HORIZONTALLY MOVING PIPE RACK

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Filed: Oct. 26, 1970

Appl. No.: 83,743

U.S. Cl. 211/60 RS, 175/52, 175/85
Int. Cl. A47I 7/00
Field of Search 211/60, 60 S; 175/85, 52; 214/2.5

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ABSTRACT

A carriage is mounted on a track. Rigidly mounted on the carriage there may be a row of parallel vertical posts that are spaced apart to provide vertical slots for receiving reclining pipe. The carriage is movable along the track intermittently to locate each of the slots in succession at a pipe-receiving station. Preferably, the carriage is narrow and a like carriage is spaced laterally from it and is movable in unison with it.

1 Claim, 5 Drawing Figures
Pipe racks are often located on the ground or other support beside oil well drilling masts for holding horizontally disposed pipe before it is run into a well and while it is removed from the well between trips. The pipe is laid down on the rack in one location and then rolled to another to fill the rack, or a conveyor carries the pipe from the point at which it is laid down to another location on the rack. These systems require either manual labor or undesirable mechanical equipment.

It is among the objects of this invention to provide a pipe rack on which pipe always is laid down from the same position, with which it is unnecessary to move the pipe along the rack after it has been deposited on it, and which simplifies pipe racking and speeds up the process.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which Fig. 1 is a plan view of our pipe rack; Fig. 2 is an enlarged fragmentary plan view; Fig. 3 is a side view of the apparatus shown in Fig. 2; Fig. 4 is an enlarged cross section taken on the line IV—IV of Fig. 2; and Fig. 5 is an enlarged longitudinal section taken on the line V—V of Fig. 2.

Referring to the drawings, a pair of long, parallel base members 1 are seated on the ground or on suitable foundations. They are a considerable distance apart, as shown in Fig. 1. Each base member includes a pair of spaced parallel beams 2 rigidly connected together at intervals by cross members 3. Mounted on top of each beam is a rail 4 to form a track that supports and guides the flanged wheels of a carriage 6. The sides of the carriage likewise may be formed from parallel I-beams 7 and 8 rigidly connected at their ends by cross member 9. Near one end, called the rear end herein, a pair of the wheels 10 are journaled on the ends of a shaft 11 extending through the sides of the carriage and welded therein.

Near the opposite or front end of the carriage a fixed shaft 14 likewise is welded in the carriage sides, but rockably mounted on each projecting end of this shaft is the central portion of a walking beam 15. Rigidly mounted in the ends of the beams are connecting shafts 16 that extend through large openings 17 (Figs. 4 and 5) in the side beams of the carriage. Four wheels 18 are journaled on the projecting ends of these two shafts. The walking beams ensure equalization of the load on their wheels. If desired, however, the walking beams can be dispensed with and three independent axles can be spaced along the carriage, especially when the carriage is quite long so that it will be flexible enough to distribute the load properly to the three axles.

Mounted on top of the outer side beam 7 of each carriage is a series of parallel vertical posts 21. Most of them are spaced far enough apart lengthwise of the carriages to provide vertical slots just wide enough to receive stands of horizontal drill pipe that can be stacked in the slots, but at the front end of the carriages the slots are wider for receiving drill collars 22, as shown in Fig. 3.

For moving each carriage along the tracks there is a traction screw 25 that has its ends rotatably mounted in bearings 26 secured to blocks 27 and 28 mounted on the end cross members of the underlying base member. The screw extends centrally through a carriage 6 directly above its cross shafts. A nut 29, shown in Fig. 5, is mounted on the screw and secured against rotation in the front cross member 9 of the carriage, so that when the screw is turned it will move the carriage along the track. The two screws are driven from their rear ends. Preferably, drive sprockets 31 are mounted on the screws near their rear bearings and are connected by an endless chain 32 so that only one screw needs to be driven directly and yet both will be turned in unison. The drive for the one screw can be any suitable motor connected to its rear end, such as a hydraulic drive 33.

To make the structure more rigid and to tie the two carriages together more directly, it is desirable to connect their rear ends by a truss. This truss may include two vertically spaced horizontal beams 35 and 36 (Fig. 3) secured at their ends to the rear posts and the rear ends of the inner side beams 8 of the carriages. Another horizontal beam 37 is fastened at its ends to the same side beams in front of the rear wheels. Horizontal braces 38 connect the two lower beams of the truss, and other braces 39 connect the vertically spaced beams.

With the pipe rack disclosed herein, pipe removed from an oil well mast is always lowered in the same path to the rack carriages. This is done by the pipe-lowering means shown supporting drill collar 22 in Fig. 3. As fast as one set of carriage slots is filled with pipe, the carriages are moved just far enough to place the next set of slots in pipe-receiving position. This can be repeated, if necessary, until all of the slots are stacked full of pipe. Of course, in running the pipe back into the hole this procedure is just reversed. Every time a stack of pipes in a set of slots is removed, the carriages are moved along the tracks to bring the next stack into position for removal. The construction of the rack is relatively simple and the movement of the carriages is easily controlled by controlling the drive for the chain and sprockets.

There may be situations in which it is desirable to omit posts 21, except possibly the end posts, and to rack pipe on the carriages in horizontal rows laid one upon another. This can be done in the same way as just explained, by moving the carriages along the tracks step by step, except that they will be moved after each pipe is laid down instead of waiting for a stack of pipe to be formed.

According to the provisions of the patent statutes, we have explained the principle of our invention and have illustrated and described what we now consider to represent its best embodiment. However, we desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:
1. The combination with means for lowering to a horizontal position pipe removed from an oil well mast, said means always lowering the pipe in the same vertical plane, of a pipe rack for storing the lowered pipes horizontally comprising two pairs of substantially horizontal parallel rails extending across said vertical plane, one pair of said rails being laterally spaced from the other pair, a carriage above each pair of rails and having wheels for running on said rails, means extend-
ing between the carriages rigidly connecting them for simultaneous movement, a plurality of parallel vertical posts rigidly mounted on each carriage and spaced apart lengthwise of the rails to provide vertical slots for receiving said pipes with each pipe supported by both carriages, and drive means operatively related to said carriages for moving the carriages along said rails intermittently to position successive slots in said vertical plane to receive pipe from said lowering means.

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