

J W DURBIN

PIPE RACKING DEVICE

3 Sheets-Sheet 1



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PIPE RACKING DEVICE

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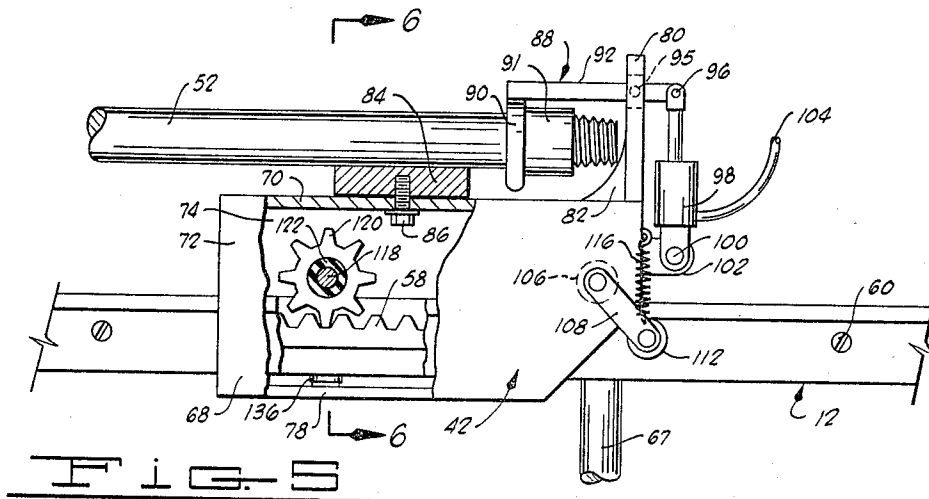
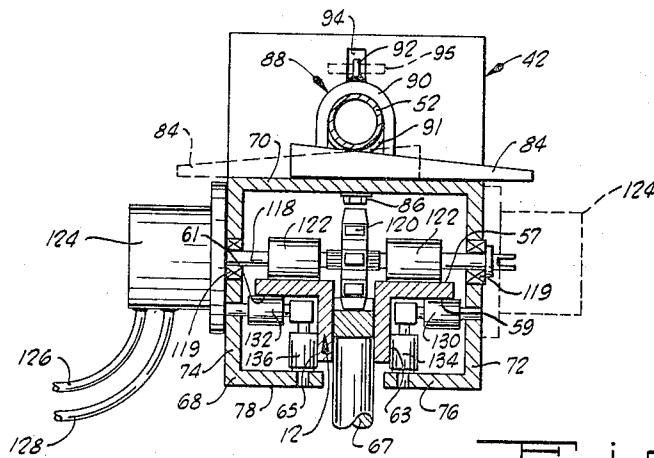
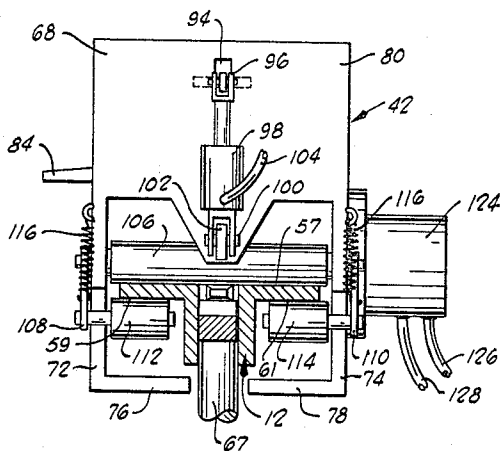


FIG. 7

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3 Sheets-Sheet 3

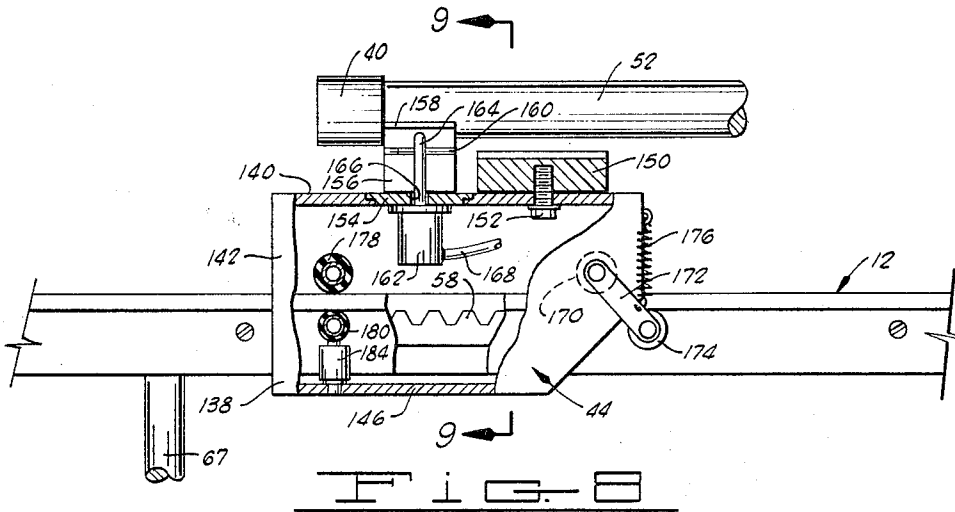
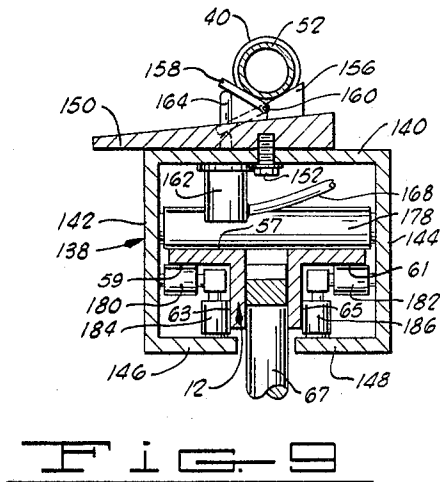
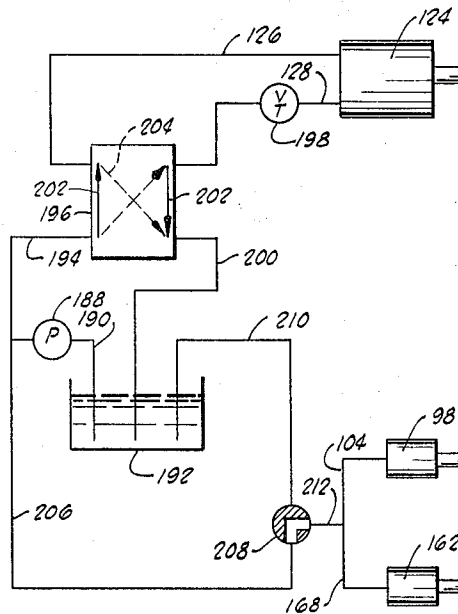


Fig. 10

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PIPE RACKING DEVICE

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9 Claims. (Cl. 214-2.5)

This invention relates generally to improvements in apparatus for racking pipe or the like. More particularly, but not by way of limitation, this invention relates to an improved power driven device for racking pipe used in the drilling of oil and gas wells or the like.

In the rotary method of drilling oil wells, joints of drill pipe approximately thirty feet in length are threadedly connected to form a continuous conduit or drill string which carries the drill bit on its lower end. The bit is rotated to bore into the formation by rotating the upper end of the drill string. It is frequently necessary to change a drill bit due to wear or breakage, and in order to do so, the drill string and attached bit must be removed from the well.

To facilitate removing the drill string from the well, which may be several miles deep, the string is generally divided into "triples" or short strings consisting of three thirty feet joints of drill pipe. The "triples" are most often positioned vertically in the derrick with their lower ends resting on the rig or derrick floor. In the case of very deep wells, and during certain other operations such as when casing is to be run into the well, there is insufficient space on the floor to accommodate all of the drill pipe. Also, when drilling has been completed the pipe will not be positioned in the derrick.

When all of the pipe cannot be accommodated on the rig floor, the drilling string is divided into thirty foot joints and racked horizontally on pipe racks provided adjacent the drilling rig for this purpose. The pipe racks are usually about four feet above the level of ground as compared with the height of the rig floor, which may be from ten to twenty feet above the ground. To facilitate the removal of the pipe joints from the floor to the rack, an inclined ramp, usually constructed of heavy timbers, extends from the floor to the pipe rack level. A catwalk, also generally constructed of heavy timbers, extends from the inclined ramp across the central portion of the pipe rack. Each joint to be moved is caught at its upper end by a device known as an elevator, lifted vertically, and broken loose from the next lower joint. The lower end of the joint is then swung to the inclined ramp and lowered with its lower end sliding down the ramp. A two-wheel trolley which is operated manually is used to lift the lower end of the joint when it reaches the end of the incline, to move the joint rapidly along the catwalk after the elevator has been disconnected. On reaching a position adjacent the pipe rack, the joint is rolled off the catwalk onto the pipe rack.

The afore-described operations are carried out very quickly and the heavy joints are handled very roughly. Frequently, the joints are bent and must be straightened before they can be re-used. Often they are damaged so extensively that they cannot be re-used. Furthermore, such a procedure is dangerous, particularly to the man operating the trolley. Occasionally, a joint may be dropped, damaging not only the joint of pipe but other equipment in the vicinity and, of course, endangering the lives of workers on or about the rig.

One pipe racking device proposed in the past included a track instead of the inclined ramp and catwalk and had two cars movably mounted on the track. One car was to quickly and the heavy joints are handled very roughly, support the lower end of the joint of pipe and the other car was to support the opposite end of the joint. The car supporting the lower end of the joint was connected with a cable and winch system through which it was attempted to

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control the rate of movement of the pipe along the track, and then to return both cars to the upper end of the track adjacent the rig floor. The device depended entirely on the force of gravity to move the joint and supporting cars to the pipe rack. Also, no provision was made on either car for positively latching the joint thereto. The pipe was discharged from the first car upon engagement with a projection on the track, but the second car did not discharge the pipe except as a result of the pipe movement away from the first car. This arrangement could result in the pipe leaving the cars at an angle and perhaps missing a portion of the rack or, at best, entering the rack askew. The racked pipe would then have to be straightened by hand before additional joints could be racked.

This invention provides improved pipe racking apparatus including an elongated track which can replace the inclined ramp and catwalk or be mounted thereon. The elongated track is provided with a rack gear which is co-extensive therewith and a first car movably mounted on the track, having a pinion gear in engagement with the rack gear, and means for rotating the pinion gear to propel the first car along the track. The apparatus also includes a second car movably mounted on the track. The first and second cars are arranged to latch onto and carry opposed ends of a joint of pipe.

One object of the invention is to provide an improved pipe racking device that will safely and quickly rack pipe.

Another object of the invention is to provide an improved pipe racking device which is power driven in both directions to and from the pipe rack.

A further object of the invention is to provide an improved pipe racking device that releases each end of a joint of pipe simultaneously so that the pipe will be racked evenly and without manual rearrangement.

An additional object of the invention is to provide an improved pipe racking device that will rack pipe efficiently without damage to the pipe.

The foregoing and additional objects and advantages of the invention will become more apparent as the following description is read in conjunction with the accompanying drawings wherein like reference characters denote like parts in all views, and wherein:

FIG. 1 is an elevation view of a portion of a drilling rig illustrating the pipe rack and a pipe racking device constructed in accordance with the invention;

FIG. 2 is a plan view of the apparatus of FIG. 1;

FIG. 3 is an enlarged view, partly in elevation and partly in cross-section, of a portion of one embodiment of the track used in carrying out the invention;

FIG. 4 is a cross-sectional view of the track of FIG. 3 taken along the line 4-4 of FIG. 3;

FIG. 5 is an enlarged side view, partly in elevation and partly in cross-section, of a car used in carrying out the invention;

FIG. 6 is a cross-sectional view taken along the line 6-6 of FIG. 5;

FIG. 7 is a front elevation view of the car illustrated in FIG. 5;

FIG. 8 is an enlarged view, partly in elevation and partly in cross-section, of a second car used in carrying out the invention;

FIG. 9 is a cross-sectional view taken along the line 9-9 of FIG. 8; and

FIG. 10 is a schematic diagram of a hydraulic circuit that can be used in the apparatus shown in FIG. 1.

Referring now to the drawings, and to FIG. 1 in particular, shown therein and generally designated by the reference character 10, is a pipe racking device constructed in accordance with the invention. The pipe racking device 10 includes a track 12 which has a horizontally disposed section 14 extending between pipe racks 16 and 18 (see FIG. 2). The track 12 also includes an inclined

portion 20 which extends from one end of the horizontally disposed portion 14 upwardly to a rig floor 22. The rig floor 22 comprises a portion of a drilling rig 24 which is partially shown in FIGS. 1 and 2.

The rig 24, in addition to the floor 22, includes a vertically extending derrick 26, a draw-works 28 mounted on the rig floor 22, and a driller's console or control stand 30. A drilling line or cable 32 extends upwardly from the draw-works 28 over a series of pulleys (not shown) in the top of the derrick 26 to control the vertical movement of the blocks 34 in the derrick 26. A clamping device 36, generally known in the trade as an elevator, is suspended from the lower end of the blocks 34 and is arranged to engage a drill string 38 having an externally upset or enlarged end 40 which may be seen projecting upwardly from the rig floor 22.

In addition to the track 12, the pipe racking device 10 also includes a first, or power, car 42 which is arranged for movement along the track 12 and a second, or trailing, car 44 which is also mounted on and arranged for movement along the track 12. Flexible members 46 and 48 are illustrated as being connected with the cars 42 and 44, respectively. The flexible members 46 and 48 may be hydraulic or pneumatic hose, or electrical cables, depending on the type of energy which is to be utilized in operating and controlling the cars 42 and 44. As illustrated, the flexible members 46 and 48 are slidably suspended on a supporting cable 50 which extends from the rig 26 to the extreme end of the track 12 along the path which the cars 42 and 44 will traverse.

FIGS. 1 and 2 also show one section or joint of pipe 52 which is approximately thirty feet long being moved from the rig floor 22 to the racks 16 and 18. Additional joints of pipe 52 are illustrated as being in place on the rack 16.

FIGS. 3 and 4 illustrate the structure of the track 12. As shown more clearly in FIG. 4, the track 12 includes a pair of elongated L-shaped members 54 and 56 and a rack gear 58 which is substantially coextensive with the track 12. The L-shaped members 54 and 56 are arranged on opposite sides of the rack gear 58 whereby one leg of each L-shaped section extends outwardly from the rack gear 58, providing an upper surface 57, a pair of lower surfaces 59 and 61, and side surfaces 63 and 65, respectively. The L-shaped members 54 and 56 are retained in an assembled relationship with the rack gear 58 by a plurality of threaded fasteners 60 which extend therethrough. If desired, the L-shaped members 54 and 56 can be welded to the rack gear 58 or attached thereto in any suitable manner. Whatever method is used to assemble the track 12, it should result in uninterrupted side surfaces 63 and 65 for purposes which will become more apparent as the description proceeds. The track 12 may be made in one continuous length extending from the rig to the end of the pipe rack, as previously described, or it may be divided into short segmental portions such as the segments 12a and 12b illustrated in FIG. 3. The sections 12a and 12b are illustrated as being joined by means of a threaded hook 62 which is mounted in the track segment 12a and extends therefrom to encircle a pin 64 mounted in the track segment 12b. The track segments 12a and 12b are pulled into very close engagement, to form a continuous track 12 and rack gear 58, by tightening nut 66 on the threaded hook 62. The track 12 may be supported in various ways, such as by the wooden inclined ramp and catwalk (not shown) or by vertically extending pipe supports 67. One end of the inclined portion 20 of the track 12 may be attached to the rig floor 22.

FIGS. 6 and 7 illustrate in more detail the structure of the first car 42. The first car 42 includes a body member 68 which has an upper portion 70, a pair of downwardly extending side portions 72 and 74, and a pair of inwardly extending bottom portions 76 and 78 extending inwardly from the side portions 72 and 74, respectively. The body member 68 also includes an upwardly extending front portion 80

and a pair of triangular-shaped pipe end guide members 82 (only one is shown in FIG. 5) extending between and welded to the upper portion 70 and the upstanding front portion 80. The guide members 82 are spaced apart a sufficient distance to receive the threaded end of the pipe joint 52.

A pipe guide 84 is attached to the upper portion 70 of the body member 68 by means of a threaded fastener 86. The pipe guide 84 is tapered or wedge-shaped as may be seen more clearly in FIG. 6. The taper is provided on the pipe guide 84 so that the pipe 52 will be discharged in the proper direction from the car 42 during racking of the pipe 52. As shown in FIG. 6, the pipe guide 84 can be rotated after loosening the threaded fastener 86, to the position shown in dash lines so that the pipe 52 can be discharged in the opposite direction.

A pipe clamp 88 includes a downwardly extending U-shaped portion 90 adapted to encircle a portion of the pipe 52 and engage an external upset or enlarged portion 91 on the pipe 52 located on the opposite end thereof from the upset portion 40. A lever portion 92 extends from the U-shaped portion 90 through an opening 94 in the front portion 80 of the body member 68. The lever portion 92 is pivotally mounted in the front portion 80 by a pin 95. The portion of the lever 92 which extends through the front portion 80 is pivotally attached at 96 to an actuating cylinder 98. The cylinder 98 is pivotally connected at 100 to a bracket 102 which is rigidly fixed to the front portion 80 of the body member 68. The cylinder 98 is provided with an internal spring (not shown) which exerts a downward force on the lever 92 to release the clamp 88. A conduit 104 extends from the cylinder 98, for purposes which will be explained more fully in connection with FIG. 10.

As may be seen more clearly in FIG. 7, a guide roller 106 is rotatably positioned between the side walls 72 and 74 of the body member 68, and is arranged to engage the upper surface 57 of the track 12. A pair of arms 108 and 110 which are pivotally mounted on the side walls 72 and 74, respectively, extend downwardly and forwardly, carrying a pair of guide rollers 112 and 114 thereon. Springs 116, which have one end attached to the side walls 72 and 74 and the opposite end thereof attached to the arms 108 and 110, are provided to bias the arms 108 and 110 and the guide rollers 112 and 114 carried thereon upwardly into engagement with the lower surfaces 59 and 61, respectively, of the track 12.

A shaft 118 extends across the body member 68 and is journaled in bearings 119 mounted in the side walls 72 and 74. A pinion gear 120 is fixed for rotation with the shaft 118 and is engageable with the rack gear 58. A pair of rotatable guide members 122 are disposed on the shaft 118 on either side of the pinion gear 120 and are engageable with the upper surface 57 of the track 12 to limit the depth to which the pinion gear 120 can extend into the rack gear 58.

A fluid motor 124 is mounted on the exterior of the side wall 72 and is coupled with the shaft 118. The arrangement is such that rotation of the motor 124 will cause rotation of the shaft 118 and the pinion gear 120, to move the first car 42 along the track 12. A pair of conduits 126 and 128 extend from the motor 124 for purposes which will become more apparent in connection with the description of FIG. 10. If the pipe 52 is to be discharged from the pipe guide 84 as shown in solid lines in FIG. 6, the motor 124 will be mounted as shown in the solid lines thereon. If the pipe guide 84 is reversed to the position shown in dash lines, so that the pipe 52 will be discharged off the opposite side of the first car 42, the motor 124 may be easily moved to the position shown in dash lines, and mounted on the side wall 74. While there is little possibility that the pipe 52 will strike the motor 124 as it is discharged from the car 42 in either direction, it is preferred that

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the motor 124 and its connecting lines 126 and 128 be moved to the side of the car opposite the direction of discharge, to prevent any possibility that the end of the pipe 52 could become entangled in the lines 126 or 128, or damage the motor 124.

Guide rollers 130 and 132 are positioned beneath the shaft 118 in engagement with the lower surfaces 59 and 61 of the track 12 to prevent the guide members 122 and the pinion gear 120 from moving in a vertical direction, thereby becoming disengaged from the rack gear 58. Rotatable guide rollers 134 and 136 are supported by the in-turned bottom members 76 and 78, respectively, of the body member 68 and are arranged to engage the side surfaces 63 and 65 of the track 12 to prevent lateral movement of the car 42 as it proceeds along the track 12.

The details of construction of the rear, or trailing, car 44 are illustrated in FIGS. 8 and 9. The car 44 includes a body member 138 having a top portion 140, downwardly extending side portions or walls 142 and 144, and inwardly extending bottom portions 146 and 148. A tapered pipe guide 150 is secured to the top portion 140 of the body member 138 by a threaded fastener 152. The pipe guide 150 is in all respects identical with the pipe guide 84 and is positioned on the top portion 140 of the car 44 in a parallel arrangement with the pipe guide 84 on car 42. Stated in another way, the pipe guide 150 is arranged so that the taper thereon will discharge the pipe 52 in the same direction as does the pipe guide 84.

A plate 154 is rotatably mounted in the top portion 140. A pipe engaging member 156 is mounted on the top side of the plate 154. The upper portion of the member 156 is tapered to engage the exterior of the pipe 52 and has a plate 158 hinged thereto at 160. An actuating cylinder 162 is mounted on the lower side of the plate 154 and has a reciprocable shaft 164 extending through an opening 166 in the plate 154. The upper end of the reciprocable shaft 164 is engageable with the lower surface of the hinged plate 158 to move the plate 158 upwardly to engage the exterior of the pipe 52, thereby supporting the pipe 52 on the car 44. The cylinder 162 contains an internal spring (not shown) that exerts a downward force on the shaft 164 to lower the plate 158. A conduit 168 is connected with the latch actuating cylinder 162 for purposes which will be explained more fully in connection with FIG. 10.

The front end of the car 44 is provided with a guide roller 170 which extends between the side walls 142 and 144. The guide roller 170, shown in dash lines in FIG. 8, is in all respects similar to the roller 106 described in connection with FIG. 7. Likewise, the car 44 is provided with a pair of arms 172 which are pivotally mounted on the body member 138 and carry a pair of rollers 174 which engage the lower surfaces 59 and 61 of the track 12 as do the guide rollers 112 and 114 shown in FIG. 7. Springs 176 have one end connected with the body member 138 and the other end connected with the arms 172 to bias the rollers 174 upwardly into continuous contact with the lower surfaces 59 and 61 of the track 12. While only one arm, one guide roller 174, and one spring 176 are illustrated in FIG. 8, it should be understood that identical but reversed parts are provided on the opposite side of car 44.

A rotatable guide roller 178 extends between the side walls 142 and 144 near the rear of the car 44, and is provided to engage the upper surface 57 of the track 12. A pair of guide rollers 180 and 182 are rotatably positioned to engage the lower surfaces 59 and 61 of the track 12, just below the roller 178. The guide rollers 180 and 182 cooperate with the guide roller 178 to prevent vertical movement of the car 44 with respect to the track 12. Guide rollers 184 and 186 are rotatably mounted on the bottom portions 146 and 148, respectively, and are engageable with the side surfaces 63 and 65

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of the track 12 to prevent lateral movement of the car 44 as it proceeds along the track 12. The guide rollers 180, 182, 184 and 186 are in all respects similar to the guide rollers 130, 132, 134 and 136 illustrated in FIG. 6.

FIG. 10 illustrates schematically a hydraulic circuit which may be used in carrying out the invention. It should be understood that the following described hydraulic components could be replaced with equivalent electrical or pneumatic members without departing from the scope of this invention. As illustrated, the suction side of a pump 188 is connected by a conduit 190 with a reservoir 192. The discharge side of the pump 188 is connected by a conduit 194 with a four-way selector valve 196 which is mounted in the control stand 30.

One port of the four-way selector valves 196 is connected by the conduit 126 with the fluid motor 124. Another port of the four-way selector valve 196 is connected with the hydraulic motor 124 by means of the conduit 128. A throttling valve 198 is illustrated as being operably disposed in the conduit 128. The purpose of the throttling valve 198 is to regulate the volume of flow through the conduit 128 and, consequently, to control the speed of the motor 124. (The throttling valve 198 is combined with the four-way selector valve 196 in some valves which are commercially available.) The fourth port in the four-way selector valve 196 is connected by a conduit 200 with the reservoir 192.

The four-way selector valve 196 is constructed so that the fluid flow therethrough may follow either the solid arrows 202 or the dash line arrows 204. If the selector valve 196 is set so that the path therethrough follows the solid arrows 202, the fluid will flow from the conduit 194 through the four-way valve 196 into the motor 124, causing the motor 124 to rotate in one direction. Return flow from the motor 124 will go through the conduit 128 to the four-way valve 196, thence into the conduit 200, returning to the reservoir 192. If the selector valve 196 is in a position wherein fluid flow will follow the dash line arrows 204, hydraulic fluid will flow from the conduit 194 to the conduit 128, thence into the motor 124, causing the motor 124 to rotate in the opposite direction. Fluid will return from the motor 124 through the conduit 126 to the valve 196, thence into the conduit 200 to the reservoir 192.

The discharge of the pump 188 is also connected by a conduit 206 with a selector valve 208. The selector valve 208 is also mounted in the control stand 30. One outlet port of the selector valve 208 is connected by a conduit 210 with the fluid reservoir 192. The other outlet of the valve 208 is connected by means of a conduit 212 with the conduit 104 leading to the hydraulic cylinder 98, and with the conduit 168 leading to the actuating cylinder 162. The arrangement is such that hydraulic fluid flowing through the conduit 206 and the valve 208 will enter the conduit 212 and, through the conduits 104 and 168, into the cylinders 98 and 162, respectively, simultaneously actuating both cylinders. When it is desired to release the cylinders 98 and 162, the selector valve 208 is rotated to a position wherein the fluid in the conduit 212 can flow through the valve 208 into the conduit 210, and into the reservoir 192.

The conduits 104, 126 and 128 are all contained within the flexible member 46 (see FIG. 1) which, in the use of hydraulic or pneumatic power is preferably a multi-tube bundle having a loom pulled thereover. The conduit 168 is contained within the flexible member 48, as shown in FIG. 1. If electrical power is used, the foregoing members can be multi-conductor cables which are well known in the art.

Operation

When it is desired to rack the thirty foot joints of the pipe 52 on the horizontally disposed pipe racks 16 and 18, the cars 42 and 44 will be positioned on the inclined

section 20 of the track 12 adjacent the rig floor 22. The driller, who will operate the pipe racking device 10, is stationed on the rig floor in the vicinity of the control stand 30. The draw-works 28 is actuated to feed out the cable 32 to lower the blocks 34 and the elevator 36 that depend therefrom in the derrick 26. As the elevator 36 reaches the vicinity of the drill string 38, the elevator 36 is latched to the drill string 38 adjacent the upset or enlarged end 40 thereon. The cable 32 is then reeled in by the draw-works 28, pulling the blocks 34 and the elevator 36 which are connected with the drill string 38 upwardly in the derrick 26. As soon as the next connection between drill pipe joints 52 has been pulled from the well, i.e., when approximately thirty feet of the drill string 38 has been pulled from the well, the draw-works 28 is stopped to suspend the drill string 38 while the connection is broken between the joints. Slips (not shown) are set between the drill string 38 and the rotary table (not shown) on the rig floor 22 to prevent the drill string 38 from dropping into the well. After the thirty foot joint has been broken loose from the remainder of the drill string 38, the lower end thereof is swung outwardly until it is seated between the pipe end guide members 82 on the first car 42. At that time, the driller will switch the selector valve 208 to a position wherein the cylinders 98 and 162 are actuated. Upon actuation of the cylinder 98, the latching device 88 on the first car 42 is moved to a position securely retaining the upset or enlarged portion 91 of the pipe joint 52 between the front end 80 of the car 42 and the U-shaped lamp 90 of the latching device 88.

After the pipe joint 52 is latched onto the first car 42, the driller will move the selector valve 196 to a position which will direct fluid to the motor 124 to rotate the pinion gear 120, thereby driving the first car 42 down the track 12 away from the rig floor 22. Movement of the car 42 away from the rig floor 22 carries the lower end of the pipe joint 52 toward the pipe racks 16 and 18. The upper end of the pipe joint 52 is lowered by the elevator 36 until it rests on the pipe-engaging member 156 of the car 44. The elevator 36 is then released from the pipe joint 52, and as the car 42 proceeds down the track 12 the joint 52 will slide along the member 156 until the upset or enlarged end 40 of the joint 52 engages the end of the member 156. Upon engagement of the upset or enlarged end 40 with the latch member 156, the car 44 will be drawn therewith along the track 12 as the car 42 proceeds outwardly into the vicinity of the pipe racks 16 and 18.

It should be pointed out that as each car 42 and 44 reaches the juncture between the horizontal portion 14 and the angular, or inclined, portion 20 of the track 12, the arms 108 and 110 on the car 42 and the arms 172 on the car 44 will pivot slightly to permit the rollers 106, 112 and 114 and the rollers 170 and 174 on the cars 42 and 44, respectively, to remain in continuous contact with the track 12. The provision of the pivotal arms permits the cars 42 and 44 to traverse the angle between the track sections very easily, whereas if they were rigidly fixed the weight of the pipe 52 thereon would tend to cause the guide rollers passing over the juncture to bind on the track.

When the pipe joint 52 has been carried by the cars 42 and 44 to a position adjacent the pipe rack 16, the selector valve 208 is moved to a position wherein pressure on the cylinders 98 and 162 is released. The release of pressure on the cylinders 98 and 162 permits the internal springs therein to release the latching mechanism 88 on the first car 42 and, simultaneously, lower the hinged plate 158 on the car 44. The pipe joint 52 is discharged from the cars 42 and 44 and rolls downwardly along the tapered guides 84 and 150 onto the pipe rack 16.

As previously pointed out, if the pipe is to be racked on the pipe rack 18, the tapered pipe guides 84 and 150 would be rotated to a position wherein the taper would slope toward the pipe rack 18. Also, the plate 154 on the

car 44 would be rotated to place the hinged plate 158 on the side corresponding to the taper in the guide 150. Likewise, the motor 124 on the car 42 would be moved and mounted on the side 74 of the car 42, as indicated by the dash lines on FIG. 6.

After the pipe joint 52 has been racked, the four-way selector valve 196 is moved to a position wherein the direction of rotation of the motor 124 is reversed, thereby driving the car 42 along the track 12 toward the rig 24. The car 42 will engage the car 44, carrying it along the track 12 therewith until both cars are again positioned on the inclined portion 20 of the track 12 adjacent the rig floor 22. If desired, the cars 42 and 44 may be returned along the track 12 to the rig floor 22 at a much higher speed than used during the movement of the cars to the pipe racks 16 and 18. The various components of the pipe racking device 10 are now in a position to receive the next pipe joint 52 which is to be racked.

It should be understood from the foregoing description that a pipe racking device constructed in accordance with the invention is extremely safe to use in racking the heavy drill pipe in that it does not require the personnel racking the pipe to be in the immediate vicinity of the pipe or the pipe racks. Furthermore, the speed with which the pipe can be racked is dependent only upon the maximum speed of the means powering the car 42 and the ability of the crew to break the drilling string into thirty foot joints. Also, the likelihood of damage to the pipe by being dropped or otherwise mishandled is virtually eliminated by the use of a pipe racking device as set forth.

It should be apparent that the embodiment described is by way of example only and that many changes and modifications can be made therein without departing from the spirit of the invention or from the scope of the annexed claims.

What is claimed is:

1. A pipe racking device comprising:

an elongated track including a rack gear extending substantially the length of said track;

a first car arranged for movement along said track and including:

a pinion gear rotatably mounted on said first car in engagement with said rack gear, driving means operably connected with said pinion gear for causing rotation thereof, and releasable latch means on said first car for releasably securing one end of the pipe thereto;

a second car arranged for movement along said track and including:

pipe engaging means thereon for releasably supporting the other end of the pipe on said second car; and,

control means operably connected with said driving means for causing said driving means to rotate in a direction to move said first car along said track, said control means being operably connected with said latch means and engaging means for simultaneously releasing said latch means and engaging means from said pipe.

2. A pipe racking device comprising:

an elongated track including:

a rack gear extending substantially the length of said track, and means for supporting said gear;

a first car arranged for movement along said track, said first car including:

a body member, a shaft journaled in said body member, a pinion gear mounted on said shaft in operable engagement with said rack gear, driving means for rotating said shaft and pinion gear mounted on said body member, and, releasable latch means mounted on said body member for releasably securing one end of the pipe to said first car;

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a second car arranged for movement along said track, said second car including:

a body member, and,

pipe engaging means mounted on said body member for releasably supporting the other end of the pipe on said second car; and,

control means operably connected with said driving means for causing said driving means to rotate in a direction to move said first car along said track, said control means being operably connected with said latch means and with said engaging means for simultaneously releasing said latch means and engaging means from said pipe.

3. The pipe racking device of claim 2 wherein said means for supporting said rack gear includes a pair of elongated members disposed on opposite sides of said rack and extending parallel therewith.

4. The pipe racking device of claim 3 wherein said first and second cars also include guide means located on said body members engageable with said elongated members to guide said cars along the track.

5. The pipe racking device of claim 2 wherein said means for supporting said rack gear includes:

a pair of elongated members each having a generally L-shaped cross-section, said members being disposed on opposite sides of said rack gear whereby one portion of each of said members extends outwardly from said rack gear;

means connecting said elongated members with said rack gear; and,

spaced-apart leg members connected with said elongated members and depending therefrom for supporting said elongated members and rack.

6. The pipe racking device of claim 2 wherein the releasable latch means on said first car includes:

a lever pivotally supported by said body member, said lever having a first end arranged to engage one end of the pipe; and,

lever actuating means mounted on said body member and operably connected with the opposite end of said lever for moving the first end of said lever into and out of latching engagement with said pipe.

7. The pipe racking device of claim 2 wherein the releasable latch means on said second car includes:

a first pipe support member mounted on said body member at an angle with respect to the body member;

a second pipe support member pivotally connected with said first pipe support member; said first and second pipe support members cooperating to releasably latch the pipe for movement with said second car; and,

latch actuating means mounted on said body member operably connected with said second pipe support member to pivot said second pipe support member into and out of latching engagement with the pipe.

8. The pipe racking device of claim 2 wherein said track is comprised of a plurality of track segments, each segment including:

a rack gear;

a pair of elongated members, each having a generally L-shaped cross-section, said members being disposed on opposite sides of said rack gear whereby one portion of each of said members extends outwardly from said rack gear;

means connecting said elongated members with said rack gear;

a pin member on one end of each of said track segments extending between said elongated members; and,

a lock member on the other end of each of said track segments arranged to releasably engage said pin member to join said track segments to form said track.

9. A pipe racking device comprising:

an elongated track including:

a rack gear extending substantially the length of said track,

a pair of elongated members, each having a gen-

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erally L-shaped cross-section, said members being disposed on opposite sides of said rack gear whereby one portion of each of said members extends outwardly from said rack gear,

means connecting said elongated members with said rack gear, and

spaced-apart leg members connected with said elongated members and depending therefrom for supporting track;

a first car arranged for movement along said track, said first car including:

a body member,

a shaft journaled in said body member,

a pinion gear mounted on said shaft in operable engagement with said rack gear,

driving means for rotating said shaft and pinion gear mounted on said body,

releasable latch means mounted on said body for releasably securing one end of the pipe to said first car, said latch means including:

a lever pivotally supported by said body member, said lever having a first end arranged to engage one end of the pipe, and

lever actuating means mounted on said body member and operably connected with the opposite end of said lever for moving the first end of said lever into and out of latching engagement with said pipe, and

guide means located on said body member engageable with said elongated members to guide said first car along the track;

a second car arranged for movement along said track, said second car including:

a body member,

guide means located on said body member engageable with said elongated members to guide said second car along said track, and

pipe engaging means mounted on said body member for releasably supporting the other end of the pipe on said second car, said pipe engaging means including:

a first pipe support member mounted on said body member at an angle with respect to said body member,

a second pipe support member pivotally connected with said first pipe support member, said first and second pipe support members cooperating to releasably support the pipe for movement with said second car, and

actuating means mounted on said body member operably connected with said second pipe support member to pivot said second pipe support member into and out of supporting engagement with the pipe; and,

control means operably connected with said driving means for causing said driving means to rotate in a direction to move said first car along said track toward or away from said second car, said control means also connected with said latch actuating means on said first and pipe engaging means on said second cars to simultaneously release the pipe from said cars.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,268,095

August 23, 1966

J W Durbin

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 68, strike out "quickly and the heavy joints are handled very roughly."; column 6, line 37, for "126" read -- 196 --; column 7, line 45, strike out "latch".

Signed and sealed this 22nd day of August 1967.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents