March 10, 1942. W. A. ABEGG 2,275,813

BUSHING SUPPORTING MEANS FOR OIL WELL RIGS

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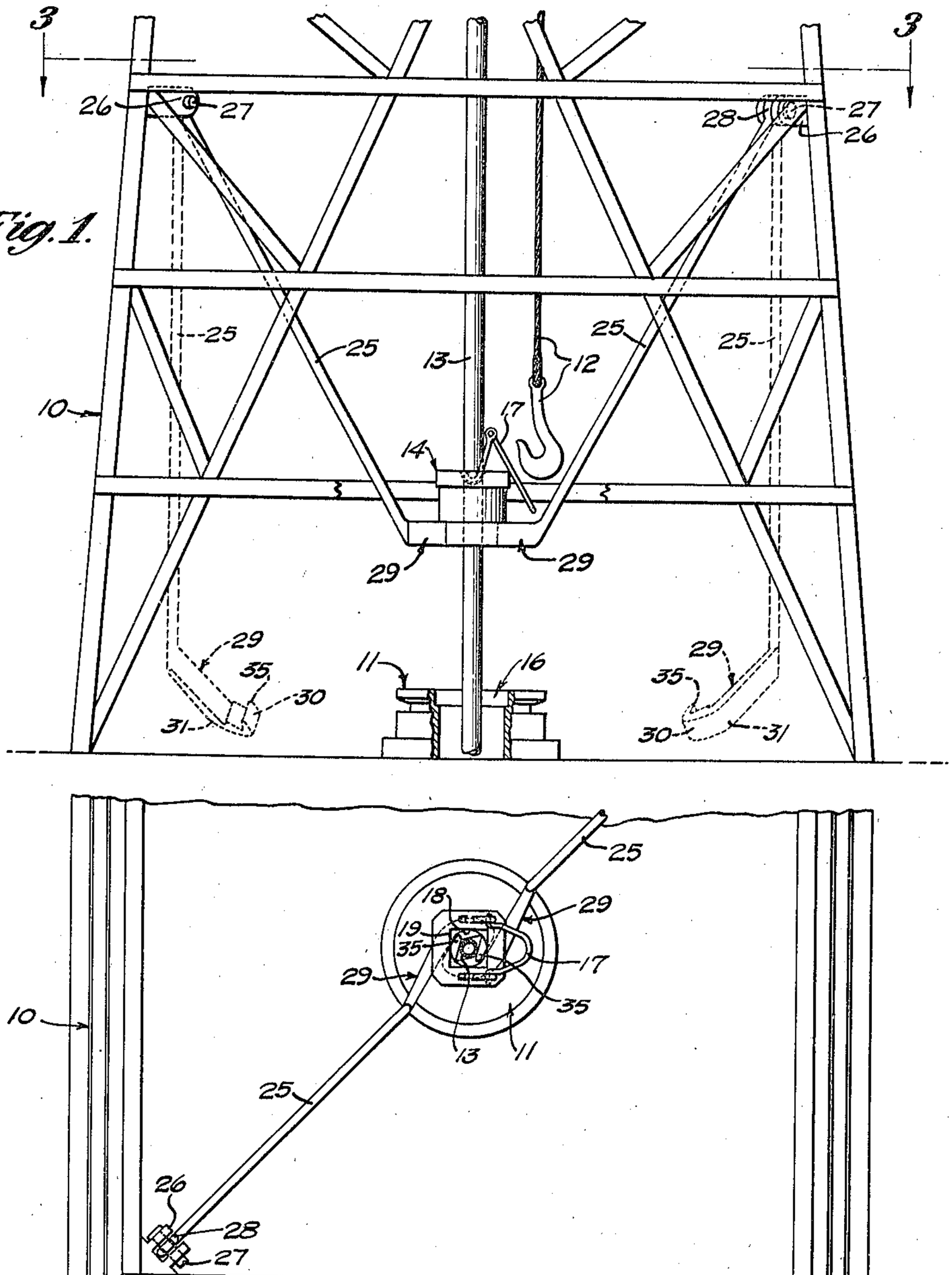


Fig. 1.

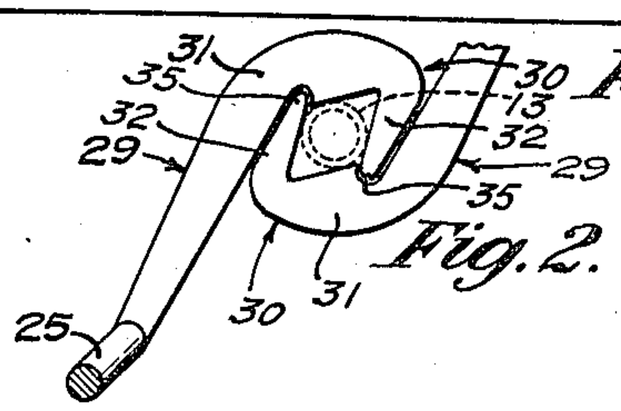


Fig. 2.

Fig. 3.

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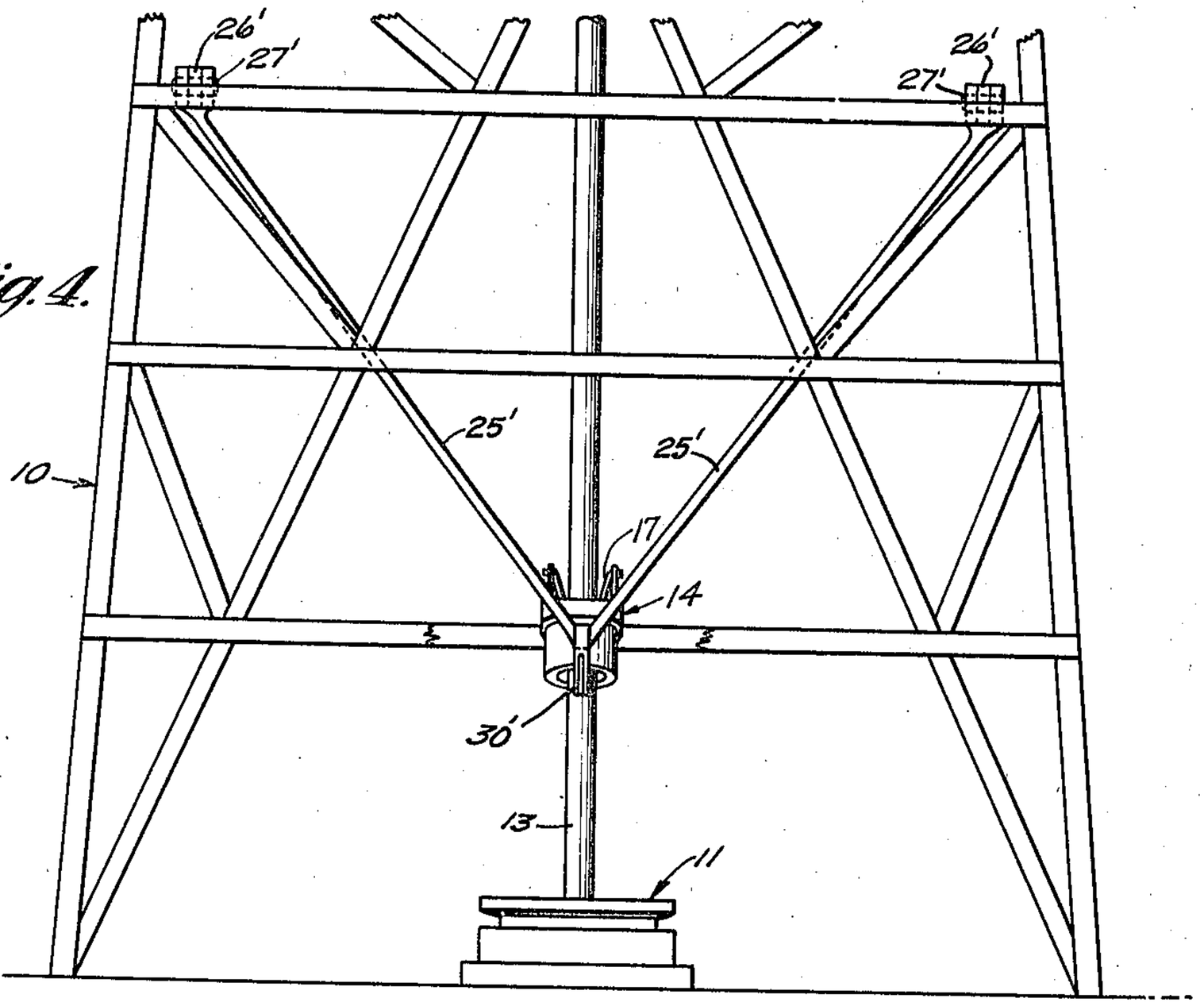
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BUSHING SUPPORTING MEANS FOR OIL WELL RIGS

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Fig. 4.



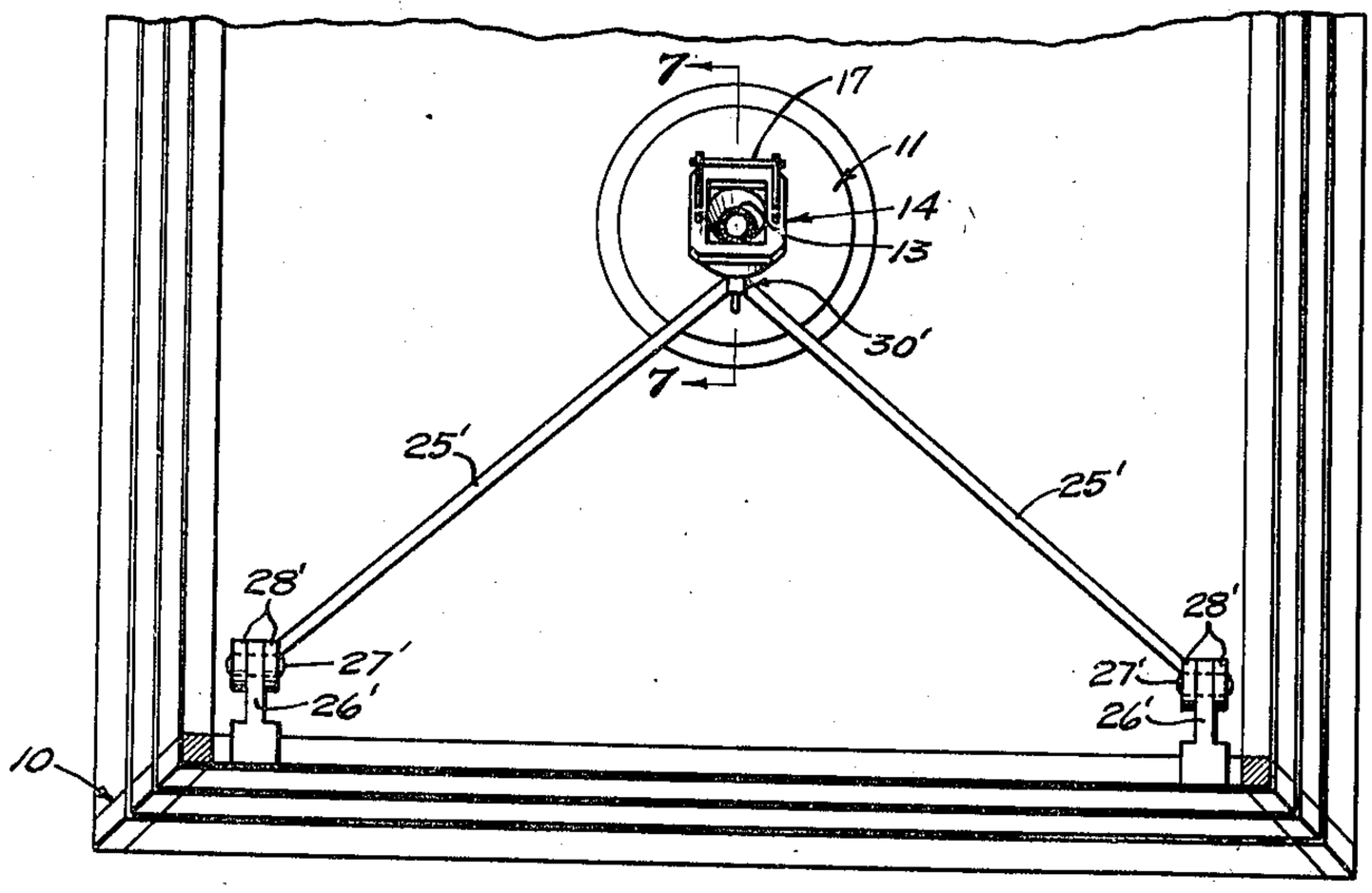


Fig. 5.

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BUSHING SUPPORTING MEANS FOR OIL WELL RIGS

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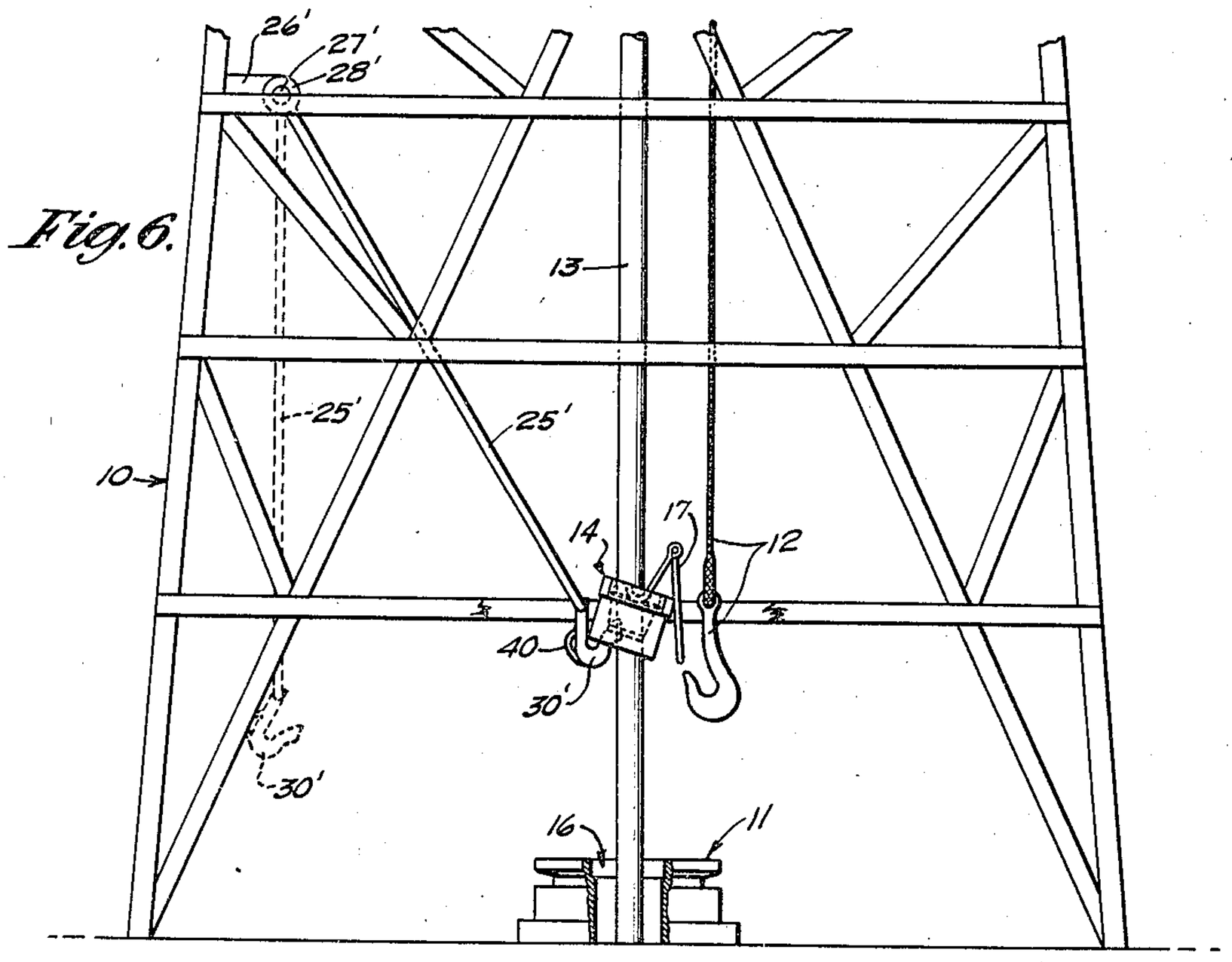


Fig. 6.

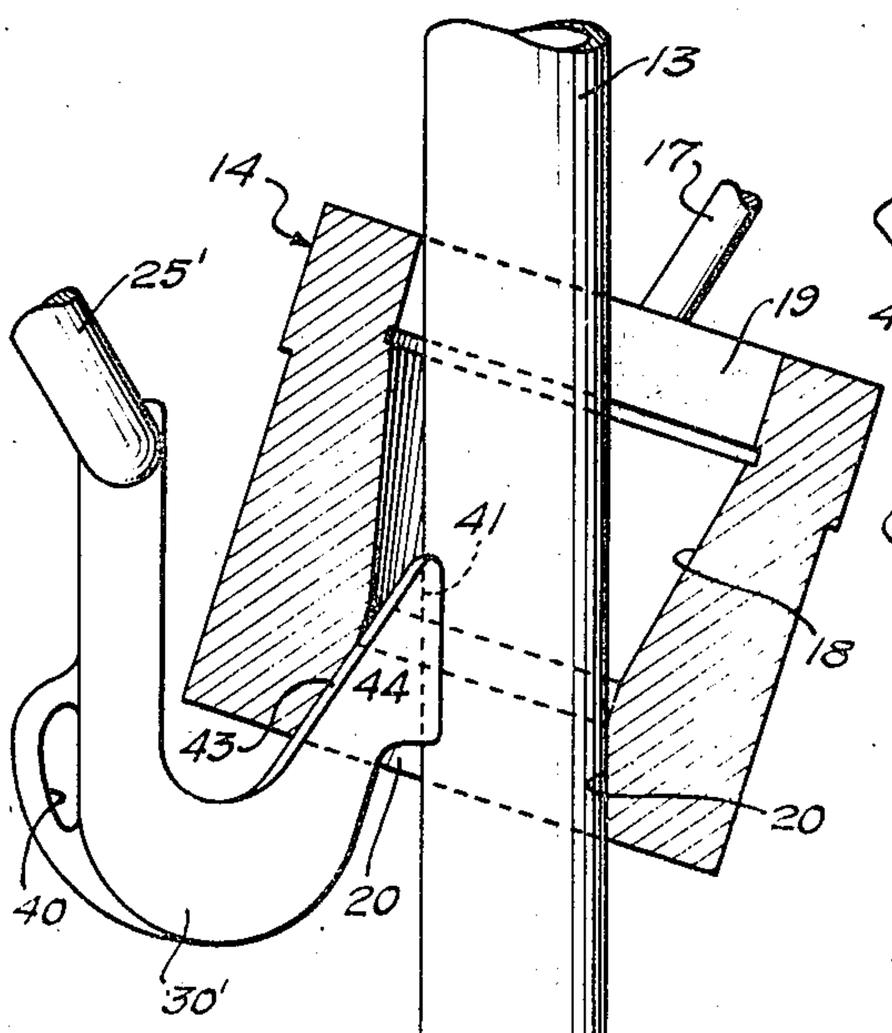


Fig. 7.

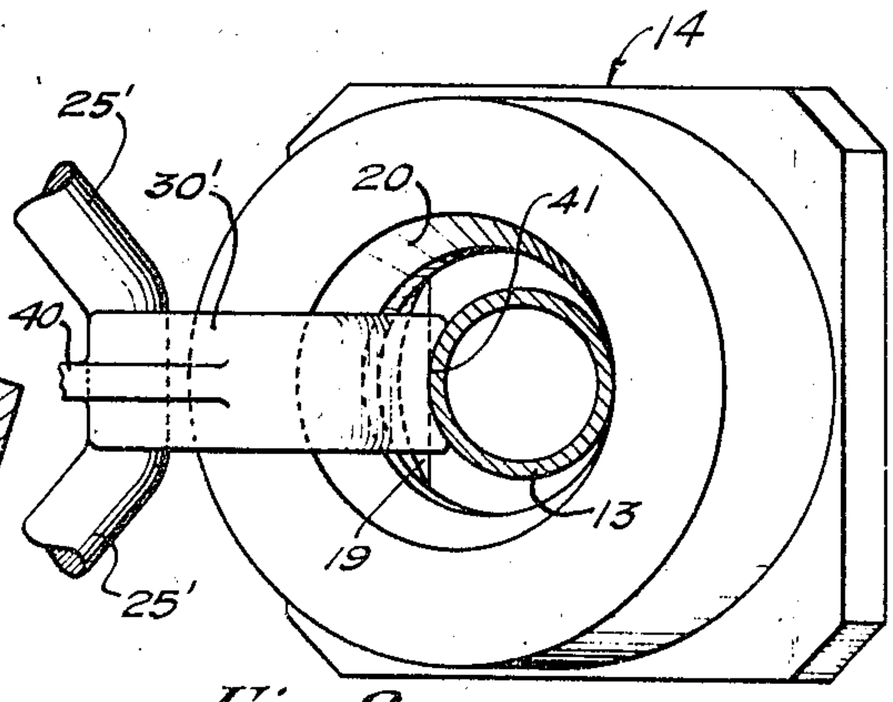


Fig. 8.

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BUSHING SUPPORTING MEANS FOR OIL WELL RIGS

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Fig. 9.

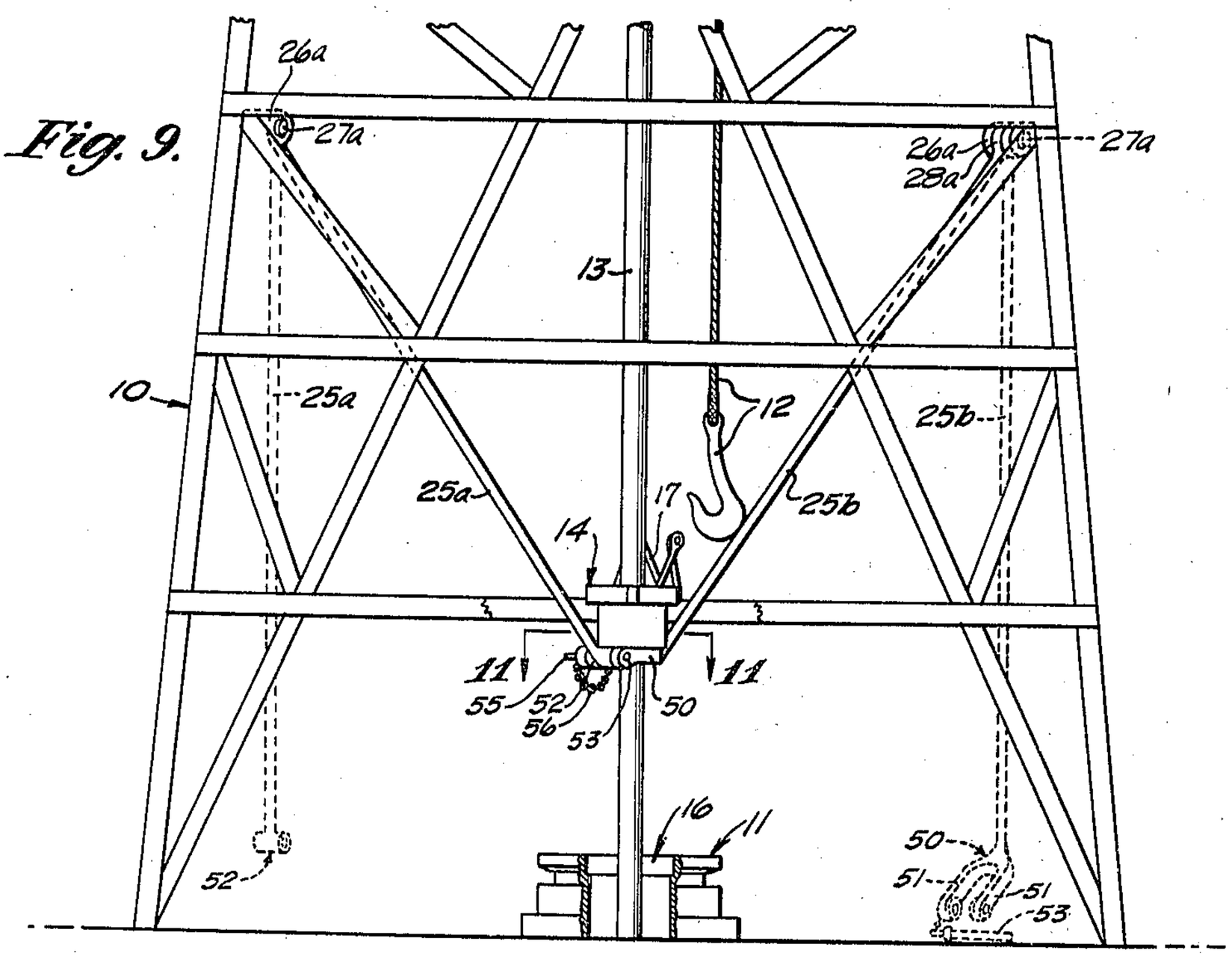
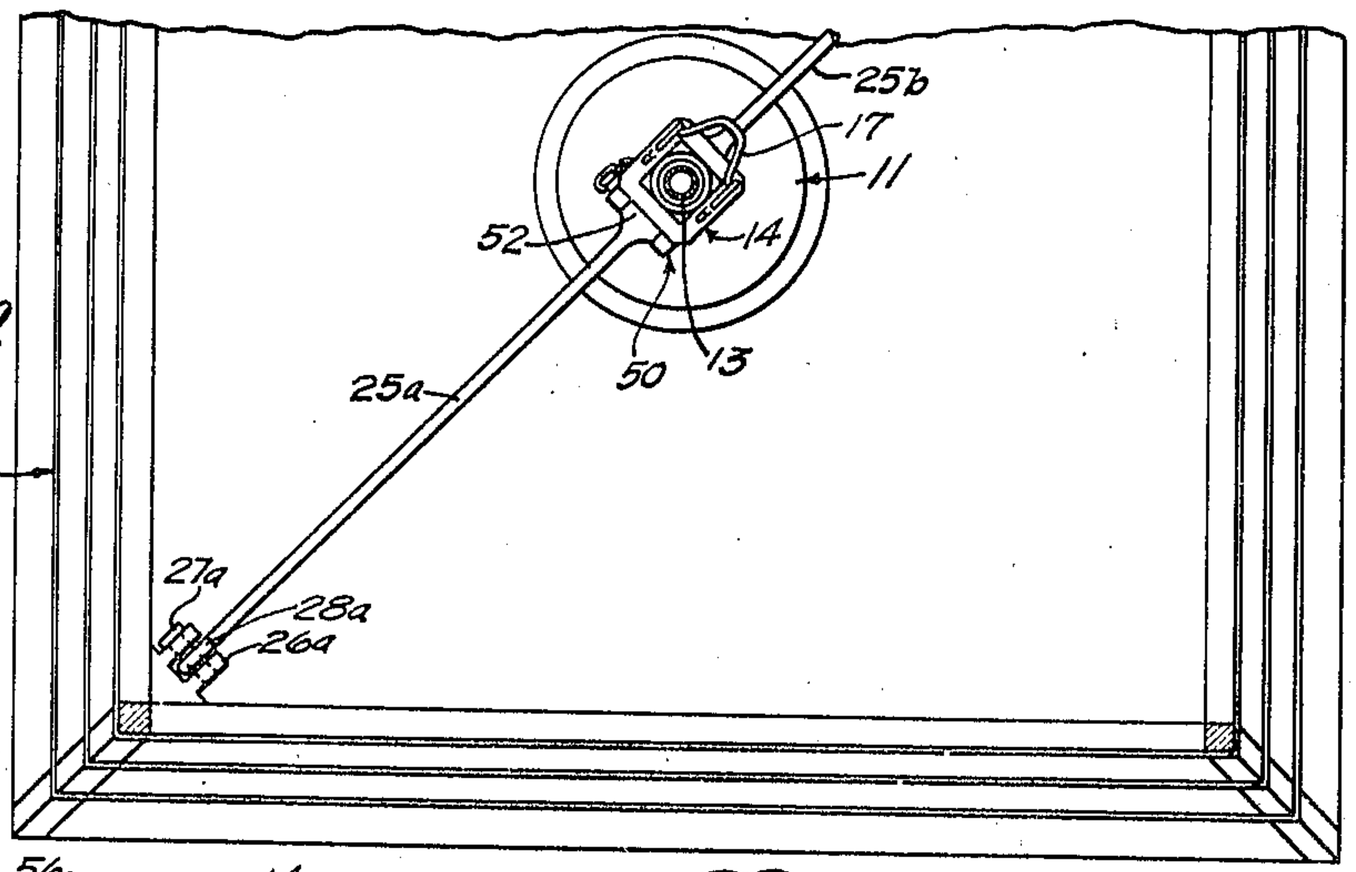


Fig. 10.



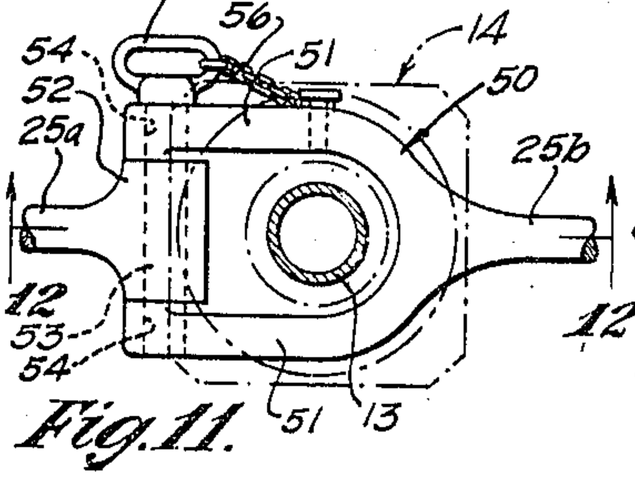


Fig. 11.

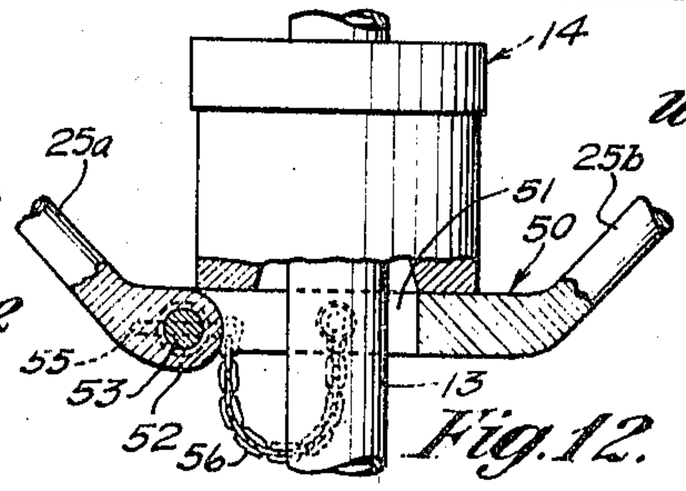


Fig. 12.

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UNITED STATES PATENT OFFICE

2,275,813

BUSHING SUPPORTING MEANS FOR OIL WELL RIGS

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Application October 3, 1939, Serial No. 297,708

4 Claims. (Cl. 255—1)

This invention has to do generally with bushing supporting means for oil well rigs and is more particularly concerned with means whereby bushings for rotary tables may be supported above those tables without disturbing the pipe-encircling condition of the bushings.

While the bushing, to be supported as above, may be of any character, the invention is used to particular advantage in connection with "table" or "master" bushings, and I have therefore illustrated and will describe the invention as so embodied, but it will be understood this is not to be considered as limiting the invention, considered in its broader aspects.

In my copending application filed October 29, 1937, Rotary table bushing and means for handling same, Ser. No. 171,759, which issued December 19, 1939 as Patent No. 2,183,526, I have set forth in some detail the advantage of utilizing a one-piece table bushing and the occasion for lifting such a bushing clear of the table while the drill stem remains in its position of vertical extension through that table.

In said copending application, various means are shown for transferring the weight of the bushing to the pipe after said bushing has been lifted to a position of vertical clearance above the table.

It is among the objects of the present invention to provide a bushing support which is mounted on the drilling rig but normally clear of the table and associated parts, being quickly and easily movable into a position of bushing-support when occasion for such support arises. Once the bushing has been elevated to a given position of vertical clearance above the table, the supporting means is swung into supporting engagement with the bushing while the latter still encircles the pipe, and the driller may then proceed with whatever operation he has in mind without interference from the bushing and without fear that said bushing (which is normally decidedly bulky and heavy) may fall back to the table.

The support is of such character that the bushing does not have to be especially prepared or fabricated to take it. In its simplest form it may be applied to any standard bushing, and, in this connection, it is to be understood that while the invention is particularly well adapted for use with one-piece bushings, it is also decidedly useful in connection with bushings of the hinged-section type, where those sections are latched in encircling condition about the pipe and therefore may be lifted and supported as a unit while still in such encircling condition.

Other objects and features of novelty will be made apparent in the following detailed description. Reference will be made to the accompanying drawings, wherein:

Fig. 1 is an elevational view showing my invention applied to a conventionally illustrated oil well rig;

Fig. 2 is an enlarged, fragmentary plan view of the bushing-engaging element on the supporting arm;

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

Fig. 4 is a view similar to Fig. 1 but showing a variational embodiment of my invention;

Fig. 5 is a fragmentary top plan view of Fig. 4;

Fig. 6 is a side elevation of Fig. 4;

Fig. 7 is an enlarged section on line 7—7 of Fig. 5 but showing the well pipe and suspension hook in elevation;

Fig. 8 is a bottom plan view of Fig. 7;

Fig. 9 is a view similar to Fig. 1 but showing a variational embodiment of the invention;

Fig. 10 is a fragmentary top plan view of Fig. 9;

Fig. 11 is an enlarged, fragmentary section on line 11—11 of Fig. 9; and

Fig. 12 is a section on line 12—12 of Fig. 11.

In Fig. 1 I have illustrated an oil well rig in somewhat conventional form and as including a usual derrick 10, rotary table 11, cat line and hook 12, and drill pipe 13, the latter extending axially through the bore of table 11.

At 14 is illustrated a master bushing which normally occupies the table bore 16 and takes pipe 13 within its own bore. The bushing may be of any suitable type, so long as it is of a construction which will allow it to be lifted bodily from the table without opening up to free it from its pipe-encircling condition. It is here shown as of "one-piece" construction which lends itself particularly well to application of my invention, but this showing is not to be considered as limitative on the broader aspects of the invention.

Bushing 14 is illustrated as being provided with a detachable bail 17, and as having a major conical bore 18, an upper, square counterbore 19, and an upwardly and inwardly tapering lower bore 20 (Figs. 2 and 7). Kelly drive bushings and wedge slips are adapted to be interchangeably mounted in the master bushing bore, but since these elements are normally removed before application of my suspension means to the bushing, they are not here illustrated.

My bushing suspension means embodies a pair of arms 25 which are pivoted at their outer ends

at points above and at one side of table 11. While the pivoted supports may be attached to any suitable structure, it is a matter of convenience to employ the derrick structure, as illustrated, for this purpose. Thus, I have shown brackets 26 secured to diagonally opposite corners of the derrick, said brackets supporting horizontal pivot pins 27 which take eyes 28 on the ends of arms 25.

At the lower or distal end of each arm is provided an integral bushing-engaging member 29 which is bent angularly from the arm and formed as hook 30, including offset portion 31 and V-fork portion 32, the fork mouth 32' being in line with the arm axis. The hooks on the two arms are offset oppositely and their mouths open oppositely, as clearly shown in Fig. 2.

Arms 25 normally hang vertically as illustrated in dotted lines in Fig. 1, where they are out of the way and yet in position to be immediately available when occasion for their use arises.

When bushing 14 is to be cleared from table 11, cat hook 12 is engaged with bail 17 and operated to elevate the bushing to a position somewhat above that which it occupies in Fig. 1. Thereupon arms 25 are swung inwardly and upwardly. As they approach pipe 13 they are sprung horizontally to permit the hooks 30 to pass the pipe. When the hooks are sufficiently high to allow noses 35 to clear the pipe, the arms are allowed to spring back to their normal condition, which brings each hook at the side of the pipe remote from the pivotal mounting of the associated arm. When the arms are then lowered slightly, the hooks will engage the pipe as illustrated in Figs. 2 and 3 and the pipe will, of course, prevent the arms from dropping further.

Bushing 14 is then lowered until it rests upon and is supported by the upper faces of the two hook ends. The cat line may then be disconnected and the bushing will be held in elevated position until occasion arises for returning the bushing to the table, when the operations described above are reversed.

Of course, instead of springing the arms to allow the hooks to pass the pipe, the pin and eye connections 27—28 may be sufficiently loose, or otherwise suitably formed to allow sufficient bodily horizontal movement of the arms to permit the described pipe-passing operations.

In Figs. 4 to 8, inclusive, I have shown a variational embodiment of the invention wherein a single bushing-engaging hook 30' is utilized. This hook opens upwardly and is carried rigidly by a pair of arms 25' which spread from the hook in the form of a V (Fig. 5) with their upper ends pivoted at 27' to brackets 26' at adjacent corners of the derrick.

The hook has a hand-hold 40 while its nose has an external face 41 which extends vertically along the pipe and is arcuately formed to fit the curvature of the pipe periphery, all when the hook is in the position of Fig. 7.

The arm and hook normally occupy the dotted line positions of Fig. 6. When the bushing 14 is to be suspended, it is lifted along the pipe as described in connection with Fig. 1, to a position slightly above that illustrated in Fig. 6.

Arm 25' is then swung inwardly and upwardly to the full line position of Figs. 6 and 7 with face 41 in engagement with the pipe. The inner face 43 of the hook nose is inclined with respect to face 41, these two faces defining what may be termed a wedge nose 44 on the end of the hook.

With the hook manually held in the above position, bushing 14 is lowered onto the hook, the wedge nose 44 entering bushing bore 20 or, expressed otherwise, the annular clearance space between the bushing and pipe 13.

As the cat line is slacked off, the bushing will tilt into the position of Fig. 6. Thereafter the bushing will prevent the outward swinging of the arm and hook and since the hook cannot drop without coincidentally swinging outward, said hook will remain in the position of Fig. 6 and, through arms 25', support the bushing in its predetermined position of elevation above the rotary table until occasion arises to return the bushing to the table, when the above operations will be reversed.

In Figs. 9 to 12, inclusive, I have shown a variation in which arms 25*a* and 25*b* are pivoted to brackets 26*a* at diagonally opposite corners of the derrick. The distal end of arm 25*b* is formed as a bushing-engaging fork 50, the arms 51 of which are sufficiently spread to take pipe 13 between them. The distal end of arm 25*a* is formed as a transversely elongated eye 52 which is adapted to fit between the free ends of fork arms 51.

Arms 25*a* and 25*b* normally hang in the dotted line positions of Fig. 9. When bushing 14 is to be cleared from the table, it is elevated as described in connection with the other figures. The suspension arms are then swung upwardly and inwardly to the positions of Figs. 11 and 12, with eye 52 entered between fork arms 51. A keeper pin 53 is then thrust through eye 52 and suitable apertures 54 in fork arms 51, to hold the fork and eye against relative separative movement and thus holding the entire suspension unit in the condition of Figs. 11 and 12. Keeper pin 53 has a hand hold 55 and is chained at 56 to fork 50 to prevent its misplacement or loss when the arm 25*b* is hanging idly.

With the suspension arms thus coupled together and prevented from swinging downwardly and outwardly, bushing 14 is lowered on top of fork arms 51 and thus maintained in a predetermined position of elevation above the rotary table until occasion arises for returning the bushing to the table, when the above operations are reversed.

While I have illustrated and described preferred embodiments of my invention, various changes in design, structure and arrangement may be made without departing from the spirit and scope of the appended claims.

I claim:

1. A bushing support adapted to be associated with an oil well rig including a rotary table and a bushing therefor, through the bore of which bushing a vertical pipe is adapted to extend, said support embodying a pair of arms adapted to be mounted at opposite sides of the table for pivotal movement about horizontal axes at points above the table, a pair of elements, one on the distal end of each arm, said arms being of individual lengths to swing their associated elements into positions where at least one of them is in supporting engagement with said bushing when the latter is lifted clear of the table and along the pipe to a predetermined height, and releasable means interconnecting the two elements to prevent their separation when they are so positioned.

2. A bushing supporting device embodying a pair of rods adapted to be pivotally mounted at opposite sides of and above a rotary table whereby their distal ends are movable into and out of

positions overlying the table, a fork on the distal end of one rod, a portion on the distal end of the other rod adapted to enter the space between the arms of the fork when said ends are in said overlying position, and releasable means for holding said fork and portion against relative separative movement.

3. A bushing supporting member embodying a rod, one end of which is adapted to be pivotally connected to a supporting structure at one side of and above a rotary table, the rod being movable pivotally to and from a position where its distal end overlies the table, and a fork rigid with the distal end of the rod and bent out of the axial plane of the rod to such extent that the fork is substantially horizontal when the rod is in said position; the mouth of the fork opening toward said one side when the rod is in said position.

4. A bushing support adapted to be associated with a well rig including a rotary table having a central bore and a bushing therefor, which bushing forms a fully encircling annulus about a well pipe extending vertically through the table bore; said support embodying a pivot member which is mounted independently of the table at a point above and at one side thereof, a rigid arm connected to said member for pivotal movement about a horizontal axis and substantially restrictively through a vertical plane which extends from said member towards said pipe, and a bushing engaging element rigidly connected to the distal end of the arm, said arm being adapted when in inoperative position, to hang clear of the table and bushing, the arm being of such length that, when pivotally swung to operative position through said vertical plane after the bushing is lifted out of the plane of the table and along the pipe to a predetermined height and with the bushing still fully encircling the pipe, said element is brought directly into engagement with the bushing.

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