March 2, 1943. O. L. DERRICK 2,312,804

GUIDE FOR KELLY BARS

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Fig. 1.

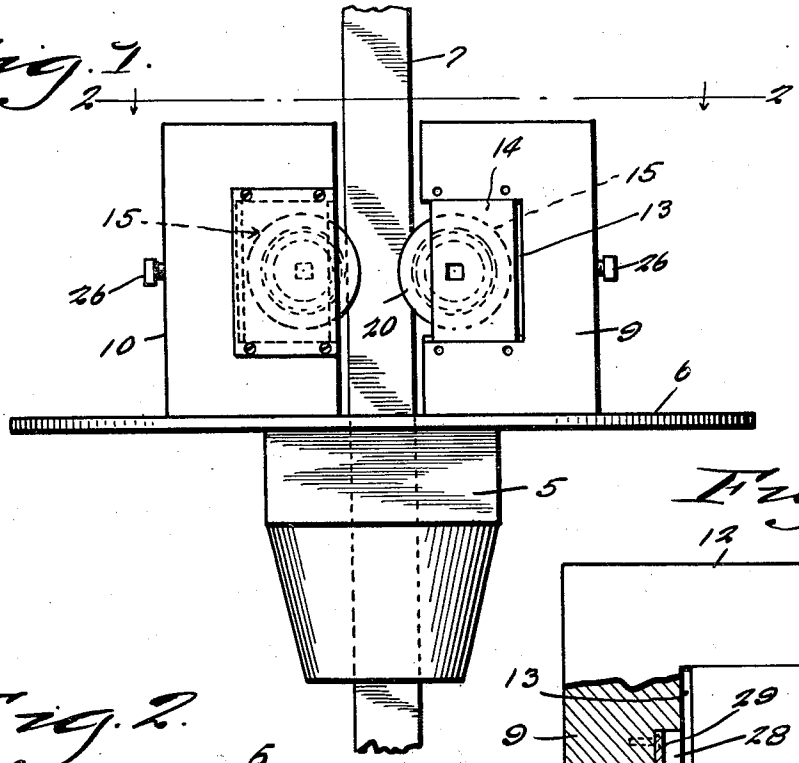


Fig. 5.

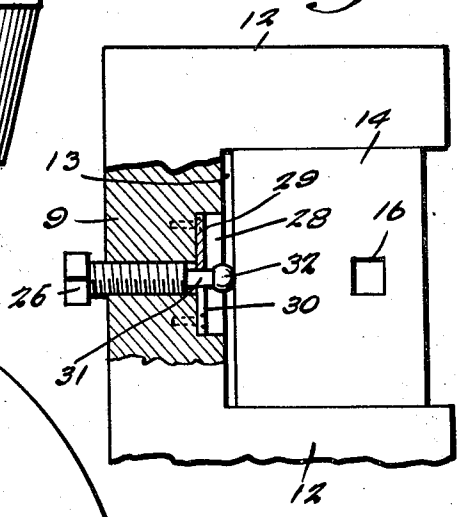
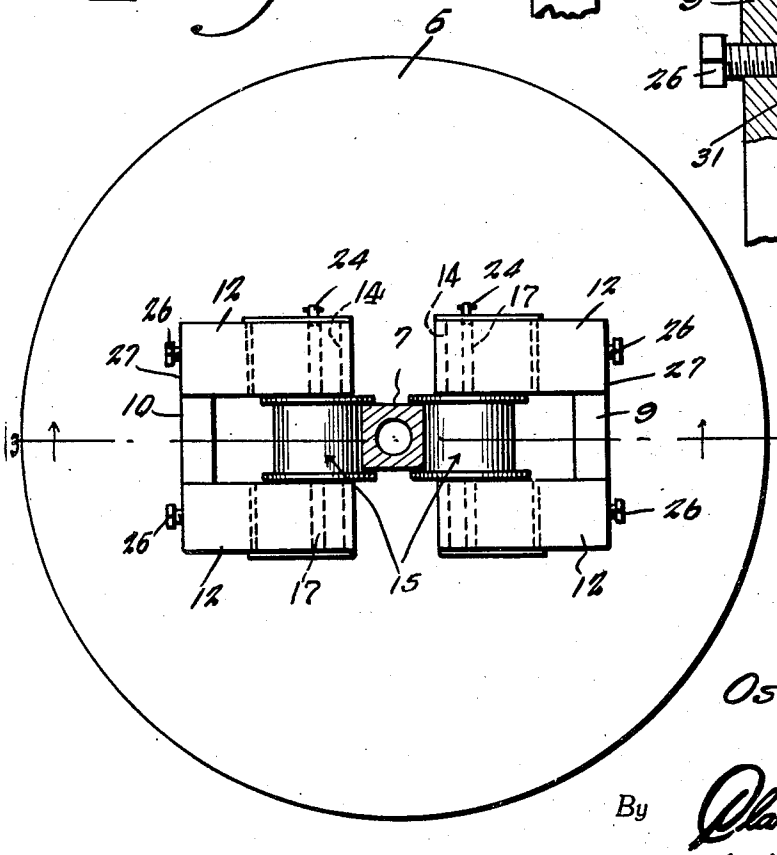


Fig. 2.



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Fig. 3.

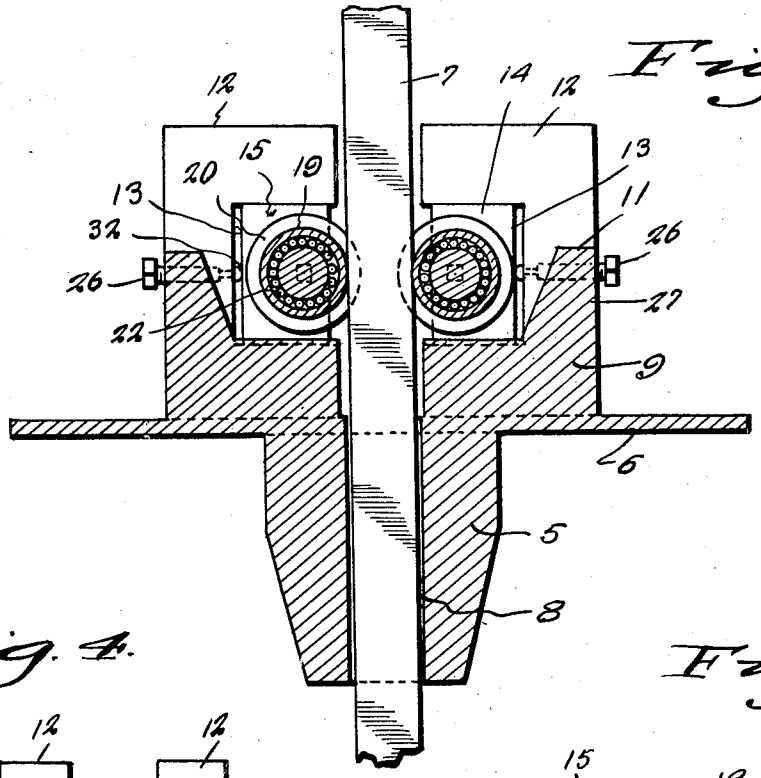


Fig. 4.

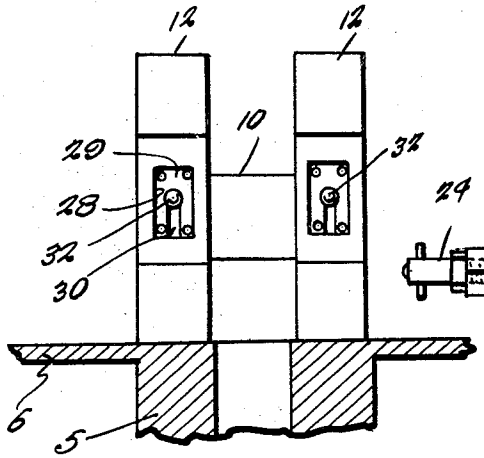


Fig. 7.

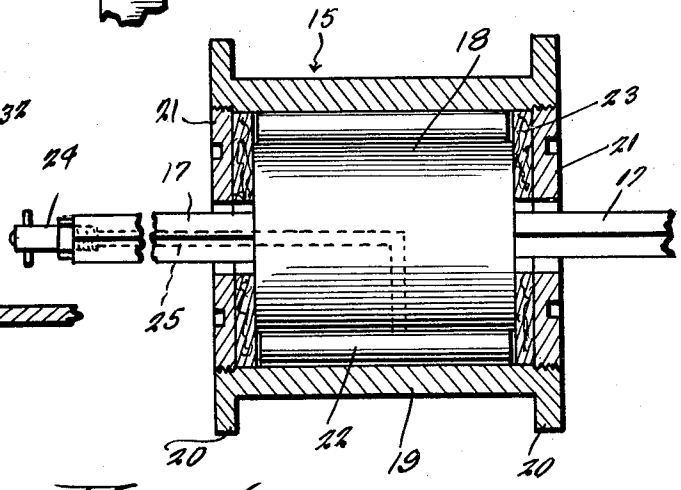
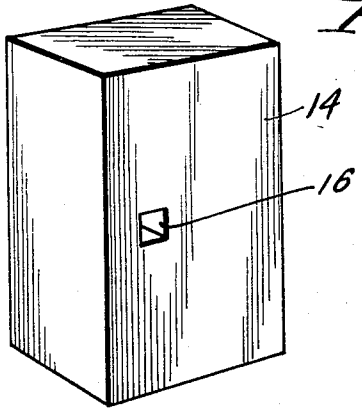


Fig. 6.



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Fig. 8.

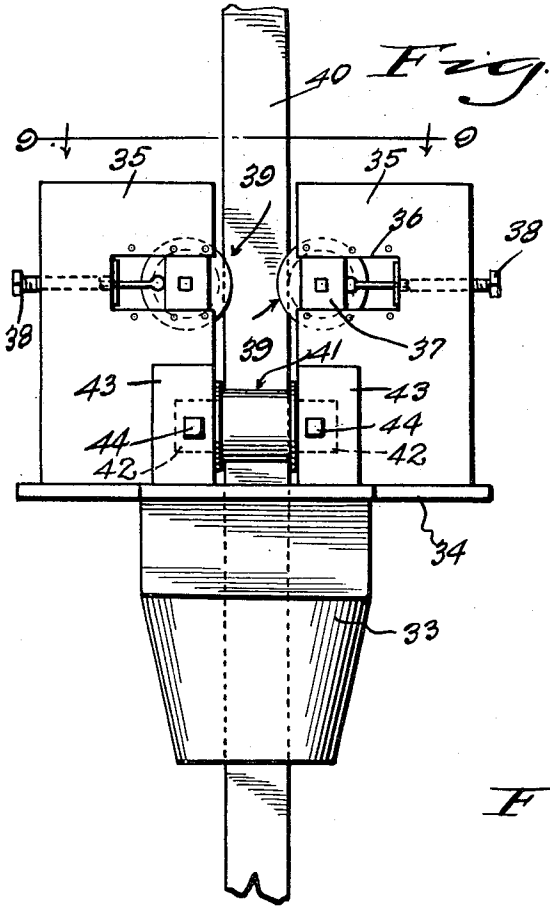


Fig. 9.

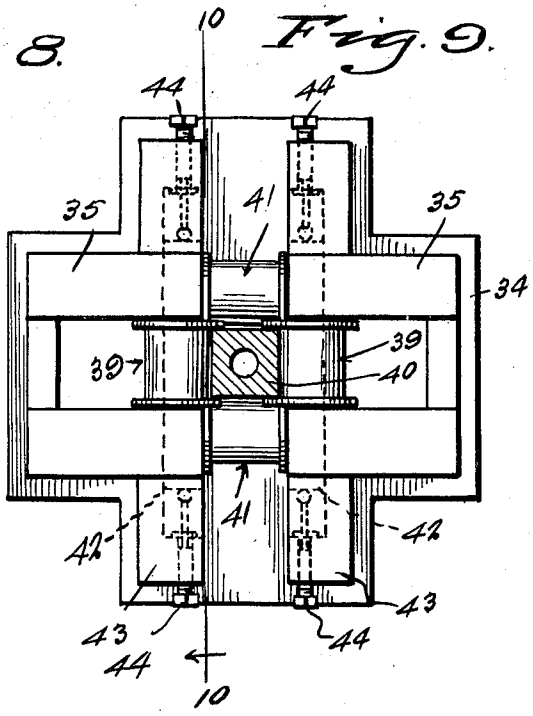
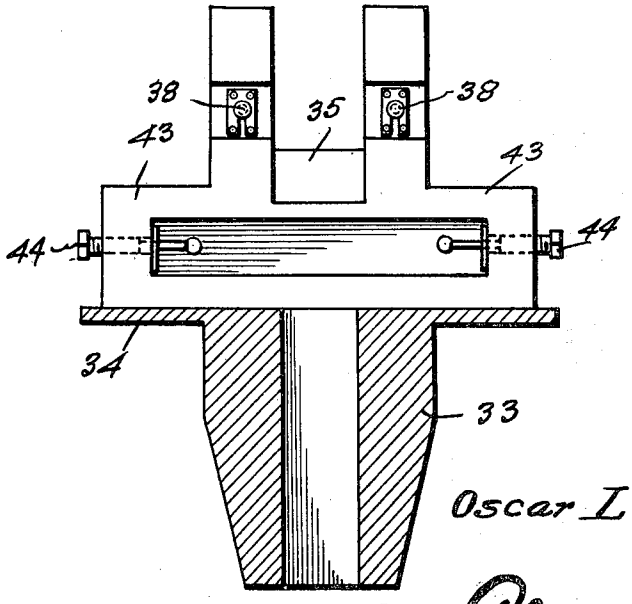


Fig. 10.



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UNITED STATES PATENT OFFICE

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GUIDE FOR KELLY BARS

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Continuation of application Serial No. 263,997, March 24, 1939. This application February 13, 1940, Serial No. 318,767

12 Claims. (Cl. 308—6)

This application is a continuation of my application on Guide for Kelly bars, filed March 24, 1939, Serial No. 263,997.

This invention appertains to rotary well drilling apparatus, and more particularly to a roller guide for a Kelly bar.

In the operation of rotary well drilling equipment, particularly such as is used in the drilling of oil wells, it is the general custom to provide a drill stem with a driving bar or section which extends upwardly above the ground and which passes through a rotary table structure disposed to rotate in a horizontal plane, and through which the driving bar or section extends while in constant driving relation therewith. The driving bar or section, commonly known as a "Kelly bar," is usually square in cross section and extends through a bushing at the center of the rotary table, which bushing has a square opening so that the driving bar may be constantly rotated by the table, and, at the same time, the bar may have longitudinal movement relative thereto to permit the drill stem to be fed downwardly as the drilling operation proceeds, or to be drawn upwardly when desired to properly adjust the drilling tool with relation to the earth formation being penetrated.

The principal object of the present invention is to provide a guide or bushing for the Kelly bar in the rotary table whereby friction will be reduced to a minimum, as well as a considerable amount of the wear that has occurred heretofore on the Kelly bar and guide bushing.

A further object of the invention is to provide for adjustment of the guide rollers rollers toward and from the axis of the guide to accommodate for Kelly bars of different sizes, as well as to take up for wear on the Kelly bar.

Other objects and advantages of the invention will become apparent from the following specification.

In the drawings:

Fig. 1 represents a side elevational view of the guide;

Fig. 2 is a plan view thereof with the Kelly bar in section on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section therethrough on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary detailed cross sectional view;

Fig. 5 is a fragmentary top plan view with a portion in section;

Fig. 6 is a perspective view of one of the slide blocks;

Fig. 7 is a longtudinal sectional view through one of the rollers;

Fig. 8 is a side elevation of a modified form of the invention;

Fig. 9 is a top plan view with the Kelly bar in section on the line 9—9 of Fig. 8; and

Fig. 10 is a vertical sectional view taken substantially on the line 10—10 of Fig. 9 with the rollers removed.

Referring to Figs. 1 to 7 of the drawings, the numeral 5 represents a bushing having a circumferential flange 6 for bearing upon and cooperation with the usual rotary table. Numeral 7 denotes the Kelly bar which is slidable through the square opening 8 of the bushing 5.

In carrying out the present invention, a pair of blocks 9—10 are suitably secured upon the plate 6 or formed integrally therewith. Each of these blocks is bifurcated as at 11 to define the side portions 12—12, and each of these side portions 12—12 is undercut as at 13 to define a slideway for the corresponding slide block 14. The slide blocks 14 are mounted in pairs in companion side walls adapted for supporting corresponding rollers 15 therebetween. Each of the blocks 14 is formed with a square opening 16 therein (Fig. 6) for receiving one of the corresponding square pintles 17 of the cylinder 18 of the roller 15.

The roller 15 is constructed of a sleeve 19 (Fig. 7) having circumferentially extending end flanges 20—20, the afore-mentioned cylinder 18, end plates 21—21 and the roller bearings 22 interposed between the cylinder 18 and the sleeve 19. The ends of the sleeve 19 are closed by end walls 21 screw-threaded into the ends thereof, with packing washers 23 interposed between the ends of the cylinder 18 and said end walls 21. The pintles 17 extend through enlarged openings in the end walls 21 and packing washers 23. One of the pintles 17 has a lubricating fitting 24 at the outer end thereof through which lubricant may be supplied to a duct 25 extending to the interior of the roller construction.

The blocks 14 and their rollers 15 are adjustable toward the Kelly bar 7 by adjusting screws 26, which adjusting screws are threaded through the back wall portions 27 of the blocks 9 and 10 as shown in Fig. 3.

As shown in Fig. 5, the inner side of each of the cut-out portions 13 of the side walls 12 has a recess 28 formed therein for receiving a detent plate 29 which is slotted inwardly from one edge thereof as at 30 and secured to the side wall by screws or the like. The adjusting screw

26 has a neck portion 31 movable through this slot 30, but the plate serves to prevent the screw from being entirely removed from the block 9 because of the presence of a head 32 on the neck 31. However, by screwing the adjusting screw entirely to its innermost extent, the plate 29 can be removed easily, after which the adjusting screw 26 can be unscrewed and removed outwardly.

The rollers 15 can be adjusted inwardly so that the flanges 20 thereof will overlap the Kelly rod 7, as shown in Fig. 3, and serve to guide the same in a definite manner without allowing any "slap action," "torque," or the like, that would result in wear to the Kelly bar or rollers.

The rollers 15 are adjustable toward and from each other over a wide range as permitted by the slots 13 to accommodate Kelly bars of different sizes as well as to take up for wear on the Kelly bar. Provision is made for lubricating the rollers to reduce friction to a minimum and thereby reduce wear on the Kelly bar.

A modification of the invention is shown in Figs. 8, 9 and 10 wherein the rotary table plug 33 has a plate 34 thereon, and above this rise two upstanding blocks 35—35. The upper portions of these blocks 35—35 are cut out as at 36 for receiving slide blocks 37 which are adjustable by adjusting screws 38 for feeding rollers 39—39 against opposite sides of a Kelly bar 40.

Between the blocks 35—35, and in a plane below the rollers 39—39, is a second set of rollers 41—41. These rollers are supported by blocks 42—42 slidable in continuous cut outs or slots (Fig. 10) in stationary blocks 43—43 at each side of the Kelly bar 40. The continuous slots extending to opposite sides of the Kelly bar provide for wider adjustment of the rollers and greater strength and bracing thereof. Each of the stationary blocks 43 has an adjusting screw 44 for adjusting the corresponding side blocks 42.

The rollers 39 and 41 assume the relationship shown in Fig. 9 with respect to the Kelly bar 40 and this gives added guiding support to the Kelly bar.

The guiding of the Kelly bar between a pair of rollers as set forth above, permits the Kelly bar to move in a true perpendicular direction, even though the derrick may be slightly out of plumb, thus assuring that a straight hole will be drilled directly downwardly.

I claim:

1. A guide for a drill stem comprising a body having an opening therein adapted to receive the drill stem, said body having means forming a pair of guideways on opposite sides of the centered axis of the opening and extending laterally at an angle to said axis, said guideways having the outer end portions thereof closed and having inner end portions thereof open to the opening, blocks slidably mounted in said guidings, means for guiding said drill stem through the opening including a roller having opposite ends thereof mounted in the blocks with the axis of said roller between the upper and lower confines of the guideways and adjustable by the blocks toward and from the axis of the body opening, and means for securing the roller in adjusted positions relative thereto.

2. A guide for a Kelly bar comprising a body having an opening therein adapted to receive the Kelly bar, said body having means forming a pair of slots on opposite sides of the central axis of the opening and extending laterally at an angle to said axis, said slots having the inner end portions thereof open to the periphery of the opening, blocks slidably mounted in said slots and confined wholly between the upper and lower sides thereof, means for guiding said Kelly bar through the opening including a roller arranged between the slots in the body and having opposite ends thereof mounted in the blocks and slidable and bodily adjustable toward and from the axis of the body opening, and means for securing the roller in adjusted positions relative thereto.

3. A guide for a Kelly bar comprising a body having an opening therein adapted to receive the Kelly bar therethrough, means forming opposed slots on opposite sides of the opening with the slot on each side extending to opposite sides of an upright medial plane extending transversely of the opening at the axis thereof, a pair of rollers extending transversely between the cooperating slots and arranged on opposite sides of said medial plane, and means slidably mounting the opposite ends of the rollers in the slots with the axes of the rollers between the upper and lower edges of the slots for adjustment toward and from each other.

4. A guide for a Kelly bar comprising a body having an opening therein adapted to receive the Kelly bar, said body having opposed side portions, each of said side portions having a guideway therein extending to opposite sides of an upright medial plane through the axis of the opening and with the inner portion of said guideway in open communication with the opening, a pair of rollers extending parallel with said medial plane between the cooperating guideways, and a pair of blocks supporting the opposite ends of each roller and slidably mounted in the guideways for adjustment toward and from each other, said pair of blocks supporting each roller with the axis thereof between the opposite sides of the guideways.

5. A guide for a Kelly bar comprising a body having an opening therein adapted to receive the Kelly bar, said body having opposed side portions, each of said side portions having a guideway therein extending to opposite sides of an upright medial plane through the axis of the opening at right angles to the guideways and with the inner portion of said guideway in open communication with the opening, a pair of rollers extending parallel with said medial plane between the cooperating guideways, a pair of blocks supporting the opposite ends of each roller and slidably mounted in the guideways for adjustment toward and from each other, said pair of blocks supporting each roller with the axis thereof between the opposite sides of the guideways, said blocks being adjustable in the guideways substantially to the medial plane of the opening, and means for securing said blocks in adjusted positions.

6. A guide for a Kelly bar comprising a body having an opening therein adapted to receive the Kelly bar, said body having upstanding sides on opposite sides of said opening, rollers extending between said sides of the body in position to bear against opposite sides of the Kelly bar, each of said sides having a medial upwardly extending opening therein and having slots therein extending at an angle to the central axis of the body opening and extending to and open at said medial opening of the side, and a pair of blocks slidably mounted in said slots and supporting each roller for adjustment of the roller toward and from the axis of the body opening, said pair

of blocks supporting each roller with the axis thereof between opposite sides of the slots.

7. A guide for a Kelly bar comprising a body having an opening therein adapted to receive the Kelly bar, said body having upstanding sides on opposite sides of said opening, rollers extending between said sides of the body in position to bear against opposite sides of the Kelly bar, each of said sides having a slot therein extending continuously to points on opposite sides of the body opening and arranged at an angle to the central axis thereof, and blocks slidably mounted in the slots for adjustment toward and from each other and having the respective opposite ends of the rollers journaled directly therein, said blocks mounting the rollers with the axes thereof between the upper and lower edges of the slots.

8. A guide bushing for Kelly rods comprising a bushing body, a pair of blocks rising from the body, a roller adjustably mounted on each of the blocks and adapted for engagement with opposite sides of a Kelly rod operating through the bushing, said blocks being formed to provide slideways, slide blocks operative in the slideways and adapted to carry the said rollers, adjusting screws for the slide blocks, plates secured to the blocks and having openings therein smaller than the diameter of the screws, said screws having reduced portions disposed through the openings of the said plates, said reduced portions of the screws defining on each screw a shoulder for abutting one side of the plate and a head at the extremity of the screw, said plates serving as detents to prevent displacement of the screws from the blocks.

9. A guide bushing for Kelly rods comprising a bushing body, rollers mounted in the bushing body and adapted for engagement with opposite sides of a Kelly rod operating through the bushing, each roller comprising an outer sleeve having flanged ends, a core, roller bearings interposed between the core and the said sleeve, removable end walls for the sleeve, and packing means interposed between the end walls and the ends of the core.

10. A guide for a Kelly bar comprising a body, means mounted on the body for guiding the Kelly bar relative thereto, said guide means including a roller, said roller comprising an outer sleeve adapted to bear against a side of the Kelly bar, a cylinder therein, and roller bearings interposed between the cylinder and sleeve and journaling the sleeve for turning movement relative thereto.

11. A guide for a Kelly bar comprising a body, means mounted on the body for guiding the Kelly bar relative thereto, said guide means including a roller, said roller comprising an outer sleeve adapted to bear against a side of the Kelly bar, a cylinder therein, roller bearings interposed between the cylinder and sleeve and journaling the sleeve for turning movement relative thereto, supporting means for said cylinder, means for directing lubricant to the bearings within the sleeve, and end walls for the sleeve externally of the cylinder for retaining the lubricant therein.

12. A guide bushing for Kelly rods comprising a bushing body, a pair of blocks rising from the body, and a roller adjustably mounted on each of the blocks and adapted for engagement with opposite sides of a Kelly rod operating through the bushing, said blocks being formed to provide slideways having laterally spaced upper and lower sides, slide blocks operative in the slideways and journaling directly therein the respective opposite ends of said rollers with the axes of said rollers between the upper and lower sides of the slideways in bridging relation between the slideways, adjusting screws for the slide blocks, and detents for the said adjusting screws.

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