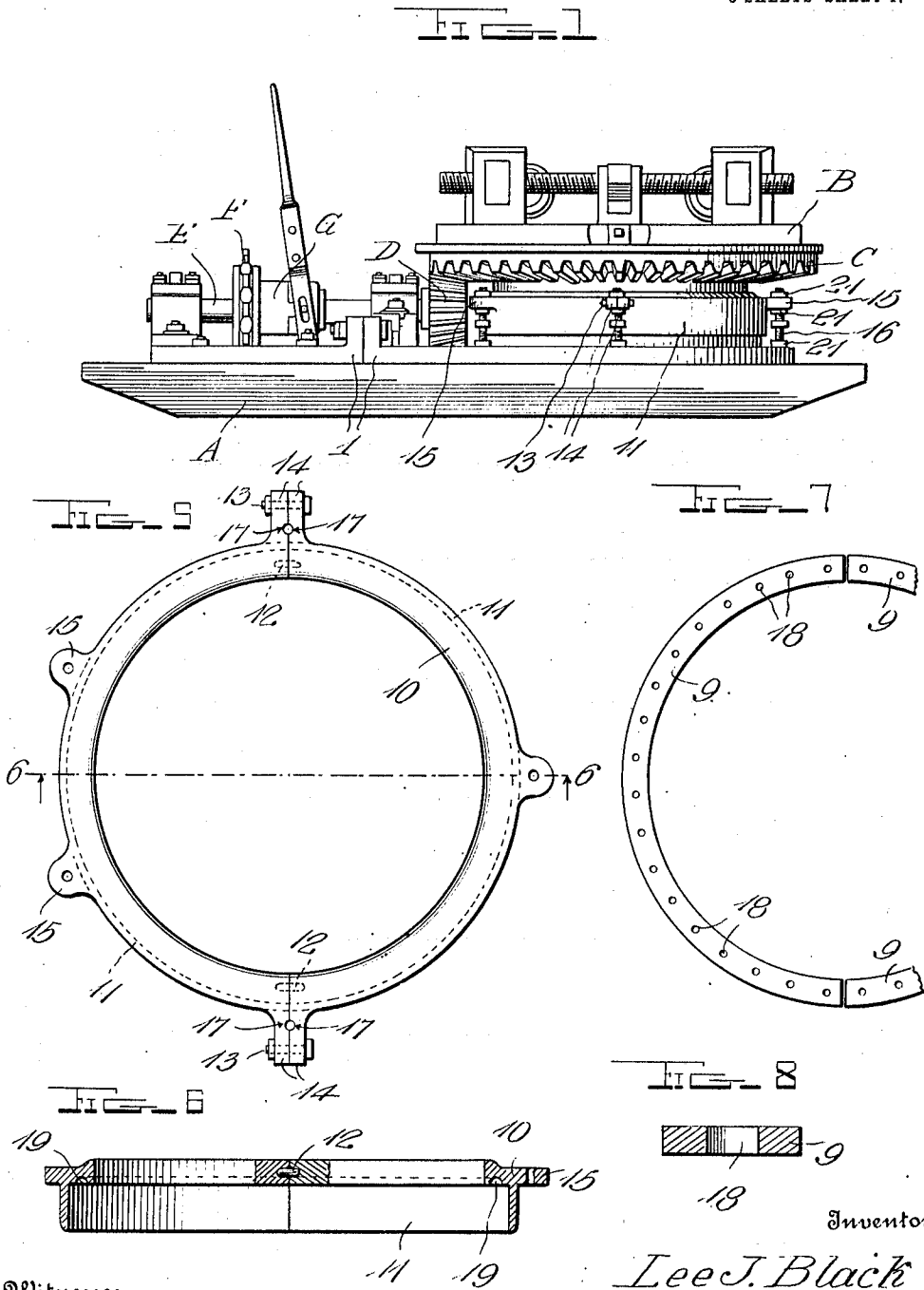


L. J. BLACK.
 ROTARY DRILLING MACHINE.
 APPLICATION FILED JULY 6, 1912.

1,053,777.

Patented Feb. 18, 1913.

3 SHEETS-SHEET 1.



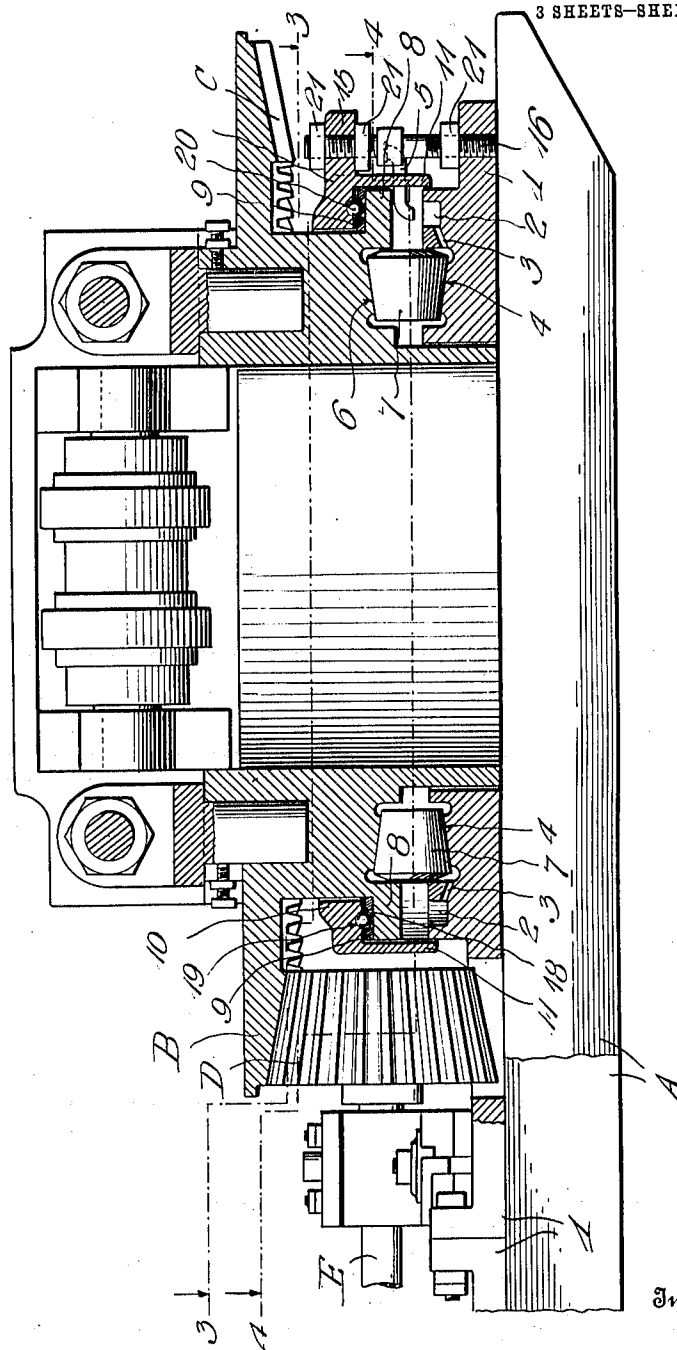
Witnesses

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 Attorney

1,053,777.

3 SHEETS—SHEET 2.



Inventor

Witnesses

S. M. McCall,

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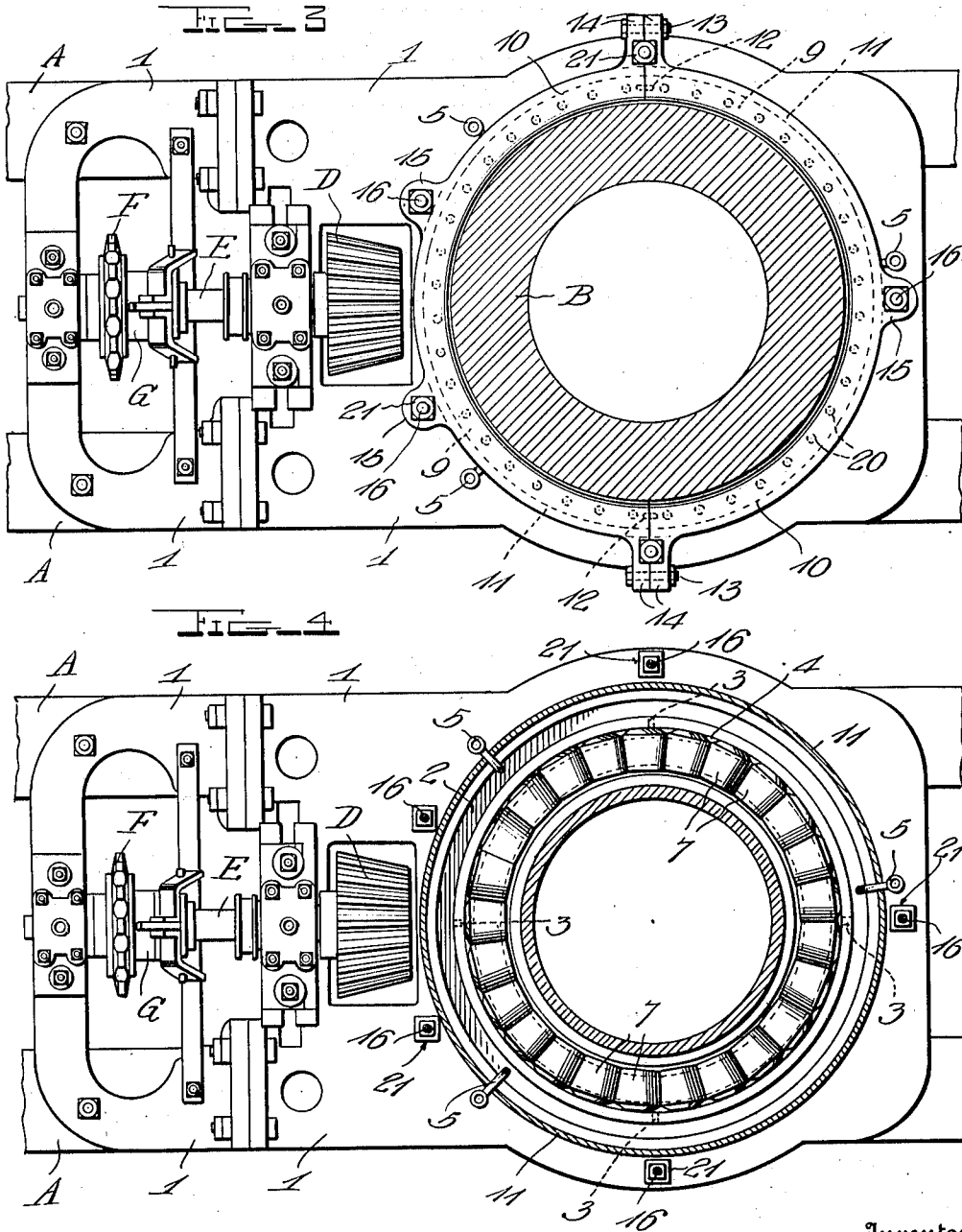
By *A. B. Wilson & Co*
Attorneys

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Inventor

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UNITED STATES PATENT OFFICE.

LEE J. BLACK, OF BEAUMONT, TEXAS.

ROTARY DRILLING-MACHINE.

1,053,777.

Specification of Letters Patent.

Patented Feb. 18, 1913.

Application filed July 6, 1912. Serial No. 708,035.

To all whom it may concern:

Be it known that I, LEE J. BLACK, a citizen of the United States, residing at Beaumont, in the county of Jefferson and State of Texas, have invented certain new and useful Improvements in Rotary Drilling-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to rotary drilling machines for boring oil and other wells and characterized by a rotary turn table and having gripping jaws adapted for engagement with a tube or other tool to be driven such as is shown in my application Serial No. 588,175 filed October 20, 1910.

One object of the invention is to provide means whereby the life of the rotary will be prolonged, the construction simplified and friction and noise reduced.

Another object is to provide simple and effective means whereby the table actuating pinion and rack will be firmly held properly in mesh thereby preventing wear of the teeth of the gears and lifting of the ring.

Another object is to provide simple and effective means for connecting the table and base and for causing a steady, easy running motion of the table with a minimum of friction and noise.

With these and other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings: Figure 1 is a side elevation of a rotary equipped with these improvements; Fig. 2 is a longitudinal vertical section thereof; Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2; Fig. 4 is a similar view taken on the line 4—4 of Fig. 2; Fig. 5 is a detail plan view of the connecting ring. Fig. 6 is a vertical section taken on the line 6—6 of Fig. 5. Fig. 7 is a plan view of the ball carrying ring or spacer with parts broken out for convenience in illustration; Fig. 8 is a vertical section thereof.

In the embodiment illustrated the bed frame or base 1 of the machine is cast in two separable sections similar to that shown in my former application and which are secured together by suitable fastening elements. This bed frame is shown supported

on sills A and supports a turn table B which will not be described in detail as it forms no part of the present invention and is clearly shown in the application above referred to, said table being provided with a circular rack C on its lower face which meshes with a drive pinion D by means of which the table is rotated. This pinion is fast on a shaft E having a sprocket wheel F through which motion is imparted to the shaft from any suitable source of power. A clutch G is also provided for disconnecting the sprocket wheel when desired.

The base 1 is provided with an annular groove 2 designed as an oil container and leading from which are a plurality of inclined passages 3 which communicate with a cone race 4 and supply oil thereto to prevent cutting and wearing of the walls of said race. A plurality of oil supply spouts or pipes 5 are arranged at intervals around the machine through which oil may be supplied to the groove 2 during the operation of the drill or at any other time. The table B is provided in its lower face with a cone race 6 adapted to register with the race 4 in the base member 1 and in the race so formed a plurality of cones 7 are revolvably mounted as shown clearly in Figs. 2 and 4. This table B is provided with an annular flange 8 arranged adjacent the cone race therein and which projects beyond said race and forms a seat on its upper face for an annular ball carrying ring 9 which also performs the function of a spacer for a purpose to be described.

A connecting ring 10 encircles the table B above the ball carrying ring 9 and has a depending annular skirt 11 which extends down over the upper end of the base 1 thereby forming a protective casing for the cone race. This ring 10 is preferably constructed in semi-circular sections connected by dowel pins 12 and by bolts 13 which pass through apertured ears 14 formed on the ends of the ring sections as is clearly shown in Fig. 5. This connecting ring 10 is also provided with a plurality of laterally extending apertured lugs or ears 15 for the passage of connecting bolts 16 which secure said ring firmly to the base 1 (see Figs. 1 and 2). The apertured ears 14 of the ring sections are also provided on their meeting edges with registering notches 17 which form bolt holes for the passage of the bolts 16 therethrough.

The ball carrying spacer ring 9 is provided with a plurality of seats 18 in which bearing balls 20 are seated and extend into a race 19 formed in the lower face of the connecting ring 10 as is clearly shown in Figs. 2 and 6, said balls being designed to permit the easy turning of the table with a minimum amount of friction. The ball ring or spacer 9 is also shown made in sections and it may be constructed of any suitable or desired material.

As shown five bolts 16 are employed but any desired number may be used, said bolts being threaded at their opposite ends and passing through the lugs or ears 15 and 14 of the ring 10 and into threaded sockets in the base 1. Jam nuts 21 are arranged on said bolts above and below the lugs 14 and 15 of the ring 10 and above the base 1 whereby said connecting ring 10 is securely locked to said base and the table thereby firmly held in operative position and all danger of separation thereof from the base 1 is prevented.

The depending annular skirt 11 of the connecting ring 10 closely engages the outer face of the base 1 having a machine fit whereby the accumulation of mud and grit in the oil groove and cone race is prevented thereby reducing wear on both the base and table while the rotary is in operation. This connection of the table and base firmly holds the rack C of the table in mesh with the pinion D while the rotary is under strain and the pinion and gear are securely held in alinement.

As before pointed out the bearing balls arranged between the connecting ring and the table prevent all friction and permit the table to turn with a free and easy motion.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as claimed.

I claim as my invention;

1. A rotary drilling machine including a supporting base having a cone race, a turn table mounted to rotate on said base and having a cone race registering with the cone race in said base, an annular flange extending laterally from said table, a connecting ring encircling said table above said flange and having a depending skirt overlapping the upper end of said base, bearing balls between said flange and ring, and means connecting said ring and base.

2. A rotary drilling machine including a supporting base having a cone race, said base also having an oil groove arranged adjacent said cone race and communicating therewith, means for supplying oil to said groove, a turn table mounted to rotate on said base and having a cone race registering with the cone race in said base, an annular flange extending laterally from said table, a connecting ring encircling said table above said flange and having a depending skirt, bearing balls between said flange and ring, and means for detachably connecting said ring and base.

3. A rotary drilling machine including a supporting base having a cone race, a turn table mounted to rotate on said base and having a cone race registering with the cone race in said base, an annular flange extending laterally from said table, a connecting ring encircling said table above said flange and having a depending skirt overlapping the upper end of said base, bearing balls between said flange and ring, apertured ears extending laterally from said ring, bolts engaging said ears and the sockets in said base, and jam nuts for locking said bolts in operative position.

4. A rotary drilling machine including a supporting base having a cone race, a turn table mounted to rotate on said base and having a cone race registering with the cone race in said base, an annular flange extending laterally from said table, a connecting ring encircling said table above said flange and having a depending skirt overlapping the upper end of said base, an annular spacing member arranged between said flange and ring and provided with a plurality of ball seats, balls positioned in said seats, said connecting ring having a ball race in its inner face registering with the seats in said spacing member, and means connecting said ring and base.

5. A rotary drilling machine including a supporting base, a turn table rotatably mounted thereon, anti-friction elements arranged between said base and table, a ring for connecting said table and base composed of detachably connected sections having a depending annular skirt near its outer edge and a ball race in its inner face, bearing balls in said race and means for detachably connecting said ring and base.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LEE J. BLACK.

Witnesses:

CARR P. COLLINS,
JOHN L. BAKER.