Oct. 6, 1931. L. E. ZERBE 1,825,930

LOCKING BAR FOR BUSHINGS

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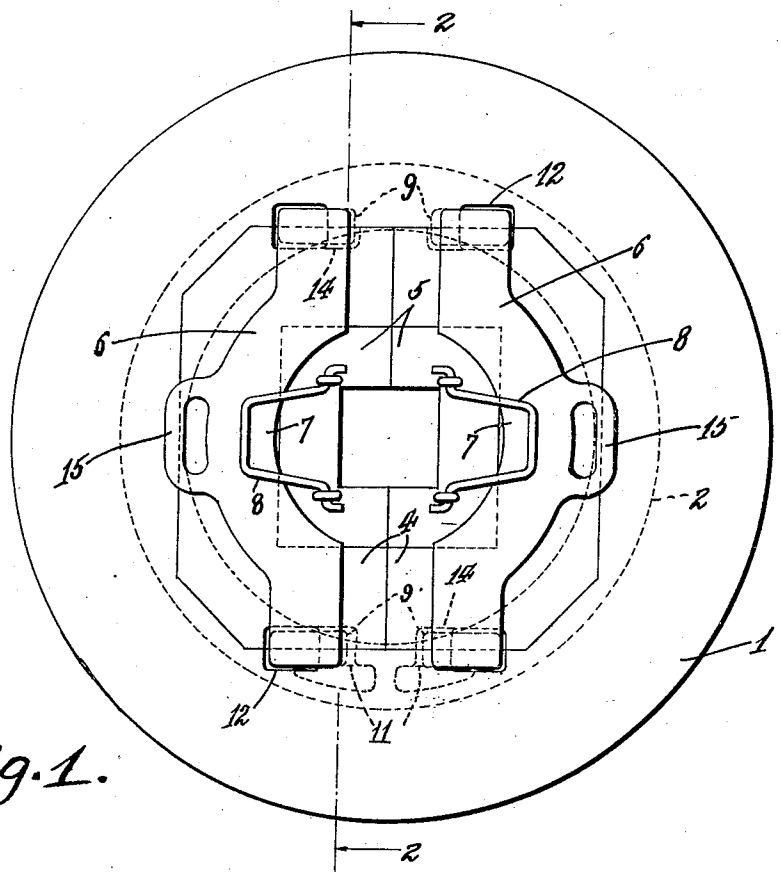


Fig. 1.

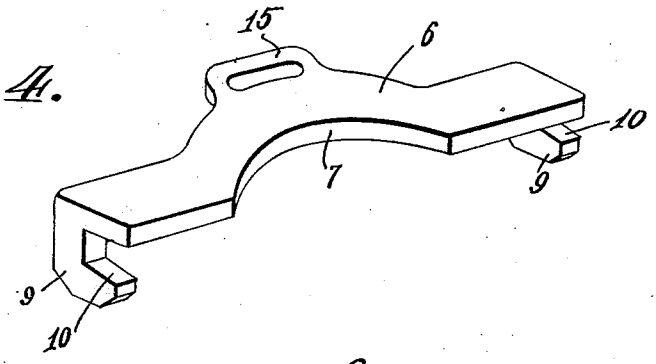


Fig. 4.

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Fig. 2.

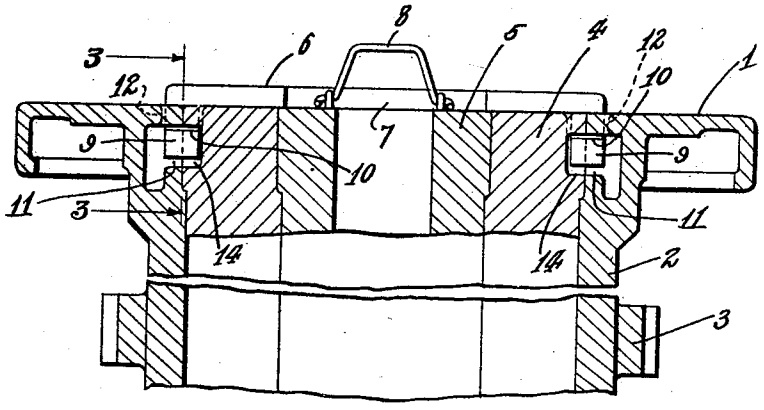
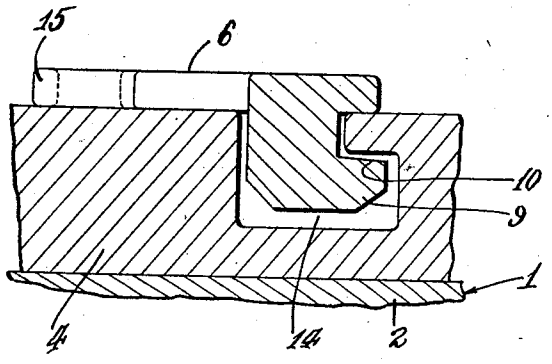


Fig. 3.



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UNITED STATES PATENT OFFICE

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LOCKING BAR FOR BUSHINGS

Application filed October 20, 1930. Serial No. 489,928.

This invention relates to rotary well drilling equipment, and more particularly to locking bars for the bushings of such rotary machines.

This invention is addressed to an improvement over the structure illustrated in the W. E. Davidson Patent No. 1,496,256 of June 3, 1924, for Rotary drilling equipment. In the structure disclosed in the above identified patent, the locking bar straddles the bushing and is held in position in L-shaped slots formed solely in the face of the rotary table. Mounting of the locking bar as illustrated in the patent aforesaid limits the opening through the rotary table in which the bushing is mounted, and it is the principal object of this invention to provide a locking bar which may be used for holding the bushings in a rotary machine which does not restrict the size of the opening formed through the rotary table for the receipt of such bushings allowing the use of bushings of greater size in relation to the rotary table and consequently allowing the rotary table to handle drill stems, casings or the like of greater diameter.

Another object of this invention is to provide a locking bar for a bushing which includes an L-shaped slot formed part in the rotary table and part in the split table bushing, the slots being formed in the table and in the bushing in a manner to align when assembled, and the L-shaped slots being adapted to receive the hooks or locking lugs which are formed integral with the locking bar.

Another object of this invention is to provide a locking means for locking the split table bushing to a rotary table of a rotary machine which is so formed that the hooks or lugs of the locking bar act in holding the bushings in position as keys directly latching the split table bushing to a rotary table rather than by holding the said bushing in position by means of a bar straddling the bushing.

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 drawings.

In the drawings:

Figure 1 is a plan view of a rotary machine illustrating a locking bar embodying my invention as adapted thereto.

Figure 2 is a fragmental sectional view of the rotary machine taken substantially on the line 2—2 of Figure 1.

Figure 3 is a fragmental sectional view on an enlarged scale taken substantially on the line 3—3 of Figure 2.

Figure 4 is a perspective view of the locking bar embodied in my invention.

In the preferred embodiment of my invention illustrated in the accompanying drawings, 1 indicates a rotary table which may be of any suitable or desirable form of construction, many types of which are common in the art. The rotary table includes a downwardly depending flange or skirt 2 defining an opening axially of the rotary table. The rotary table is supported upon any suitable or desirable form of means for supporting the said table in rotatable position. The rotary table is driven by any suitable or desirable means such, for example, as the gear 3 which is secured to the skirt 2. The gear 3 is herein illustrated as of the spur gear type, but this invention is not limited to this type of rotary table or drive and is equally well adaptable for use in connection with the common form of rotary machine wherein the table is driven through beveled gears.

The opening through the rotary table is formed polygonal in shape so that the rotary table drive bushing 4 is driven as the rotary table is driven. The rotary table drive bushing 4 is fitted into the axial opening of the rotary table 1. Fitted within the split drive bushing 4 is a drill stem bushing 5 which is likewise a split bushing and fits into a further square or other polygonal opening defined by the split drive bushing.

During the drilling of a well, particularly during the feeding of the drill stem therein, it often occurs that the drill stem encounters an obstruction which causes an upheaval of the drill stem. The drill stem is also at times heaved upwardly in the well due to

the sudden development or release of gas pressure from within the oil well. Such upheaval of gas pressure often results in the dislodgement of the drill stem bushing 5 or the table drive bushing 4.

In withdrawing the drill stem from the hole for the purpose of sharpening or replacing the bit carried thereby, it often occurs that the drill stem bushing 5 and the split drive bushing 4 are displaced by engagement of the drill stem during its withdrawal. In order to firmly hold the said bushings in place and to allow the formation in the table of the maximum sized opening for the split table bushing 4 and consequently for the drill stem bushing 5, I prefer to provide the following construction:

A lock bar 6 is provided which is bowed outwardly at its central portion 7 to permit access to the drill stem bushings 5 and to accommodate for the handles 8 of such drill stem bushings. The hold-down bar 6 is provided at its opposite ends with downwardly depending hooks 9 which are formed with tapered hook faces 10.

Formed from within the inner periphery of the skirt 2 of the rotary table 1 is a horizontal slot 11 which is reached through a vertically extending slot 12 formed from the upper face of the rotary table. The slot thus formed is approximately one-half of an L-shaped slot formed to accommodate the hooks 9 of the locking bar 6. The other half of the L-shaped slot is formed in a corresponding manner from the outer periphery of the split drive bushing 4 as indicated at 14. The hooks 9 of the locking bar 6 fit within the L-shaped slot formed and act as a key preventing the relative displacement of the split drive bushing 4 and the rotary table 1. The bar 6 which connects the hooks 9 extends across the opening of the rotary table 1 and over the corners of the split drill stem bushings 5, holding the split drill stem bushing 5 from being displaced vertically relative to the split drive bushing 4.

As set forth in the Davidson patent above referred to, the hook faces 10 of the hooks 9 are formed inclined so as to permit the hooks 9 being rotated out of engaging position as the handle 15 of the locking bar 6 is raised.

In holding the split drive bushings 4 and the split drill stem bushings 5 assembled from relative displacement relative to the rotary table 1, two such locking bars 6 are employed.

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 rotary drilling equipment, the combination of a rotary table, a split bushing loosely mounted in the central opening of said table, the table and the bushing being provided with complementary slots defining an L-shaped lock slot, and a locking bar extending over the bushing and provided at either end with depending hooks adapted to loosely fit in the L-shaped slots to key the bushing to the rotary table.

2. In a rotary drilling equipment, the combination of a rotary table, a split drive bushing inserted in the central opening of said table, a split drill stem bushing inserted in said drive bushing, the rotary table and the split drive bushing having formed in their adjacent surfaces complementary slots defining a plurality of L-shaped slots and locking bars provided at either end with hooks fitting in said slots, and the locking bar extending over the central opening of said table from said slots.

3. In a rotary drilling equipment, the combination of a rotary table, a drive bushing fitted in the central opening of said table, a locking bar provided at its opposed ends with hooks and formed bowed at its central portion, and being provided with a handle at the bowed portion, the rotary table and the split drive bushing being formed with complementary slots defining L-shaped slots into which the hooks formed at the ends of said locking bar fit to key the split drive bushing to the rotary table.

Signed at Torrance, Calif., this 15th day of October, 1930.

LEWIS EMANUEL ZERBE.