Sept. 20, 1938. J. D. SPALDING 2,130,401

ROTARY MACHINE

Filed Nov. 6, 1937

Fig. 1.

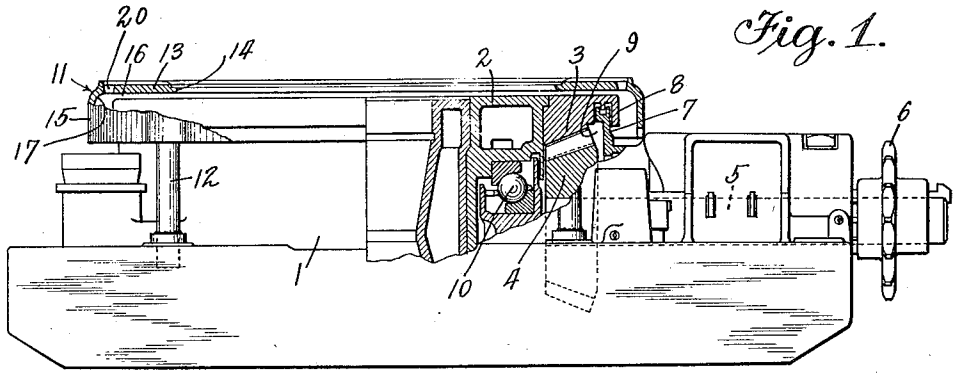
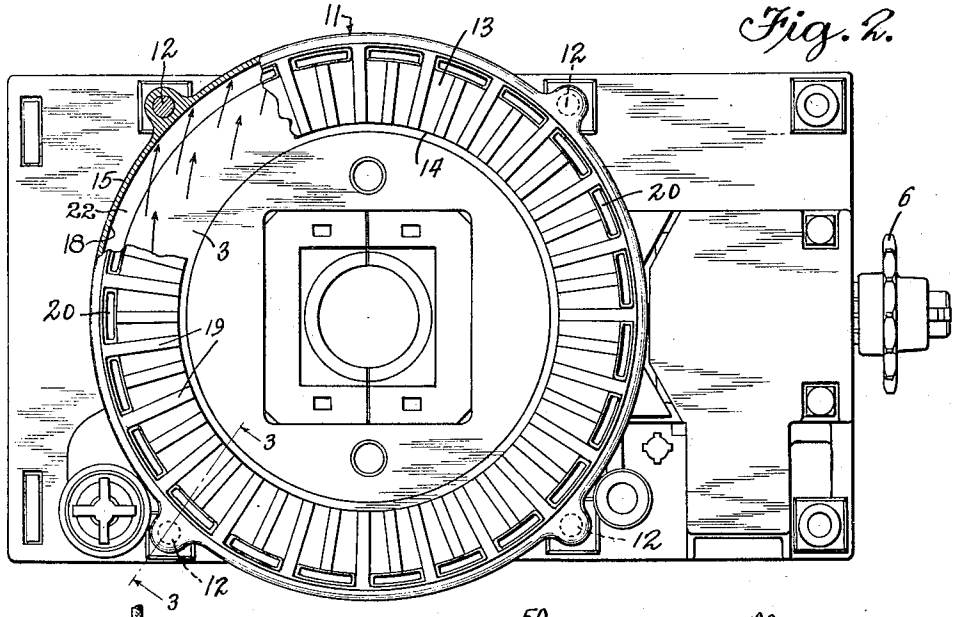


Fig. 2.



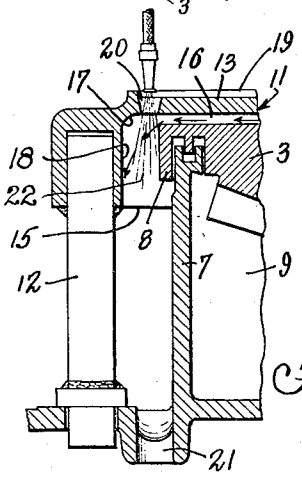


Fig. 3.

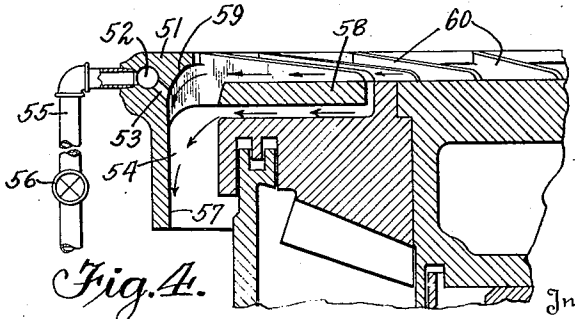


Fig. 4.

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UNITED STATES PATENT OFFICE

2,130,401

ROTARY MACHINE

John D. Spalding, Los Angeles, Calif., assignor to The National Supply Company, Torrance, Calif., a corporation of Pennsylvania

Application November 6, 1937, Serial No. 173,160

13 Claims. (Cl. 255—23)

This invention relates to rotary machines of the type used in the drilling of oil, gas, water or other wells or holes, and is more particularly directed to an improvement in the ring or guard used in connection with the rotary table of such machines.

It is an object of this invention to provide a rotary machine which includes a stationary ring or guard member having openings through which a fluid may be directed to clean out or scavenge the annular clearance space between the guard or ring and the rotary table.

Another object of this invention is to provide a guard or ring member for a rotary table, which guard or ring member includes a series of scavenging openings adjacent the table periphery and is formed with a deflecting wall positioned radially outwardly from the said openings.

Another object of this invention is to provide a guard ring for a rotary machine, which ring has a cylindrical wall and an annular passage provided with ports which open into the annular space between the said wall and the table of the rotary machine.

Another object of this invention is to provide a stationary table guard for a rotary machine which guard includes a horizontal flange adapted to extend inwardly over the surface of the rotary table and a cooperating wall adapted to deflect radial flow of foreign matter from both above and below the flange.

Other objects and advantages of this invention it is believed will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawing.

In the drawing:

Figure 1 is a side elevation partly in vertical section of a rotary machine including a guard ring or member embodying my invention.

Figure 2 is a top plan view thereof illustrating the same with certain parts broken away to illustrate the function of the guard ring in diverting fluid as thrown from the table of the rotary machine.

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2.

Figure 4 is a fragmental sectional view similar to Figure 3 but illustrating a modified form of construction embodying my invention.

The rotary machine as illustrated in the accompanying drawing may be of any suitable or desirable construction and as illustrated, includes a base 1 upon which a table 2 is rotatably mounted. The table 2 carries a ring gear 3 which is in mesh with, and is adapted to be rotated by, a pinion 4 mounted upon the pinion or drive shaft 5. The drive shaft 5 is driven by a sprocket 6 secured to the outer end of the shaft 5 and driven from any suitable or desirable source as is well understood in the art.

The base 1 in the construction as illustrated in the drawing is provided with an upstanding rim 7 which cooperates with a depending lip or skirt 8 of the table 2 to form an enclosed chamber 9 within the rim 7.

The rotary machine as illustrated forms no part of my present invention but is the subject matter of the copending application of John S. Morgan, Jr. and John D. Spalding, Serial No. 128,468, filed March 1, 1937. The rotary table 2 is supported with relation to the base 1 upon bearings 10 so as to rotate with reference to the base. A stationary member or guard 11 is positioned adjacent the upper outer periphery of the table 2 and is removably supported independently of the rim 7 upon pins 12 carried within openings formed in the base 1.

The guard 11 is provided with an inwardly extending annular flange 13 which overlaps a portion of the upper surface of the table 2 and terminates at a central opening 14 which is concentric with the axis of the table 2. The guard 11 is also formed with a downwardly extending circular wall 15 which is spaced radially from the outer periphery of the table 2 so that there is provided between the table 2 and the guard 11 an annular passage 22. Against this wall 15 rotary mud or other foreign matter falling upon the table 2 is thrown by centrifugal force during the rotation of the table 2 upon the bearings 10.

The inner surface of the wall 15 forms a deflecting surface indicated at 17 which diverts fluid downwardly and prevents the same from being thrown any considerable distance away from the rotary machine. The inner surface 18, as well as the under surface of the flange 13, is preferably formed smooth and free from ribs or fins to prevent accumulation of foreign matter within the passage 16. The inner surface 18 of the circular wall 15 is connected to the flange 13 by means of the curved section 17.

The upper surface of the flange 13 is provided with radially extending ribs 19 to stiffen the flange 13 and also to provide a firm foothold for the workmen. It will thus be apparent that the guard 11 acts as a safety guard enabling the workmen to stand near or directly over the rotating table 2 without danger of injury.

A plurality of openings 20 are provided in the

flange 13 on a diameter concentric with the axis of the table 2. These openings 20 provide means through which water or other fluid may be directed as illustrated in Figure 3 to scavenge the annular passage 16 between the table 2 and the surface 18. The deflecting surface 17 of the wall 15 is positioned out beyond the diameter of the series of openings 20 so that fluid thrown from the table 2 is not directed upwardly through the openings 20. A divided flow is thus avoided.

If desired the base 1 of the rotary machine may be provided with tapered openings or drains 21 to carry off the scavenging fluid and foreign matter. It will be obvious from the foregoing that the passage 22 is completely free and unrestricted and is of such proportions as to prevent any substantial accumulation of foreign matter which might make its way into the chamber 9 within the rotary machine.

This is accomplished by mounting the guard ring 11 directly upon the base 1 and by not supporting the same from the rim 7 of the base.

In the modification of my invention as illustrated in Figure 4, the ring member 51 is provided with an annular passage 52 from which ports 53 are formed leading into the annular chamber 54 formed between the guard member and the rotary table. A scavenging fluid, such as water, or steam, may be admitted into this annular passage 52 from an inlet conduit 55. The ports 53 direct the scavenging fluid into the annular chamber 54, thereby cleansing the same of foreign matter. A valve 56 is mounted in the conduit 55 at such location as may be convenient for the operation by one of the workmen or the driller.

In this modification of my invention the deflecting surface 57 extends above and below the upper and lower surfaces, respectively, of the flange 58, thereby serving to downwardly deflect any radial flow of foreign matter from either above or below the flange 58. The curved portion 59 of the surface 57 acts to prevent any undesirable upward flow of foreign matter. The ribs 60 of the flange 58 are provided for stiffness and the scavenging openings 61 are located between the ribs 60.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claims.

I claim:

1. In a device of the class described for use in conjunction with the table of a rotary machine, the combination of a stationary guard member having a depending wall surrounding said table and a flange overlapping a portion of the upper surface of said table, and a series of downwardly directed scavenging openings in said flange positioned adjacent the outer periphery of said table.

2. As an article of manufacture, a guard member for the table of a rotary machine comprising a horizontal flange provided with a central opening, a vertical wall depending from said flange, and a plurality of scavenging openings in said flange arranged on a circle positioned intermediate the central opening and the depending wall.

3. In a device of the class described for use in conjunction with the table of a rotary machine, a stationary guard member having a flange portion overlapping a portion of the upper surface of the table, a plurality of openings in said guard member through which fluid may be directed to wash off that part of the rotary machine adjacent the upper outer periphery of the table, and means operatively associated with the flange portion adapted to intercept foreign matter thrown from the table by centrifugal force.

4. In a device of the class described for use in conjunction with the table of a rotary machine, a stationary ring member having a flange overlapping a portion of the upper surface of the table, an annular depending wall on said ring member encircling said table, and a plurality of openings in said ring member through which fluid may be introduced to scavenge the annular space between the table and the depending wall.

5. In a device of the class described for diverting fluid thrown from the table of a rotary machine, a stationary ring member having a flange overlapping a portion of the upper surface of the table, an annular depending wall on said ring member encircling said table, said flange having a series of openings positioned adjacent the table periphery, through which openings fluid may be directed downwardly to scavenge the annular space between the table and the depending wall.

6. As an article of manufacture, a guard ring for the table of a rotary machine having an annular depending wall and an inwardly extending annular flange, a series of scavenging openings in said flange positioned on a diameter concentric with said wall, the inner surface of said depending wall being positioned radially outwardly from said series of openings.

7. In a device of the class described for use in conjunction with the table of a rotary machine, a stationary ring member having an annular depending wall encircling said table, a series of openings in said guard member concentric with said table through which fluid may be directed to scavenge the annular space between the table and the depending wall, the inner surface of said depending wall being positioned radially outwardly from said openings and adapted to deflect fluid thrown outwardly from the table.

8. As an article of manufacture, a guard ring for the table of a rotary machine, the ring having an annular flange, the upper side of the flange being roughened to provide a secure footing for workmen, a cylindrical wall depending from the outer periphery of said flange, the under surface of said flange and the inner surface of said wall being substantially smooth and free from ribs or obstructions, the intersection of said surfaces being rounded off by an annular curved portion of the ring, the flange having a series of scavenging openings positioned on a circle concentric with but of lesser diameter than the inner cylindrical surface of said wall.

9. In combination, a rotary machine having a base provided with an upstanding rim, a table rotatably supported on the base and having an annular skirt cooperating with the rim to form a chamber within the rim, a stationary ring member positioned adjacent the periphery of the table and provided with a flange overlapping a portion of the table, a depending wall on said ring member encircling the table skirt to define an annulus therebetween, said ring member being supported from the base of the rotary machine independently of the upstanding rim, whereby the space below said annulus is left entirely free and unrestricted, and a plurality of openings in said ring member through which fluid may be introduced to scavenge said annulus.

10. In a device of the class described for use in

conjunction with the table of a rotary machine, a ring member having an inwardly extending flange and a downwardly extending wall, the flange overlapping a portion of the top of the table and the wall encircling the table to define an annulus, an annular passageway in said ring member having ports communicating with said annulus, inlet means associated with said passageway through which fluid may be introduced, said ports acting to direct the flow of fluid to scavenge said annulus.

11. In a device of the class described for use in conjunction with the table of a rotary machine, a ring member having an inwardly extending flange overlapping a portion of the table, and a downwardly extending wall encircling said table, the flange acting to confine lateral flow of fluid from said table, and the wall acting to deflect the lateral flow of fluid downwardly, a passageway in said ring member having ports communicating with the annulus between the table and said wall, inlet means associated with said passageway through which scavenging fluid may be introduced, said ports acting to direct the flow of scavenging fluid to clean out said annulus.

12. In a device of the class described for use in conjunction with the table of a rotary machine, the combination of a stationary guard member having a flange adapted to overlap a portion of the upper surface of the table, a series of downwardly directed scavenging openings in said guard member positioned adjacent the outer periphery of the table, and a cooperating wall secured to said flange and adapted to deflect radial flow of foreign matter both above and below the flange.

13. In a device of the class described for use in conjunction with the table of a rotary machine, the combination of a stationary guard ring having a flange adapted to overlap a portion of the upper surface of the table, a plurality of openings in said guard ring positioned adjacent the outer periphery of the table, an annular wall on said guard ring encircling said table and adapted to divert radial flow of foreign matter on said flange downwardly through said openings.

JOHN D. SPALDING.