June 26, 1951 C. E. HARVEY 2,558,554

APPARATUS FOR HANDLING TUBING OR THE LIKE

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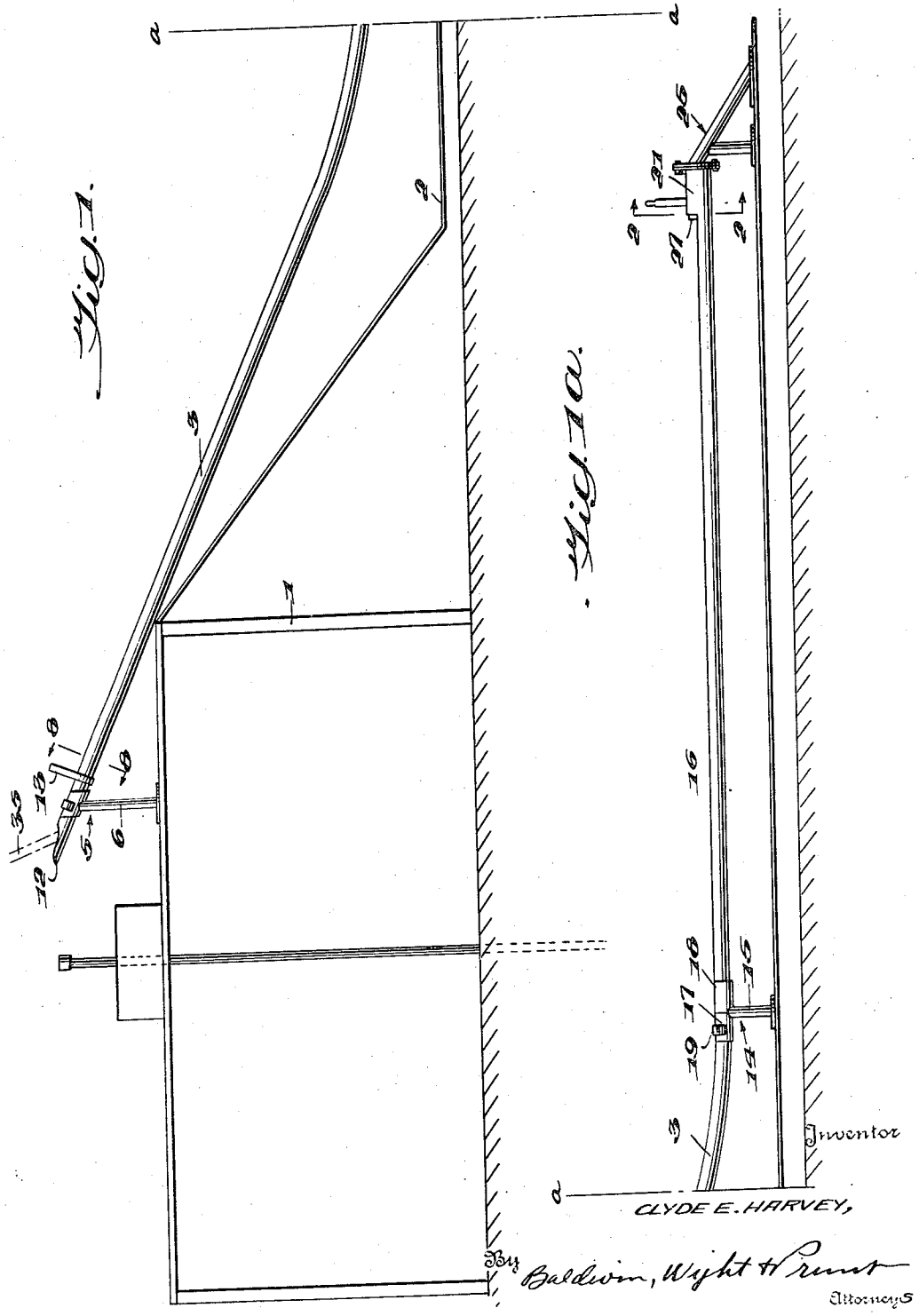


Fig. 1.

Fig. 1a.

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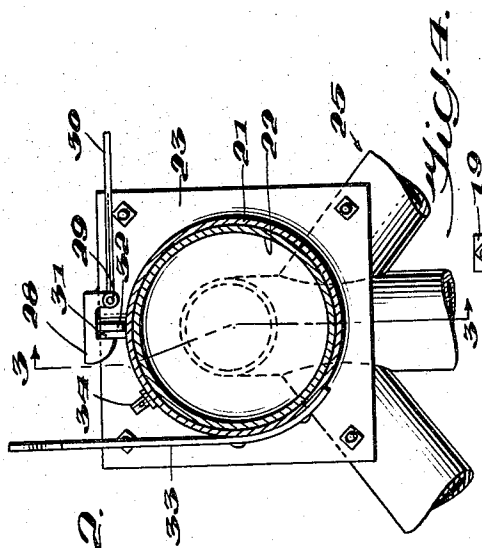


Fig. 2.

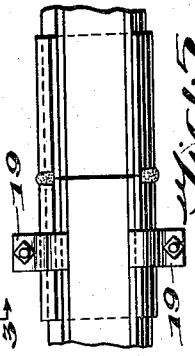


Fig. 4.

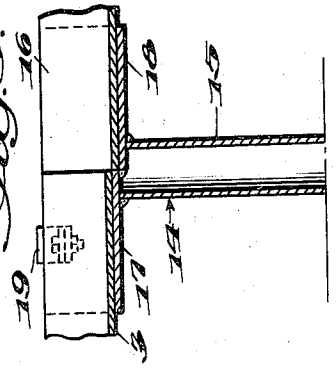


Fig. 5.

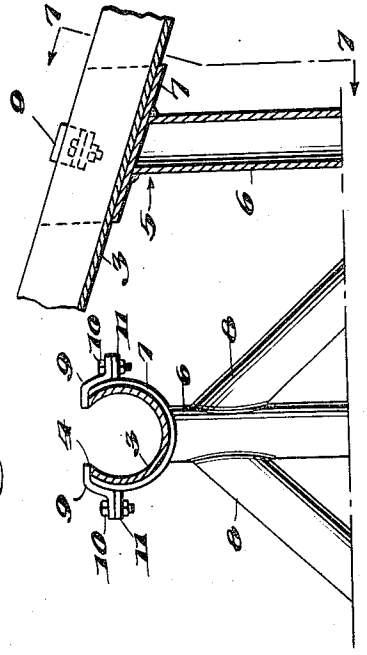


Fig. 6.

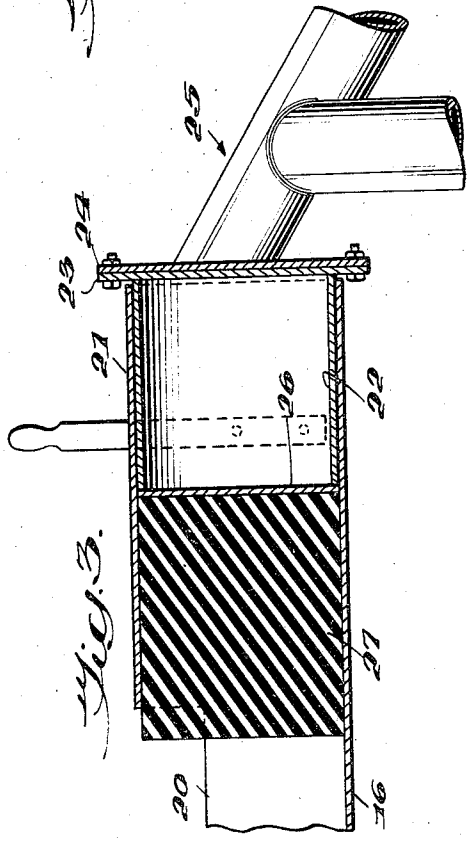


Fig. 3.

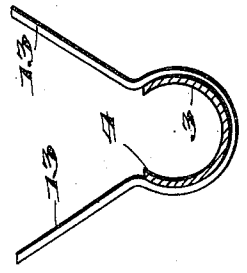


Fig. 8.

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APPARATUS FOR HANDLING TUBING OR THE LIKE

Clyde E. Harvey, Melville, La.

Application December 29, 1947, Serial No. 794,230

8 Claims. (Cl. 214—1)

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My invention consists in new and useful improvements in apparatus for handling tubing, drill pipe, casing, and rods or the like, in connection with the operation of a well drilling rig and has for its object to provide such an apparatus which will not only facilitate the handling of this equipment with a minimum of labor, but will greatly increase the safety of the operators.

Another object of my invention is to provide handling apparatus which is constructed of materials, readily available in the environment of well drilling operations and which is so constructed and assembled as to afford the required rigidity with a minimum of maintenance cost.

A further object is to provide apparatus which eliminates the necessity of using a stabbing board and will effect a considerable gain in time in laying down and picking up of drill pipe, tubing, and the like.

A still further object of the invention is to provide apparatus of this nature which may be used not only in connection with the removal of tubing and casing from a well and the racking thereof, but in the reverse operation of delivering tubing and casing for lowering in the well.

Still another object of my invention is to provide a pipe and tube handling apparatus comprising a chute or trough which may be installed adjacent any conventional well drilling rig, terminating at its discharge end in a novel tube or pipe receiving cradle of simple construction and easy operation to receive and discharge lengths of pipe or tubing as they are withdrawn from the well.

With the above and other objects in view which will appear as the description proceeds, my invention consists in the novel features herein set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views:

Figure 1 is a view in side elevation of the elevated end of my improved pipe handling apparatus showing a well drilling rig diagrammatically;

Figure 1*a* is a similar view of the discharge end of said apparatus showing the rotatable pipe or tube receiving cradle. It should be noted that Figures 1 and 1*a* are to be considered as one figure joined along the dot and dash line *a*—*a*;

Figure 2 is an enlarged transverse section taken through the end of the receiving cradle on line 2—2 of Figure 1*a*;

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Figure 3 is a longitudinal sectional view taken on line 3—3 of Figure 2;

Figure 4 is a fragmentary top plan view of the combined trough and cradle support;

Figure 5 is a longitudinal sectional view of the support shown in Figure 4;

Figure 6 is a longitudinal sectional view of the angularly disposed upper support for the trough;

Figure 7 is a transverse sectional view taken on line 7—7 of Figure 6; and

Figure 8 is an enlarged transverse sectional view taken on line 8—8 of Figure 1, showing the pipe or tube guide arms attached to the trough.

In the drawings, the numeral 1 diagrammatically illustrates the base of a conventional well drilling rig from which a horizontal catwalk 2 extends slightly above the ground level. My improved handling apparatus comprises a declining guide trough 3, preferably composed of suitably sized pipe with a portion of its upper periphery removed to provide a longitudinally extending opening or slot 4 as will be seen from Figures 7 and 8. The upper end of the inclined trough 3 is supported in an angularly disposed bracket or supporting member 5 which consists of a vertically extending standard 6 bolted by a suitable flange to the top of the derrick base 1 and having at its upper end an inclined head 7 which is substantially U-shaped in cross section and adapted to receive and support the tubing 3. The vertical standard 6 is preferably supported by angle braces 8 as shown in Figure 7, both the standard and angle braces being preferably constructed of drill pipe and welded together to form a rigid support.

In order to retain the trough 3 in place in the support 5, I provide clamping members 9 on either side of the head 7, said clamping members being bolted as at 10 to radially projecting ears 11, fastened to the head 7, the opposite ends of said clamps overlying the upper edge of the trough 3.

The upper or feeding end of the trough 3 is preferably flared laterally as at 12 to facilitate the guiding of a section of tubing or rod into the trough, which operation is further facilitated by a pair of oppositely disposed divergent arms 13 formed by a piece of suitably shaped strap metal or the like, welded to the trough 3 as will be seen from Figures 1 and 8.

The lower end of the declining trough 3 gradually curves to a horizontal line and rests in a second supporting member 14 generally similar to the support 5. The support 14 comprises a vertical standard 15 bolted to the catwalk and having at its upper end a dual purpose head for

fixedly supporting the lower end of the trough 3 and rotatably supporting the adjacent end of a tube or pipe receiving cradle 16, hereinafter referred to more in detail. As will be seen from Figure 5, this dual purpose head consists of a right angular bracket 17, substantially U-shaped in cross section for receiving the lower end of the trough 3 and an oppositely disposed right angular bracket 18 also substantially U-shaped in cross section, located in a slightly lower plane than the bracket 17, for rotatably supporting the end of the cradle 16. Clamping members 19 similar to clamping members 9 are provided for fixedly retaining the end of the trough 3 in place in the head 17 while the cradle 16 in the opposite head 18 remains free to rotate. The standard 15 is also preferably composed of drill pipe and may be supported by angular braces similar to braces 8 applied to the upper support, the parts being welded together to form a rigid structure.

The cradle 16 is formed of suitably sized tubing or pipe having the major portion of its upper periphery cut out as at 20 to form a longitudinal slot and hence a trough portion intermediate its ends, the extremity of said cradle being cylindrical to form a bearing end 21. This bearing end 21 is rotatably mounted on a bull plug 22 of slightly smaller outside diameter than the inside diameter of the cradle end 21. The bull plug is welded at right angles to a vertically extending plate 23 which in turn, is bolted to a complementary plate 24 welded to a supporting assembly 25 which is bolted to the catwalk 2. The supporting assembly 25 is similar in all respects to the supports 5 and 14, being made up of suitable pieces of drill pipe welded together to form a rigid structure and bolted to the catwalk.

Immediately adjacent the outer extremity of the bull plug 22 the cylindrical cradle end 21 is internally closed by a circular disc 26 welded in place in the cradle 16 and located a sufficient distance from the end thereof to permit a slight clearance between the end 21 and adjacent face of the plate 23, said disc 26 bearing directly on the end of the bull plug. A rubber bumper block 27 fits in the end of the cradle 16 and abuts the disc 26, its opposite end extending slightly into the slot formed by the cut-out portion 20 of the cradle 16. As will hereinafter appear, this rubber bumper block acts as a resilient stop or abutment for the lengths of pipe or tubing being delivered to the cradle 16.

As previously stated, the cradle 16 is rotatably mounted in the supporting members 14 and 25. Any suitable means may be employed for normally locking the cradle in its upper or pipe receiving position. For purposes of illustration, I have shown a locking device which consists of a latch member 28 pivotally mounted at 29 to the plate 23 and having a handle 30 whereby said latch may be rocked upon its pivot. A complementary latch member 31 is rigidly secured to the periphery of the end 21 of the cradle 16 and arranged for engagement with the pivoted latch 28, a stop lug 32 being welded to the inner face of the plate 23 in line for engagement with the latch 31. If desired, spring means (not shown) may be employed to normally hold the latch 28 in its downward engaging position.

A handle 33 is welded or bolted to the outer periphery of the cradle end 21 as shown in Figures 2 and 3, whereby the cradle may be rotated in its bearings to discharge a length of tubing or pipe. The operation of this rotary cradle may if desired, be facilitated by installing a suitable grease fitting 34 in the periphery of the cradle end 21 to lubricate the bearing surfaces between the cradle and the bull plug 22.

In the operation of my improved apparatus, as a lay-down device, as the drill stem, tubing, casing or the like is withdrawn from the well and disconnected, the lower end thereof is placed in the flaring end 12 of the declining trough 3. In Figure 1, I have illustrated the drill stem diagrammatically and in dotted lines as at 35. The drill stem or the like is lowered until the elevators on the upper end thereof are within reach of the operator, said elevators being then unlatched to permit the stem or pipe to slide down the guide trough 3 by gravity, coming to rest in the cradle 16 after abutting the bumper block 27. The operator then releases the latch 28 by depressing the handle 30 and rotates the cradle by manipulation of the handle 33. The length of drill stem or pipe is thus discharged from the cradle 16 through the peripheral opening 20 in the top thereof and placed in the rack (not shown) located adjacent the cradle, after which the cradle is returned to its vertical position where the latch 28 automatically engages the latch 31 to lock the cradle in normal position.

In the use of this apparatus, as a pick up device for handling sections of pipe and delivering them into position for lowering into the well, a section of pipe is placed in the cradle 16 and a cable, connected to a suitable source of power and passing through a sheave located on one of the lower braces of the well derrick, is fastened onto the pipe section by means of a hook. The section of pipe is then pulled upwardly through the guide trough 3 until its end is in position to be latched to the elevator and raised sufficiently to be lowered into the well.

It will thus be seen that I have provided a practical and relatively inexpensive apparatus for handling sections of pipe and tubing and one which reduces to a minimum the danger of injury to the operator.

From the foregoing, it is believed that my invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details of structure without departing from the spirit of the invention as set forth in the following claims.

I claim:

1. In apparatus for handling tubing or the like at a well derrick, a continuous parti-cylindrical trough comprising a fixed guide portion, declining from a point adjacent said derrick and terminating at its lower end in a substantially horizontal receiving portion, means pivotally supporting the ends of said receiving portion for rotation about its longitudinal axis, releasable means normally locking said receiving portion against rotation and means for rotating the latter to discharge its contents.

2. Apparatus for handling tubing or the like at a well derrick, comprising a fixed guide trough, declining from a point adjacent said derrick, a substantially horizontal receiving cradle at the terminus of said trough and in longitudinal alignment therewith, bearing members at each end of said cradle pivotally supporting the latter for rotation about its longitudinal axis, releasable locking means carried by one of said bearing members for normally retaining said cradle in receiving position and means for rotating said cradle to discharge its contents.

3. Apparatus for handling tubing or the like at a well derrick, comprising a fixed guide trough declining from a point adjacent said derrick, a substantially horizontal elongated receiving cradle formed of tubular stock cut out longitudinally at the upper portion of its periphery and arranged in longitudinal alignment with the terminus of said trough, bearing members pivotally supporting said cradle for rotation about its longitudinal axis, releasable locking means normally retaining said cradle against rotation, and means for rotating said cradle to discharge its contents through said cut out portion.

4. Apparatus as claimed in claim 3, wherein the end of said cradle is provided with a resilient bumper block adapted to act as an abutment for the tubing or the like being handled.

5. In apparatus for handling tubing or the like at a well derrick, a continuous parti-cylindrical trough comprising a fixed guide portion, declining from a point adjacent said derrick and terminating at its lower end in a substantially horizontal receiving portion arranged in longitudinal alignment with said guide portion, a common supporting standard having oppositely disposed brackets, respectively underlying adjacent ends of said portions for fixedly supporting the end of said guide portion and rotatably supporting the adjacent end of said receiving portion, a second supporting member for rotatably supporting the opposite end of said receiving portion, releasable

means normally locking said receiving portion against rotation and means for rotating the latter to discharge its contents.

6. Apparatus as claimed in claim 5, wherein the upper end of said trough is flared horizontally to facilitate the reception of tubing being handled.

7. Apparatus as claimed in claim 5, including a pair of divergent arms for guiding the sections of tubing or the like into said trough.

8. Apparatus as claimed in claim 5, wherein one end of said receiving portion is supported in a locking and bearing assembly comprising a support fixed to a suitable foundation, a horizontally disposed bearing member adapted to engage the end of said receiving portion, a releasable latch carried by said support, and a complementary latch fixed to the periphery of said receiving portion.

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