Dec. 26, 1933. G. E. BEHNKE 1,940,839

ROLLER BIT

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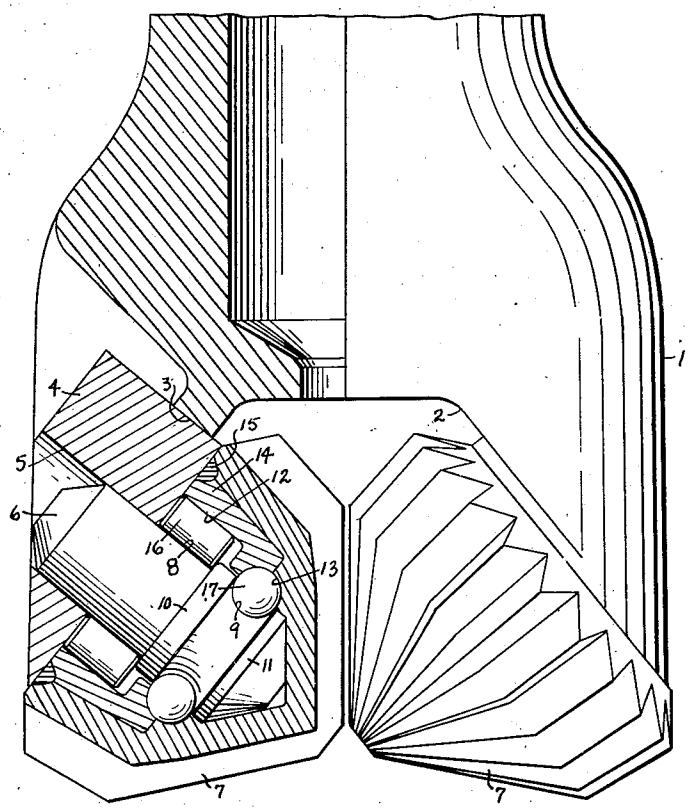


FIG 1.

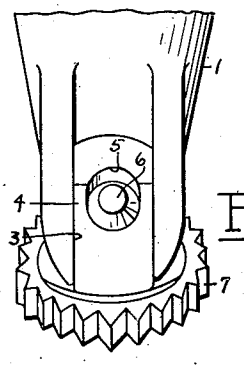


FIG 2.

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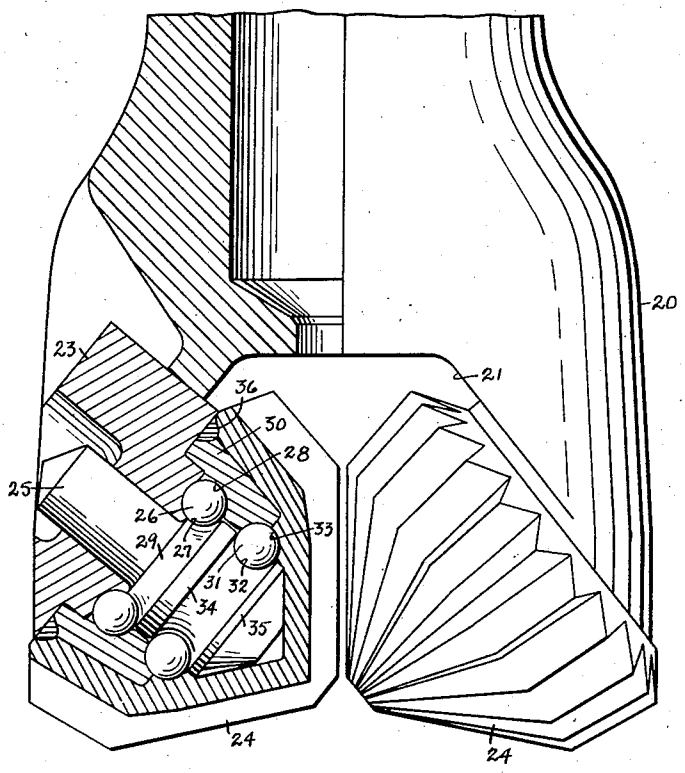


FIG 3.

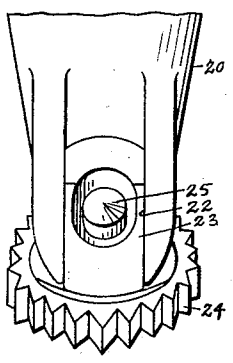


FIG 4.

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UNITED STATES PATENT OFFICE

1,940,839

ROLLER BIT

Guy E. Behnke, Houston, Tex., assignor to Reed Roller Bit Company, Houston, Tex., a corporation of Texas

Application November 21, 1932
Serial No. 643,591

8 Claims. (Cl. 255—71)

This invention relates generally to deep well drilling apparatus and specifically to roller bits.

It has for its object the provision of new and improved bearings for roller cutters, and will be found particularly useful in that conventional type of roller bit including a head having a substantially V-shaped cutter recess in the bottom thereof and substantially conical cutters in said recess.

In the accompanying drawings one preferred embodiment of the invention is illustrated by Figs. 1 and 2, Fig. 1 being a fragmentary sectional elevation of the bit, and Fig. 2 a fragmentary elevation taken at a right angle to Fig. 2; and another embodiment of the invention by Figs. 3 and 4, Fig. 3 being a fragmentary sectional elevation of the bit and Fig. 4 a sectional elevation thereof taken at a right angle to Fig. 3.

Referring first to Figs. 1 and 2, the bit head is indicated at 1. It has in its lower end a substantially V-shaped cutter recess 2, the walls of which have downwardly opening slots 3 for the reception of cutter supports 4. The cutter supports 4 are removably welded in the slots 3 and have openings 5 in which the cutter pins 6 are removably welded. Rotataby mounted on the cutter pins 6 are the substantially conical roller cutters 7. Each cutter is mounted on its pin by means which will now be described. The pin 6 has therein a roller raceway 8 and a ball raceway 9. The roller raceway 8 is defined by the body of the pin 6, the annular flange 10 of the pin and the adjacent wall of the support 4. The raceway 9 is defined by the body of the pin and the annular flanges 10 and 11.

The cutter 7 has a roller raceway 12 and a ball raceway 13. The roller raceway 12 is defined by the ring 14 and the ball raceway 13 is defined by a portion of the inner wall of the cutter and the ring 14. The rim of the cutter 7 and the adjacent edge of the ring 15 are beveled to form an annular space whereby the ring may be removably welded in the cutter as indicated at 15.

In the roller raceways 8 and 12 are the rollers 16 and in the ball raceways 9 and 13 are the balls 17. The rollers 16 serve to take the major portion of the load which is at the base of the cutter and the balls 17 serve to rotatably lock the cutter 7 on the pin 6.

Referring now to Figs. 3 and 4, the bit head is indicated at 20, its V-shaped recess at 21, the slots in the walls of said recess at 22, one of the supports at 23 and the cutters at 24.

As in the construction disclosed by Figs. 1 and 2, the support 23 is removably welded in the slot 22 and the pin 25 is removably welded in the support 23. The balls 26 are disposed in raceways 27 and 28, the former being formed by the support 24 and the rounded portion 29 of the pin 25 and the latter being formed by the ring 30. Another set of balls is disposed in raceways 32 and 33, the former being formed by the body of the pin 25 and the annular flanges 34 and 35 and the latter being formed by the inner wall of the cutter 24 and the pin 30. The ring 30 is removably welded in the cutter 24 as indicated at 36.

The many advantages of this new and improved bearing construction will be apparent to those skilled in the art.

The invention is not limited to the preferred embodiments herein disclosed.

I claim:

1. A roller bit having a support, a pin removably secured to said support, and a cup-shaped cutter enclosing said pin, said pin having a raceway, said cutter having a raceway, balls in said raceways to rotatably lock said cutter on said pin, said cutter raceway including a ring that is removable to permit the insertion of said balls, said support serving to prevent movement of said ring out of its active position when said pin is on said support.

2. A pin having a raceway, a cutter on said pin and having a raceway, balls in said raceways to rotatably lock said cutter on said pin, said cutter raceway including a removable ring to permit the insertion of said balls.

3. A pin having a raceway, a cutter on said pin and having a raceway, and balls in said raceways to rotatably lock said cutter on said pin, said cutter raceway having a removable element to permit the insertion of said balls.

4. A pin having a pair of raceways, a cutter on said pin and having a pair of raceways, said cutter raceways including a ring, and balls in said raceways, the balls between one of said pin raceways and one of said cutter raceways serving to rotatably lock said cutter on said pin, said ring being removable to permit the insertion of said locking balls.

5. A pin having a pair of raceways, a cup-shaped cutter on said pin and having a pair of raceways, said cutter raceways including a ring, rollers between one of said pin raceways and one of said cutter raceways, and balls between the other of said pin raceways and the other of said cutter raceways, said balls serving to rotatably lock said cutter on said pin, said ring being removable to permit the insertion of said balls.

6. A pin having a raceway, a cup-shaped cutter

enclosing said pin and having a raceway, balls in said raceways to rotatably lock said cutter on said pin, said cutter raceway including a removable ring to permit the insertion of said balls, the rim of said cutter and the adjacent edge of said ring being beveled to form an annular welding space.

7. A roller bit having a head; a support carried by said head; a cutter pin removably secured in said support and having a pair of annular flanges; rollers on said cutter between said support and that one of said flanges adjacent thereto; balls between said flanges; a cutter enclosing said pin; a ring removably secured in said cutter and surrounding said rollers; said ring having an inwardly projecting annular flange to engage said balls; and said cutter having an inner surface to engage said balls.

8. A roller bit having a head; a support carried by said head; a pin removably secured in said support; said pin having a pair of annular flanges; said support having an annular flange; balls between said support and the adjacent annular flange of said pin and surrounding the said annular flange of said support; balls between said annular flanges of said pin; a cutter enclosing said pin; a ring removably secured in said cutter and surrounding said first mentioned balls and having an inwardly projecting annular flange to engage said last mentioned balls; said cutter having an inner surface to engage said second mentioned balls.

GUY E. BEHNKE.