ABSTRACT: A safety device for maintaining racked pipe against lateral displacement, once the pipe is racked in place and secured within the rack by a safety device, which, in the present instance, comprises a series of chains extending across the racking beams, with means on the racking beams, such as recesses to receive the chains. Provision is made to hang up each of the chains once a row of racked pipe is removed from between the beams which receive the pipe.
PIE RACKING PLATFORMS FOR DRILLING RIG MASTS AND THE LIKE

BACKGROUND OF THE INVENTION

This invention relates to a safety device for retaining racked pipe in a derrick or mast against lateral displacement. It is desirable to provide a safety device of this character on the pipe-racking beams of a derrick or mast which is simple and inexpensive in construction, yet sturdy and reliable in operation and requires a minimum of maintenance.

It is difficult to provide a safety device for pipe rack incorporating the above-mentioned desired design characteristics. Many of the pipe racks built heretofore were devoid of safety features and would permit pipe to be released, which could do great damage to the derrick structure and cause injury or loss of life. The safety devices, as far as known heretofore, have been inadequate to meet all the needs and requirements in the racking of pipe.

The following patents are the known prior art:
795 413 Patterson, Jul. 25, 1905 Cl. 280—179; 1 392 343, Leishman, Oct. 4, 1921 Cl. 280—791; 716 559 Myers, June 11, 1929 Cl. 255—1; 1 971 609 Harrah, Aug. 28, 1914 Cl. 211—60; 2 075 711 Gilley, Mar. 30, 1937 Cl. 214—152.

SUMMARY OF THE INVENTION

An object of this invention is to provide a safety device for the pipe rack of a mast or derrick, which will retain the pipe against lateral displacement when the racked pipe is secured in place.

Another object of the invention is to provide a series of members to pass transversely across pipe-racking beams to maintain pipe in place within the rack of a drilling rig.

Still a further object of the invention is to provide a safety device for a pipe rack, by providing chains which extend transversely across pipe-racking beams, which pipe-racking beams have notched or recessed bars thereon to receive a link of the chain, when in one position, and which notch or recess will prevent longitudinal movement of the chain fitted therein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view taken from a side and above a pipe-racking platform showing pipe-racking beams or fingers extending outward therefrom, notched bars being shown on the upper side thereof, showing transverse chains secured to the racking platform and extending thereacross, and showing one of the chains supported on a hook;

FIG. 2 is an enlarged, fragmentary view showing a portion of the support frame of a racking platform, showing a finger or beam secured at one end thereof to the frame thereof, showing a notched, upstanding chain-receiving bar secured to the upper side of the fingers, with parts of the finger being broken away and shown in section to bring out the details of construction, and showing a portion of the support frame as broken away and in section;

FIG. 3 is an elevational view of a mast showing a pipe-racking platform thereon and showing the pipe racked therein;

FIG. 4 is an enlarged, fragmentary top plan view of a pipe-racking platform having fingers or beams thereon, with notched bars secured to the upper portion of the beams, showing chains passing transversely thereacross and fitted within the notches or recesses thereof, and showing a pipe in place between the pipe-racking beams and between the safety chains fitted within the recess or notches;

FIG. 5 is a fragmentary perspective view of a modified form of the invention; and

FIG. 6 is a fragmentary perspective view of the invention shown in FIG. 5, but taken substantially at right angles thereto.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, wherein like reference characters designate like parts throughout the several views thereof, the numeral 1 designates generally a well-drilling rig having an upstanding mast or derrick which is designated generally at 2. A racking platform, designated generally by the numeral 4, is hingeably attached to the mast or derrick 2 by a longitudinal pivot member 8 which permits the platform to hinge from a vertical position to a horizontal position, as shown in FIGS. 1 and 3. Support cables 10 hold the platform 4 in a horizontal position when the mast is in the erected position, as shown as FIG. 3.

The platform 4 has spaced-apart fingers 12 secured to a side of the platform so as to form pipe-receiving slots 14 therebetween. The fingers 12 have upstanding bars 16 weldedly secured thereon as indicated at 15, which bars have spaced-apart notches 18 formed therein, in the upper side thereof, and which notches 18 are aligned with a link of a chain 20 therein when the link thereof is in edgewise relation thereto, but which slots are sufficiently narrow to prevent the chains 20 from being moved through the slots when the links thereof are in a flatwise position. Therefore, when a link of the chain 20 is positioned edgewise in the slot 18, the adjacent links, when turned flatwise, form abutments to hold the chain against longitudinal movement, as will best be seen in FIG. 4.

In the drilling of wells with a rotary drilling rig which uses pipe-racking platforms, it is desirable to stabilize the stands of drill pipe 19 in the derrick or mast in a pipe-racking platform, to prevent unwanted lateral movement, which, if several lengths of drill pipe shift laterally, simultaneously, catastrophic damage could result. The present racking platform has a multiplicity of chains 20, each chain is connected to a loop 21 and to the side 21A of the frame of the platform, which chains, when not in use, may be supported on hooks 22, on a guard rail 24 of the racking platform. As the lengths of the pipe are removed from the well these lengths or stands may be moved laterally into slots 14 with the first row being positioned at the inner end thereof. Whereupon, when one row of pipe has been so positioned, the first chain 20 is passed thereacross, as indicated at the right-hand end of FIGS. 1 and 3, however, with this arrangement, as one length or stand of pipe is put in place, the chain 20 may be dropped into another notch 18 on an adjacent bar 16. In this way, each stand of pipe is stabilized against movement in any direction.

As more stands of pipe are removed and placed within slots 14 on one side of finger board 26, the racking may continue until the last stand of pipe is placed in a slot 14, with the last chain being lowered into notches 18 to hold the stands of pipe against lateral movement. Then additional stands of pipe may be placed between fingers 12 and into slots 14 on the opposite side of the finger board and the same procedure repeated until all the pipe is racked and secured in place.

Upon going into the hole with the drill pipe, as it is desired to remove the stands of pipe, the portion of the chain 20 retaining the particular stands in slots 14 is removed to enable the removal of the stands of pipe, which process is continued until all the stands of pipe are removed from the slots 14. Each time a row of pipe is removed from between the chains 20, the chain 20 is hung on one of the respective hooks 22, so it will not be in the way of removing other stands of pipe from slots 14.

MODIFIED FORM OF INVENTION

The form of the invention as shown in FIGS. 5 and 6 utilizes a single chain 30, which chain is secured to the outer, upstanding notched bar 16, approximately mediate the length thereof, which chain 30 is of sufficient length to pass longitudinally along the bar 16 to a row of notches 18 near an end of the bar 16 where the chain may drop into one of the notches 18. Then, as a length of pipe 19 is placed in the first slot 14 between the outwardly extending fingers 12, the upstanding
pipe 19 is held against lateral movement in any direction and subsequent lengths of pipe are so positioned until the first row of pipe is racked within the pipe rack, designated generally by the numeral 4. The pipe rack may also have an oppositely disposed set of fingers, such as shown in FIG. 1, with a chain 30 similarly secured to the outermost upstanding notched bar 16, approximately mediate the length thereof, and the chain 30 is of a length to pass longitudinally along the notched bar to which it is attached and transversely across other notched bars so the chain can be placed in any row of notches 18, as desired. In this manner one chain may be utilized to hold the rows of upstanding pipe 19, as the pipe is racked within the slots 14 between the fingers 12.

The notched bars 16 in FIGS. 5 and 6, having notches 18 therein, are identical with the notched bars 16 as shown in FIGS. 1 through 4, and the chain 30 is of the same general character as the chain 20 in the aforementioned form of the invention; however, the chain 30 must be of sufficient length to pass longitudinally along approximately one-half the length of the outer finger to which it is attached, and to the most distant notch 18 thereon and to pass transversely across all the fingers so that the chain links may drop individually into each of the notches 18. As additional pipe is racked within the slots 14, the chain 30 is moved outward to perform a safety function, that is, to prevent the pipe 19 shifting laterally.

The manner of attaching the upstanding notched bars to fingers 12 is shown in the enlarged perspective detail view in FIG. 2.

As this invention may be embodied in several forms without departing from the spirit or the essential characteristics thereof, the present embodiments are therefore illustrative and not restrictive, and, since the scope of the invention is defined by the appended claims, all changes which fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents are therefore intended to be embraced by these claims.

I claim:

1. A safety device for pipe-racking platforms, on an elevated tower, having a plurality of outwardly extending fingers for use with well-drilling rigs:
   a. a length of chain means having links associated with the platform, which chain means is adapted to abridge between at least two fingers; and
   b. link-engaging means on at least one of said outwardly extending fingers to engage a link of said chain to maintain said chain against longitudinal movement when said chain means is in abridging relation between certain of said fingers.

2. A safety device for pipe-racking platforms, as defined in claim 1 wherein:
   a. said link-engaging means is an upstanding bar means having notches formed therein on the upper side thereof a spaced distance apart; and
   b. said bar means is secured to and extending longitudinally of certain of said fingers.

3. A safety device for pipe-racking platforms, as defined in claim 2 wherein:
   a. each of said outwardly extending fingers has said bar means thereon in which bar means notches are formed in the upper side thereof a spaced distance apart;
   b. said notches on said bar means being arranged in transverse rows to retain links of chain therein;
   c. said chain means associated with said platform is a plurality of chains;
   d. one said chain arranged in transverse aligned relation with respect to each transversely aligned row of notches in said bar means.

4. A safety device for pipe-racking platforms, as defined in claim 3 wherein each said chain extends across a plurality of notched bar means with a link on each chain complementally engaging a notch in each said notched bar means, so as to form pipe retainer means between a plurality of fingers to prevent lateral movement of pipe with respect thereto.

5. A pipe-racking platform for well-drilling masts and the like, which platform comprises:
   a. a frame adapted to be supported on the mast a spaced distance above the terrain;
   b. a plurality of spaced-apart fingers, one end of each of said fingers being secured to said frame and extending outwardly therefrom in substantially parallel relation to form slots therebetween, the spacing between said fingers being at least the diameter of the pipe to be received therebetween;
   c. the distal ends of said fingers forming an opening therebetween for passage of pipe into said slots;
   d. an upstanding bar secured to certain of said fingers, each bar having notches formed therein in the upper side thereof in substantially transversely aligned relation, and spaced apart a distance at least the diameter of the pipe to be received in said slots;
   e. a plurality of chains attached to a side of said frame and being in substantially aligned relation with said upstanding bar; and
   f. each said chain being secured to said frame in substantially aligned relation with rows of slots in said upstanding bars.

6. A safety device for pipe-racking platforms as defined in claim 2 wherein the length of chain means is associated with said upstanding bar means intermediate the length thereof, which chain is adapted to pass transversely across said upstanding bar means to engage notches therein at spaced intervals throughout the length of said upstanding bar means.

7. A safety device for pipe-racking platforms as defined in claim 2 wherein:
   a. said length of chain means is adapted to extend longitudinally along the upstanding bar means to a notch near either end thereof; and
   b. to extend transversely across and to engage in said notched bar means to enable upstanding pipe to be secured against lateral movement between said fingers on the pipe-racking platform.