May 31, 1960 W. A. PITTS 2,938,747

HOISTING SLING FOR CYLINDRICAL ARTICLES

Filed July 7, 1958 2 Sheets-Sheet 1

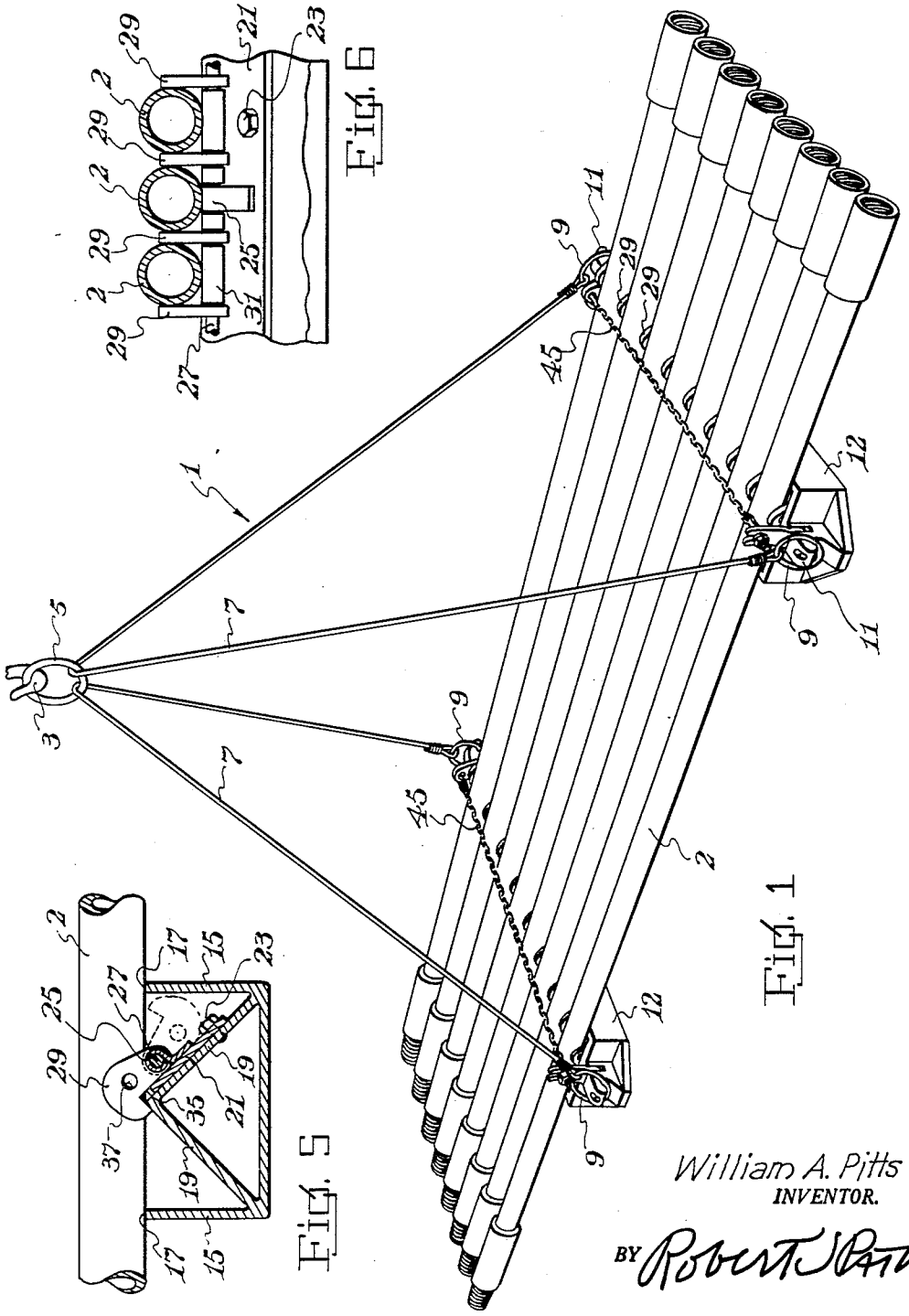


Fig. 1

Fig. 5

Fig. 6

William A. Pitts
INVENTOR.

BY Robert J. Patch

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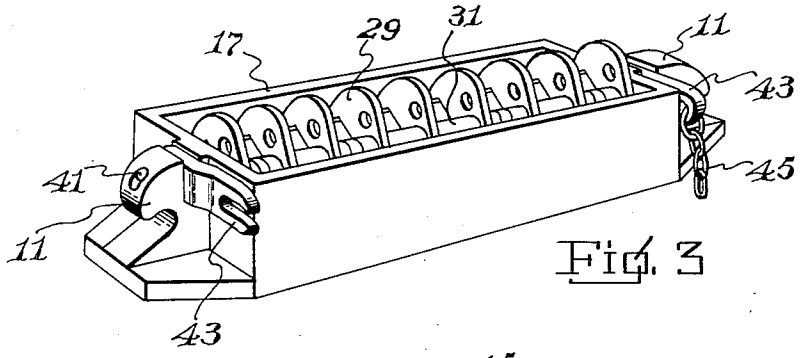


Fig. 3

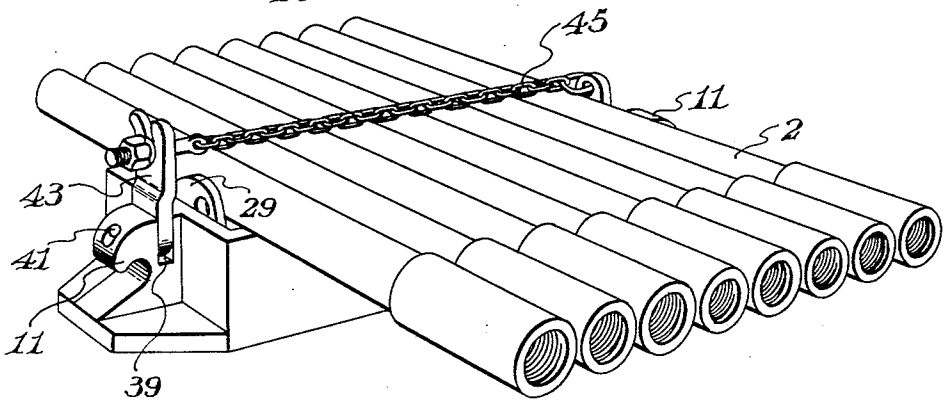


Fig. 2

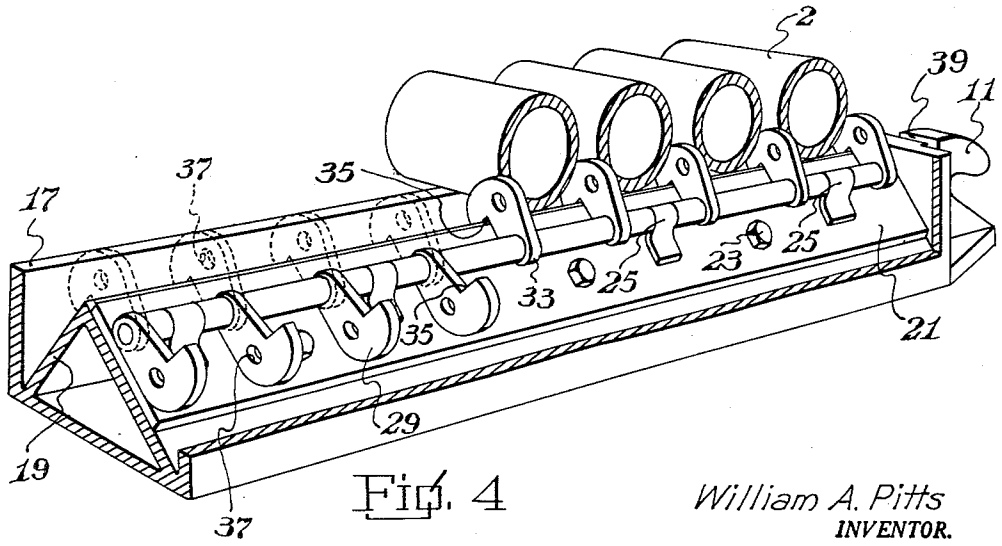


Fig. 4

William A. Pitts
INVENTOR.

BY Robert J. Patty

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HOISTING SLING FOR CYLINDRICAL ARTICLES

William A. Pitts, 1620 South Carolina Ave., Tulsa, Okla.

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3 Claims. (Cl. 294—67)

The present invention relates to a hoisting sling for cylindrical articles. The invention has utility in providing support for any of a variety of cylindrical articles, particularly long cylindrical articles such as casing or joints of drill pipe used in the construction of gas and oil wells, and will be illustrated by way of example in connection with drill pipe.

The sections of well casing and joints of drill pipe used in gas and oil well practice are quite heavy, commonly weighing a quarter of a ton to a half a ton or so apiece. These are carried from place to place and stored in groups of units lying side-by-side and during handling are frequently stacked and unstacked and moved individually. These units are cylindrical and quite long relative to their thickness, and during handling they tend to roll and shift relative to each other. Obviously, the handling of these units is rather difficult, and they sometimes break free from their restraints and roll about or fall, to the great danger of workmen in the vicinity. Indeed, serious injuries and deaths have resulted from the uncontrolled movement of these units during handling.

Although numerous attempts have been made to provide suitable devices for handling these and other cylindrical articles, none, as far as is known, has been entirely successful when used commercially on an industrial scale.

Accordingly, it is an object of the present invention to provide a hoisting sling for cylindrical articles, which will be safe for use by workmen in the vicinity.

Another object of the present invention is the provision of a hoisting sling including at least one rack for cylindrical articles, which will hold the articles securely in spaced apart relationship during bodily movement of a group of the articles.

Still another object of the present invention is the provision of a portable rack for cylindrical articles onto and from which the articles may be placed and removed without disturbing other such articles on the rack.

Finally, it is an object of the present invention to provide a hoisting sling for cylindrical articles, including as a subcombination thereof a portable rack for such articles, which will be simple and inexpensive to manufacture, easy, safe and secure to use, and rugged and durable in operation.

Other objects and advantages of the present invention will become apparent from a consideration of the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of a hoisting sling according to the present invention and showing a plurality of cylindrical articles in place thereon;

Figure 2 is an enlarged perspective view of a fragment of Figure 1, particularly illustrating the operative relationships of the portable rack;

Figure 3 is a view similar to Figure 2 but showing the articles removed;

Figure 4 is a still further enlarged fragmentary perspective view of the portable rack subcombination of the present invention;

Figure 5 is a fragmentary cross-sectional view of the portable rack viewed endwise thereof; and

Figure 6 is a fragmentary elevational view of a portion of the rack, with parts broken away for clarity, viewed endwise of the cylindrical articles.

Referring now to the drawings in greater detail, there is shown in Figure 1, a hoisting sling indicated generally at 1 for carrying elongated cylindrical articles such as a plurality of sections of drlil pipe 2. The assembly is supported from a boom line hook 3 of a crane or other conveyance (not shown), which engages in a ring 5 through which are reeved two cables 7. Cables 7 have eyes at their oposite ends, which are secured to rings 9 which in turn engage under oppositely extending ears 11 at each end of each of two portable racks 12.

Each rack 12 comprises a rigid frame 13 having a pair of upstanding longitudinally extending side flanges 15 which terminate upwardly in spaced parallel straight upper edges 17 on which pipe sections 2 are adapted to roll. Disposed between flanges 15 longitudinally of and integral with frame 13 is a central member 19 which in cross section has an inverted V shape. Detachably secured one one of the inclined outer side faces of member 19 is an elongated bracket plate 21 which extends substantially full length of member 19 and is releasably secured thereto by means of a plurality of bolts 23 passing through holes in plate 21 and secured to member 19. Plate 21 is provided with a plurality of longitudinally spaced upstanding stanchions 25 which provide aligned eyes for the reception of a cross shaft 27 which is rotatable therein. Thus, cross shaft 27 is parallel to but spaced from the associated inclined side of member 19, and hence is also parallel to and spaced from upper edges 17.

Pivotally mounted for swinging movement on and relative to cross shaft 27 is a plurality of detents 29 spaced apart from each other and from stanchions 25 by a plurality of spacer sleeves 31 loosely received on cross shaft 27. Each detent 29 has an apertured end portion 33, and spaced therefrom, an angularly recessed cutaway portion 35 on the same side of detent 29 as is the apex of central member 19. Each detent 29 has a hole 37 therethrough for the reception of a tool (not shown) by which the detents may be swung between the positions shown in full and dotted lines in Figures 4 and 5 of the drawings.

Thus, as perhaps best seen in Figure 5, each detent 29 is swingable on and relative to cross shaft 27 between two positions: the operative position shown in full line in Figure 5 in which the recess at 35 fits over the apex of member 19 and detent 29 extends above edges 17; and the inoperative position as shown in dotted line in Figure 5 in which detent 29 is disposed entirely beneath the plane defined by upper edges 17 and rests on plate 21. It is particularly to be noted that in the operative position the center of gravtiy of detent 29 is disposed on one side of the vertical plane which includes the axis of cross shaft 27, while in the inoperative position the center of gravity of detent 29 is disposed on the other side of that plane. Hence, both positions are equilibrium positions in which the detent rests by gravity on a subjacent support.

Ears 11 extend no higher than the plane of upper edges 17 and in fact taper downwardly away from that plane. They are recessed as at 39, and a fulcrum rod 41 extends through each ear and across the recess and terminates in the end walls of frame 13, thereby to provide pivotal mounting about a common axis for a pair of chain brackets 43 which can swing from a raised operative position as seen in Figure 2 to a lowered inoperative position as seen in Figure 3. In raised posi-

tion, the brackets carry between them a chain 45 or the like for retaining pipe sections 2 in place on the rack; and in lowered position, brackets 43 extend no higher than the plane of upper edges 17.

The assembly of the device according to the present invention is as follows:

With bracket plate 21 removed and cross shaft 27 separate from the stanchions 25, the required detents 29 and spacer sleeves 31 are assembled and laid out as required. The spacer sleeves are selected of two lengths: the longer approximately the diameter of the cylindrical article to be supported and the shorter one-half the difference between the diameter of the cylindrical articles and the width of a stanchion 25. To form the assembly shown in Figure 4, for example, cross shaft 27 would be fed through a detent 29, a short sleeve 31, a stanchion 25, another short sleeve 31, a detent 29, a long sleeve 31, another detent 29, a short sleeve 31, another stanchion 25, and so on. The plate 21 with the loosely assembled cross shaft 27 and detents 29 and sleeves 31 is then set in place on an inclined side of central member 19 and bolts 23 used to secure it in place. Since cross shaft 27 is of a length approximately the distance between the end walls of frame 13, no further securement of the assembly on cross shaft 27 is needed.

The operation of the device is as follows:

With all the detents 29 in the lower or inoperative position and the chain brackets 43 in the position of Figure 3, a detent 29 is swung up to the full line position of Figure 5 at that end of frame 13 which is farthest away from the articles to be loaded on the rack. The first cylindrical article is then rolled onto the rack, and it will be noted that ear 11 at the entry end serves as a ramp and that upper edges 17 thereafter serve as a rollway for rollably supporting the article. The article rolls along the rack until it is stopped by the raised detent. The next detent is then raised, thereby securing the first article in position on the rack and the second article is rolled onto the rack until stopped by the second detent. This procedure continues until the rack is full, as in Figure 2. Thereupon, chain brackets 43 are swung up and chain 45 secured therebetween, thereby preventing movement of the articles from their cradles between detents 29.

When the portable rack of the present invention is used as a subcombination of a hoisting sling, it will of course be understood that two frames 13 are set out on a support in parallelism and spaced apart substantially as seen in Figure 1. The operations on the two racks are performed at about the same time so that the group of articles secured to the racks will be each firmly supported at a pair of spaced locations lengthwise of the articles. Rings 9 are then slipped under the four ears 11 and the hoist is ready to be raised.

Naturally, unloading of the rack or the hoist proceeds in the opposite fashion from that described in connection with the loading operation.

Although the present invention has been described and illustrated in connection with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit of the invention, as those skilled in this art will readily understand. Such modifications and variations are considered to be within the purview and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A hoisting sling for cylindrical articles, comprising a pair of cradles each comprised of an elongated rigid frame, each frame having uppermost surfaces adapted to support a plurality of cylindrical articles thereon, a plurality of spaced detents spaced apart lengthwise of the frame and including a detent adjacent each end of the frame and a plurality of detents in line between said end detents, means mounting the detents on the frame for individual swinging movement about a common axis disposed lengthwise of the frame and below said uppermost surfaces, the detents being thus swingable between first positions in which the detents are disposed below said uppermost surfaces to permit cylindrical articles to roll on said uppermost surfaces and second positions in which the detents extend above said uppermost surfaces with one detent disposed between each two adjacent cylindrical articles to prevent cylindrical articles disposed between said detents from rolling off said uppermost surfaces but to permit cylindrical articles to roll off said uppermost edges one by one as the detents are returned to said first positions one by one, the centers of gravity of the detents in said first positions being disposed on one side of the vertical plane which includes said common axis, the centers of gravity of the detents in said second positions being disposed on the other side of said plane, support means on which the detents rest by gravity in each of said first and second positions, flexible members secured to each frame adjacent the ends of each frame, and further support means common to both frames and to which the flexible members of both frames are connected and from which both frames hang by the flexible members in parallel horizontal relationship.

2. A portable rack for cylindrical articles, comprising an elongated frame having uppermost surfaces, adapted to support a plurality of cylindrical articles thereon, a plurality of spaced detents spaced apart lengthwise of the frame and including a detent adjacent each end of the frame and a plurality of detents in line between said end detents, means mounting the detents on the frame for individual swinging movement about a common axis disposed lengthwise of the frame and below said uppermost surfaces, the detents being thus swingable between first positions in which the detents are disposed below said uppermost surfaces to permit cylindrical articles to roll on said uppermost surfaces and second positions in which the detents extend above said uppermost surfaces with one detent disposed between each two adjacent cylindrical articles to prevent cylindrical articles disposed between said detents from rolling off said uppermost surfaces but to permit cylindrical articles to roll off said uppermost edges one by one as the detents are returned to said first positions one by one, the centers of gravity of the detents in said first positions being disposed on one side of the vertical plane which includes said common axis, the centers of gravity of the detents in said second positions being disposed on the other side of said plane, and support means on which the detents rest by gravity in each of said first second positions.

3. A portable rack for cylindrical articles, comprising an elongated frame having a pair of spaced parallel straight uppermost edges extending lengthwise of opposite sides of the frame and adapted to support a plurality of cylindrical articles thereon, a plurality of spaced detents disposed between said uppermost edges and spaced apart lengthwise of the frame and including a detent adjacent each end of the frame and a plurality of detents in line between said end detents, means mounting the detents on the frame for individual swinging movement about a common axis disposed lengthwise of the frame, said axis being disposed parallel to and between and below said uppermost edges, the detents being thus swingable between first positions in which the detents are disposed below said uppermost edges to permit cylindrical articles to roll on said uppermost edges and second positions in which the detents extend above said uppermost edges with one detent disposed between each two adjacent cylindrical articles to prevent cylindrical articles disposed between said detents from rolling off said uppermost edges but to permit cylindrical articles to roll off said uppermost edges one by one as the detents are returned to said first position one by one, the centers of gravity of the detents in said first positions being disposed on one side of the vertical plane which

includes said common axis, the centers of gravity of the detents in said second positions being disposed on the other side of said plane, and support means on which the detents rest by gravity in each of said first and second positions.

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