July 28, 1936. H. N. HERRICK 2,049,008

APPARATUS FOR HANDLING DRILL PIPE DURING ROTARY DRILLING

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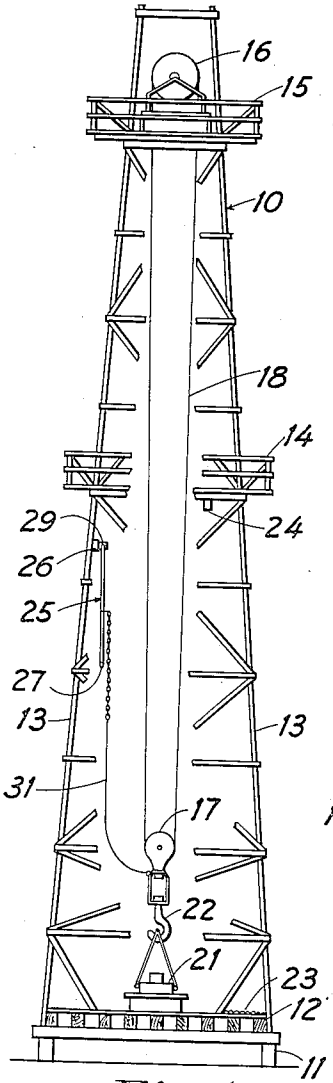



Fig. 1

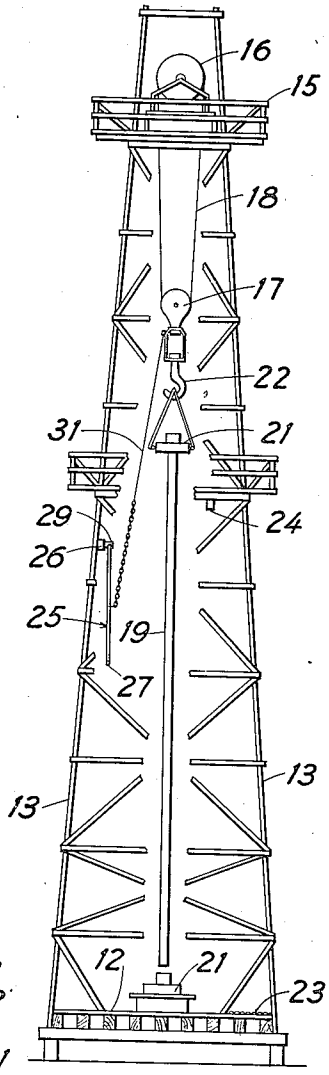



Fig. 2

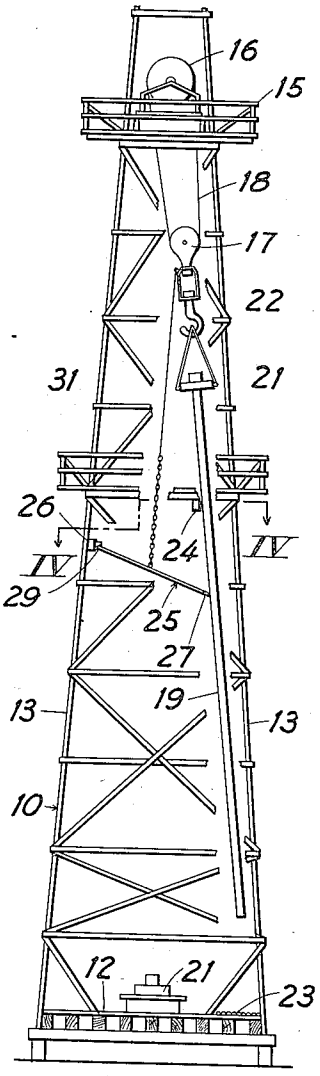



Fig. 3

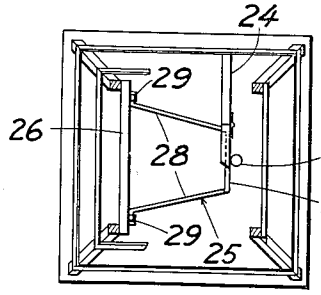



Fig. 4

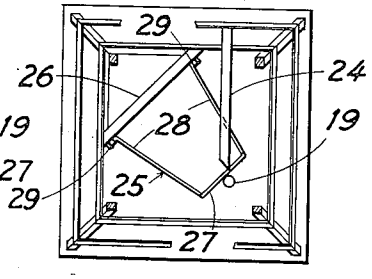



Fig. 5

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## APPARATUS FOR HANDLING DRILL PIPE DURING ROTARY DRILLING

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6 Claims. (Cl. 214—1)

This invention relates to an apparatus for handling pipe during rotary drilling and more particularly to an apparatus for automatically moving drill pipe laterally of a derrick when such pipe has been raised clear of the hole being drilled.

In the drilling of oil wells it has been the general practice to withdraw the drill pipe from the hole the distance of a single stand of the drill pipe to a point where the lower end of the stand of drill pipe is clear of the hole being drilled, after which time the stand of drill pipe withdrawn is disconnected and moved laterally of the derrick by manual labor. These stands of pipes are racked within the derrick and to one side thereof. Usually the distance to which the lower end of the pipe must be moved manually is about 10 feet. Each of these stands is generally about 85 feet long and weigh about a ton. This handling of the drill pipe is very severe manual labor. The severeness of this labor is most always aggravated by the fact that the floor of the derrick is covered with slippery mud which renders the operation dangerous and has resulted in many injuries and some deaths. Also very few men have sufficient endurance to rack 6,000 feet of pipe continuously, which causes the operation of withdrawing the pipe from the hole to be frequently interrupted.

It is one object of this invention to provide a mechanical device for overcoming the above difficulties.

Another object is to provide a mechanical device that will automatically operate to move a stand of drill pipe laterally of the derrick when the lower end of such pipe has been raised free and clear of the hole being drilled.

Another object is to provide a mechanical device that will operate efficiently to obviate the heavy manual labor during the racking of drill pipe whereby the manual labor required to rack pipe being drawn from a hole is limited to guiding the pipe to the pipe rack.

A further object is to provide a mechanical device having the above characteristics that will be so constructed and positioned as not to interfere with the other operating parts of the derrick.

A still further object is to provide a device having the above characteristics that shall be simple in structure, durable, positive and efficient in operation and that can be produced at a very small cost.

The accomplishments of the above and other objects of the invention will be apparent to those skilled in the art when taken in connection with the accompanying drawing wherein like reference characters refer to like parts. It is to be expressly understood that the drawing is not a definition of the invention but merely illustrates certain forms by means of which the invention may be effectuated.

In the drawing:

Figure 1 is an elevational view more or less diagrammatic of a derrick illustrating one embodiment of the invention.

Figure 2 is a view similar to Figure 1, showing a drill pipe withdrawn from the hole and the present invention in readiness to move the pipe laterally of the derrick.

Figure 3 is a view similar to Figures 1 and 2 illustrating the position of the pipe after being moved laterally of the derrick.

Figure 4 is a sectional view taken along the line IV—IV of Figure 3; and

Figure 5 is a view similar to Figure 4, illustrating a different position in which the present invention may be placed on the derrick.

With reference to Figures 1 to 4, inclusive, one form of the invention is disclosed in connection with a conventional derrick represented in its entirety by 10. The derrick comprises the usual foundation 11, floor 12 and legs 13, the latter usually being four in number. The derrick is provided with the usual safety platform 14, crows nest 15, crown block 16, traveling block 17 and drilling cable 18.

As illustrated in Figures 1 to 4, inclusive, the drill pipe 19 is connected to the traveling block 17 by means of a swivel 21 and hook 22. The traveling block 17 is raised by the drilling cable 18, carrying with it the pipe 19 to the position shown by Figure 2, at which time the lower end of the drill pipe is disconnected from the upper end of the cooperating stand of drill pipe. After the cooperating ends of the stand of the drill pipe have been disconnected, the stand 19 withdrawn from the hole is in readiness to be moved to the pipe rack. The pipe rack is positioned to one side of the derrick and the cooperating derrick floor is generally cushioned, as shown at 23, in order to prevent the scarring or impairing of the lower end of the pipe 19, which rests thereon. The derrick is also provided with a horizontal member 24, usually referred to as a finger, positioned intermediate the height of the derrick and adjacent the elevator platform for supporting the upper portion of the pipe 19 and retaining the same in the proper position for racking.

One form of the present invention comprises

a swinging frame represented in its entirety by 25. The frame 25 is turnably mounted to a horizontal member 26, fixed to the derrick legs at about mid-way the height of the derrick. The frame 25, which may consist of a free end 27 and a pair of legs 28 for connecting the free end 27 with the horizontal member 26, the opposite ends of the legs 28 from the free end 27 being turnably mounted to the horizontal member 26 at 29 by any suitable means.

The swinging frame 25 is operably connected to the traveling block 17 by any suitable means such as a chain or flexible cable 31. Two cables are preferably provided, one for connecting each of the legs 28 to the traveling block 17. The cables 31 preferably connect the legs 28 at a point intermediate their length. These cables are of the proper length to render the swinging frame 25 inoperable until the traveling block reaches the height shown in Figure 2. It can now be understood that upon further upward movement of the traveling block, the cables 31 will turn the frame 25 in a counter-clockwise direction about the horizontal member 26, thereby bringing the free end 27 of the frame 25 into contact with the pipe 19 and at a point intermediate the length of the pipe 19 and urge the pipe laterally of the derrick to the position shown in Figure 3. After the pipe has been positioned behind the finger 24, the crown block is then lowered sufficient to cause the lower end of the pipe 19 to rest on the cushioned portion 23 of the floor 12 of the derrick 10, the pipe 19 having been guided by manual labor to the proper position during this latter operation.

Figure 4 illustrates the position that the frame 25 may be placed with respect to the derrick when finger 24 is of the movable type, while Figure 5 illustrates the position in which the frame 25 may be placed when the finger 24 is of the stationary type.

The operation of the device is automatic and it can be noted from the drawing that the swinging frame 25 and cables 31 operate in such a manner as to be free and clear the other movable parts of the derrick, also when the traveling block is lowered to be attached to the next stand of drill pipe, the swinging frame and cable gravitationally take their positions as shown in Figure 1 and that the cables 31 are of such length as to bring the swinging frame into operating position with the pipe 19 when the pipe 19 is raised sufficient to clear its lower end of the hole being drilled.

While there are only certain embodiments of the invention illustrated and described, it will be apparent to those skilled in the art that certain changes, modifications, substitutions, additions and omissions may be made in the device without departing from the spirit and scope of the invention, as defined by the appended claims.

I claim:

1. In combination, a derrick having means for raising a pipe, and a hinged member supported in said derrick and operable by the first said means for moving said first named means and said pipe laterally of said derrick when said pipe has been raised to a predetermined position so that said pipe is in position to be racked within said derrick.

2. In combination, a derrick having a traveling block, a frame turnably mounted on said derrick and having one free end, and a flexible means for connecting said frame with said traveling block whereby said frame will be turned about its turnable mounting when said traveling block reaches a predetermined height.

3. A combination in accordance with claim 2 wherein the said flexible means connects said traveling block with said frame at a point intermediate the length of said frame.

4. In combination with a derrick having means for raising a pipe, of a frame having one of its ends turnably mounted on said derrick, and means for connecting said frame with the first said means for turning said frame about its turnably mounted end during the upward movement of the first said means.

5. In combination, a derrick having a traveling block, means for raising and lowering said traveling block, a frame having one of its ends turnably mounted on said derrick, a flexible means connecting said frame with said traveling block, the said flexible means being of such length as to permit said traveling block to move the greater part of the height of said derrick before the said frame becomes operable.

6. In combination with a derrick having a traveling block adapted to raise a pipe vertically within said derrick, pipe deflecting means supported in said derrick at a point intermediate the travel of said block, and a connector between said block and said pipe deflector means of such length that said means is operated when said block reaches a predetermined height.

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