

March 17, 1953

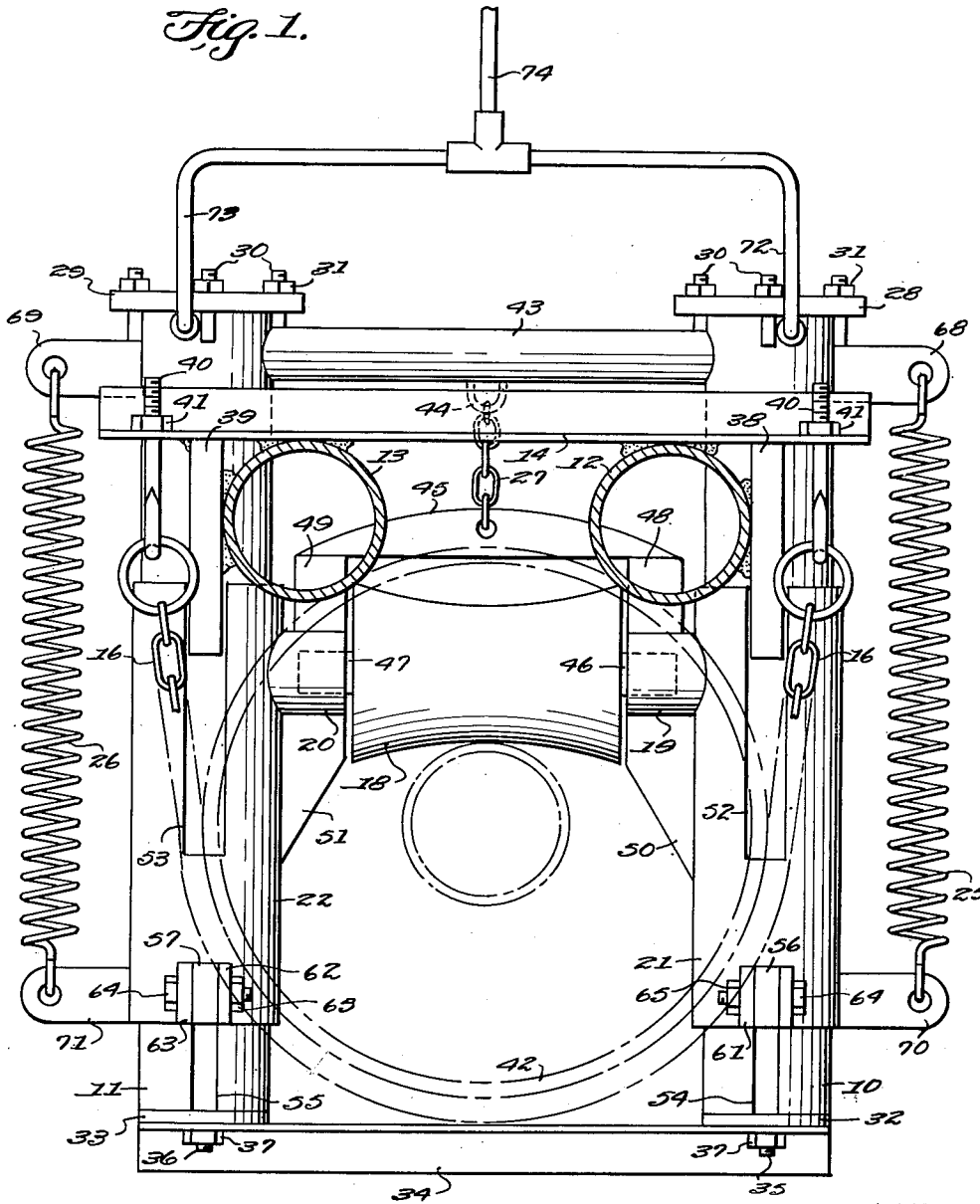
P. M. USSERY
POWER DRILL PIPE GUIDE

2,631,822

Filed Aug. 13, 1951

3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

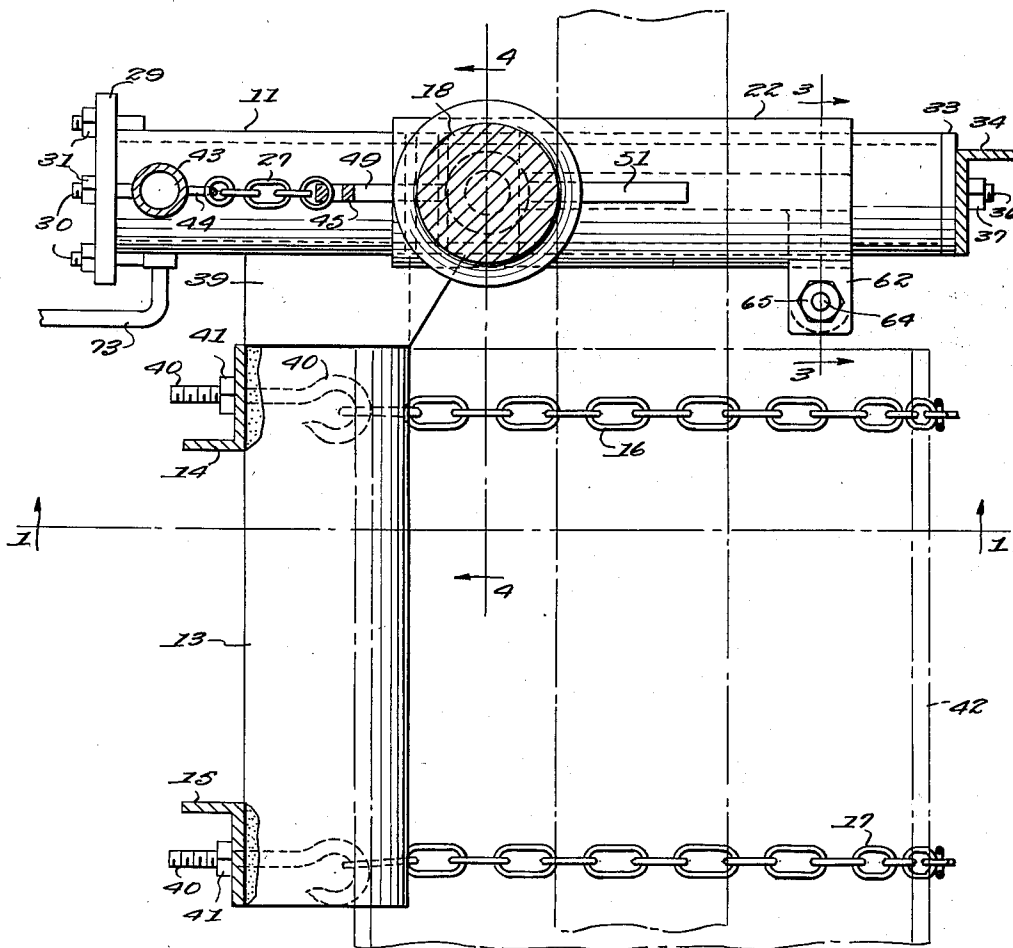
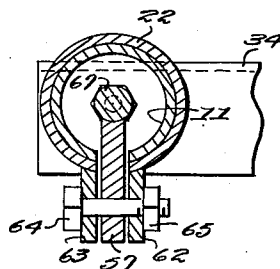


Fig. 3.



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Fig. 4.

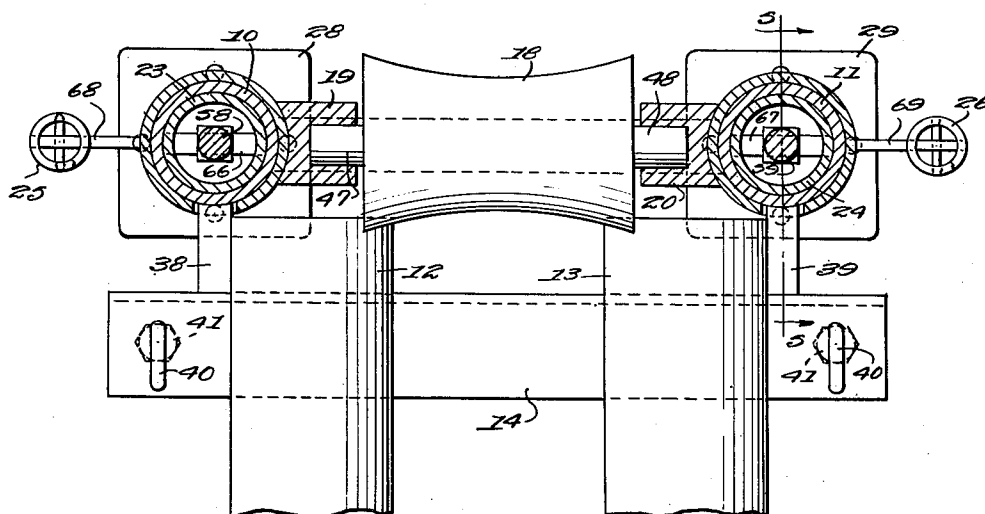


Fig. 5.

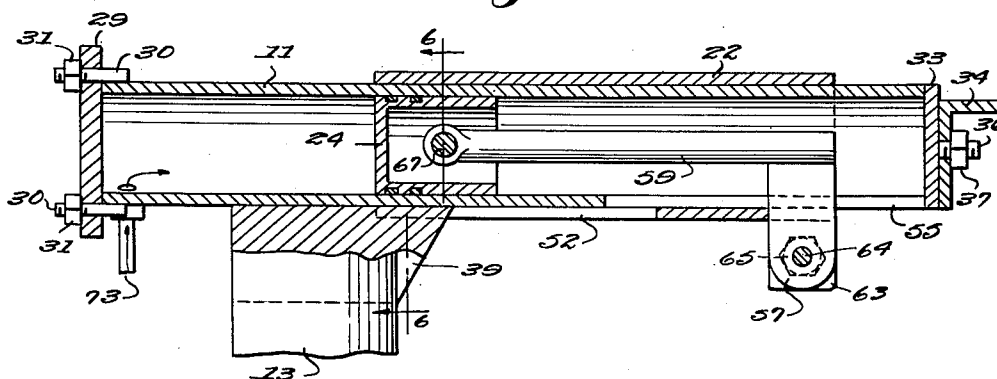
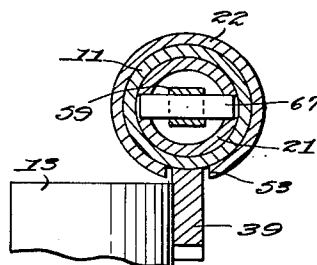


Fig. 6.



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UNITED STATES PATENT OFFICE

2,631,822

POWER DRILL PIPE GUIDE

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Application August 13, 1951, Serial No. 241,611

7 Claims. (Cl. 255-19)

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This invention relates to well drilling rigs where a drill pipe or tube extends downwardly into a well casing, and in particular a drill pipe guide roller assembly actuated by pneumatic cylinders mounted on the flow nipple of a well casing below the rotary table, with downwardly extended legs clamped to the flow nipple by chains and provided with a stop device whereby when the drill pipe is pulled to one side by the derrick, air under pressure is supplied to the cylinders for forcing the drill pipe back into the center of the well casing.

The purpose of this invention is to provide a drill pipe guide and centering rig that may be mounted in an out of the way position below the rotary table and on the flow nipple of a well casing whereby it may be operated continuously to retain the drill pipe in the center of the flow nipple and casing.

With the conventional type of drill pipe guide it is difficult to set the slips which hold the drill pipe in the center when the pipe is not supported by the derrick, or the traveling block or hoist such as in breaking out of a stand, making up a stand, or adding a joint of drill pipe. The slips are imbedded in the center of the rotary table and the rotary table supports the weight of the drill pipe in the hole or casing. The jackknife type derricks that are raised and lowered by power of the draw cause the drill pipe to bend toward one side or the other so that it does not hang in the center of the rotary table and this makes it substantially impossible to set the slips for holding the drill pipe in the rotary table.

With this thought in mind this invention contemplates a mounting frame clamped by chains on the upper end of the flow nipple of a well casing and positioned below the rotary table with spaced horizontally disposed pneumatic cylinders carried by the frame and with a guide roller assembly mounted on the frame and having pistons extended into the cylinders for driving the guide roller against the drill pipe, and springs for returning the guide roller upon release of pressure in the cylinders.

The object of this invention is, therefore, to provide means for mounting a guide roller assembly on the upper end of a flow nipple of a well casing whereby the guide roller is positioned for continuous operation.

Another object of the invention is to provide a guide roller assembly for the upper end of a well casing in which the parts are located below the rotary table of the substructure of the drilling rig whereby it does not interfere with the drilling operation.

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A further object of the invention is to provide an improved guide roller assembly mounting for a well casing which is of a comparatively simple and economical construction.

With these and other objects and advantages in view the invention embodies a pair of spaced cylinders with slots in extended ends of walls thereof, with legs extended downwardly from the cylinders and having chains attached thereto for clamping the guide on the flow nipple of a well casing, a roller carrying frame having pistons extended into the cylinders, a chain for limiting outward travel of the guide roller, and springs for returning the guide roller when pressure in the cylinders is released.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings wherein:

Figure 1 is a sectional view taken on line 1-1 of Figure 2 looking upwardly toward the under side of the guide roller mounting and showing the vertically disposed legs thereof in section.

Figure 2 is a vertical longitudinally disposed section through the guide roller mounting.

Figure 3 is a detail showing a section taken on line 3-3 of Figure 2 illustrating the connection of the guide roller mounting to one of the pneumatic cylinders.

Figure 4 is a cross section through the guide roller assembly taken on line 4-4 of Figure 2.

Figure 5 is a longitudinal section through one of the pneumatic cylinders taken on line 5-5 of Figure 4, showing the piston in an extended position.

Figure 6 is a cross section through one of the pneumatic cylinders taken on line 6-6 of Figure 5, showing the connection of the cylinder to the mounting frame.

Referring now to the drawings wherein like reference characters denote corresponding parts the drill pipe guide roller rig of this invention includes a stationary frame having pneumatic cylinders 10 and 11 mounted on vertically disposed legs 12 and 13, with the legs connected by angle irons 14 and 15 and held in position by chains 16 and 17, and a guide roller 19 journaled in bearings 19 and 20 on sliding sleeves 21 and 22, with pistons 23 and 24 positioned in the cylinders and connected to the sleeves, with springs 25 and 26 for returning the pistons, and with a chain 27 for limiting outward travel of the pistons and guide roller.

The cylinders 10 and 11 are formed, particularly as illustrated in Figure 5, with heads 28 and 29 secured to the ends of the cylinders with studs 30 having nuts 31 thereon and the opposite ends

of the cylinders are provided with closure plates 32 and 33 to which an angle iron 34 is secured by studs 35 and 36 and the studs are provided with nuts 37. The opposite end of the cylinder 10 is secured to the upper end of the tubular legs 12 with a gusset plate 38 and the cylinder 11 is secured to the upper end of the leg 13 with a similar plate 39.

The angle irons 14 and 15 are secured to the legs 12 and 13, preferably by welding, and the chains 16 and 17 are secured to the angle irons by screw eyes 40 having nuts 41 thereon. By this means the supporting or mounting frame is rigidly clamped to the upper end of the flow nipple 42 and the device may readily be installed and removed as desired.

The inner ends of the cylinders 10 and 11, through which the cylinders are attached to the legs 12 and 13 are provided with a transverse strut 43 which is provided with an eye 44 through which a chain 27 extends whereby the position of the chain is readily adjusted so that with the outer end connected to the guide roller mounting it provides a stop to limit outward travel of the guide roller 18.

The chain 27 is attached to a cross beam 45, the ends of which are attached to the bearings 19 and 20 in which the guide roller 18 is journaled, by pins 46 and 47, with bars 48 and 49. The bearings 19 and 20 are secured to the sleeves 21 and 22 preferably by welding and the connections are reinforced by gusset plates 50 and 51.

The inner ends of the sleeves 21 and 22 are provided with elongated slots 52 and 53 that are positioned to receive the gusset plates 38 and 39 which connect the cylinders 10 and 11 to the vertically disposed legs 12 and 13.

The outer ends of the cylinders 10 and 11 are provided with elongated slots 54 and 55 through which bars 56 and 57 extend downwardly from the ends of piston rods 58 and 59 project, as illustrated in Figure 3, and the lower ends of the bars are connected to ears 60 and 61 on the sleeve 21, and 62 and 63, on the sleeve 22, by bolts 64, with nuts 65 on the ends thereof. The opposite ends of the piston rods 58 and 59 are connected to the pistons 23 and 24 by pins 66 and 67, respectively.

The springs 25 and 26 are attached, at one end of the rig, to tabs 68 and 69 extended from the sides of the cylinders 10 and 11, and at the outer end to tabs 70 and 71, which extend from the outer ends of the sleeves 21 and 22.

The cylinders 10 and 11 are provided with connections 72 and 73 which extend through a tube 74 to means for supplying fluid under pressure.

With the parts arranged in this manner the guide roller mounting frame is positioned on the upper end of the flow nipple of a well casing, as illustrated in Figure 2, with the chains 16 and 17 extended around the flow nipple and secured to the ends of the angle irons 14 and 15.

With the pressure released in the cylinders 10 and 11 the springs 25 and 26 draw the pistons and guide roller inwardly toward the inner ends of the cylinders and when it is desired to force the drill pipe back to the center of the well casing air-pressure is applied to the cylinders.

With the parts mounted on the flow nipple and positioned below the rotary table of the drill rig the device is substantially in an out of the way position and may remain on the flow nipple whereby it is positioned for continuous use with-

out interfering with the usual drilling operation of the drill rig.

It will be understood that modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. A drill pipe guide roller for well drilling rigs comprising a mounting frame, means clamping the mounting frame on a flow nipple on the upper end of a well casing, a pair of horizontally disposed cylinders carried by said mounting frame, a guide roller positioned between said cylinders, pistons in the cylinders, means connecting said guide roller to the pistons in the cylinders whereby fluid under pressure supplied to the cylinders forces the guide roller across the upper end of the flow nipple, and resilient means for returning the guide roller upon release of the pressure.

2. A guide roller rig as described in claim 1 wherein means is provided for limiting the travel of the guide roller across the end of the flow nipple.

3. A drill pipe guide roller rig as described in claim 1 wherein the mounting frame includes spaced vertically disposed legs connected by angle bars with chains extended from the angle bars around the flow nipple.

4. A drill pipe guide roller mounting as described in claim 1 wherein sleeves are slidably mounted on said cylinders and the guide roller and pistons are connected to said sleeves and also in which the resilient means for returning the guide roller includes springs connected to the sleeves at one of the ends thereof and positioned with the opposite ends connected to the cylinders.

5. In a drill pipe guide roller for well drilling rigs, the combination which comprises a mounting frame having spaced vertically disposed legs, chains connected to the vertically disposed legs with screw eyes and adapted to extend around the well casing for clamping the mounting frame to the casing, spaced horizontally disposed cylinders carried by the upper ends of the legs, pistons in said cylinders, sleeves slidably mounted on said cylinders, said cylinders having slots therein, means connecting the pistons to the sleeves through the slots in the cylinders, springs connected at one of the ends thereof to the cylinders and at the other of the ends to the sleeves slidably mounted on the cylinders, a guide roller journaled in said sleeves, and adjustable means for limiting outward travel of the guide roller and sleeves.

6. A pipe guide roller mounting as described in claim 1 wherein the guide roller is adjustable horizontally on said flow nipple.

7. A drill pipe guide roller mounting as described in claim 5, wherein the said vertically disposed legs are adapted to be mounted on the flow nipple of a well casing.

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The following references are of record in the file of this patent:

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