hydraulic power.

The lower end of the cylinders 20 have screwed thereinto the working cylinders 27 in which work pistons 28 attached to the piston rods 13. The working cylinders 27 are connected to the annular passage 24 by ports 28. The caps 29 on the lower ends of the working cylinders 27 support the ring 30 having therein the annular passage 31 connected to the working cylinders 27 below the pistons. Hydraulic fluid pressure is applied to the passage 31 through the port 32.

The rotary table 7 is constructed to receive the table bushing 33 adapted to receive the slips 34 which grip the drill rod 35 in the usual manner, the drill rod being positioned concentrically with the table 7 and the sleeve 8.

The extension 36 of the base 1 carries the mechanism for rotating the gear 4. This gear is intermeshed with the gear 37 on the vertical shaft 38 which is connected by the beveled gears 39 to the horizontal shaft 40 having the sprocket wheel 41 connected to any suitable source of power.

The spider 12 rests when the same together with the table 7 is in its lowest position, upon the top of the cylinders 20 so that the table may function in any capacity that any rotary well drilling table can when not

rotating, the spider then being indirectly supported by the base.

We claim:—

1. In a rotary drilling machine, a base
5 having a vertical opening with an annular recess therein opening inwardly, a gear supported by the lower wall of the recess, means carried by the upper wall of the recess for resisting the upper movement of the gear, a
10 sleeve splined to the gear and positioned in the opening, means for elevating the sleeve, controlling its descent, and maintaining it at any selected elevation, a well drilling table secured to the top of the sleeve, and means
15 for rotating the gear.
2. In a rotary drilling machine, a base having a vertical opening, an annular recess within said base and in communication with
20 said vertical opening, a sleeve having vertical travel in the opening, an annular gear carried by the base rotatably mounted within said recess and having a connection with the sleeve whereby the sleeve may be rotarily driven and permitted to travel vertically,
25 hydraulic means for elevating the sleeve and controlling its descent and maintaining it at any selected elevated position, and a well drilling table fixedly connected to the top of the sleeve.
3. In a rotary drilling machine, a base
30 having a vertical opening, an annular recess within said base and in communication with said vertical opening, a sleeve having vertical travel in the opening, an annular gear
35 carried by the base rotatably mounted within said recess and having a connection with the sleeve whereby the sleeve may be rotarily driven and permitted to travel vertically,
40 hydraulic means for elevating the sleeve and controlling its descent and maintaining it at any selected elevated position, a well drilling table fixedly connected to the top of the sleeve, and a drill rod gripping means carried
45 by the table.
4. In a rotary drilling machine, a base having a vertical opening, an annular recess within said base and in communication with
50 said vertical opening, a sleeve having vertical travel in the opening, an annular gear carried by the base rotatably mounted within said recess and having a connection with the sleeve whereby the sleeve may be rotarily driven and permitted to travel vertically,
55 hydraulic means for elevating the sleeve and controlling its descent and maintaining it at any selected elevated position, a well drilling table fixedly connected to the top of the sleeve, and means for supporting the table on the base when the table is in its lowest
60 position.

In testimony whereof we affix our signatures.

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