

April 24, 1934.

R. L. CARPENTER

1,956,147

PIPE HANDLING APPARATUS

Filed May 10, 1932

2 Sheets-Sheet 1

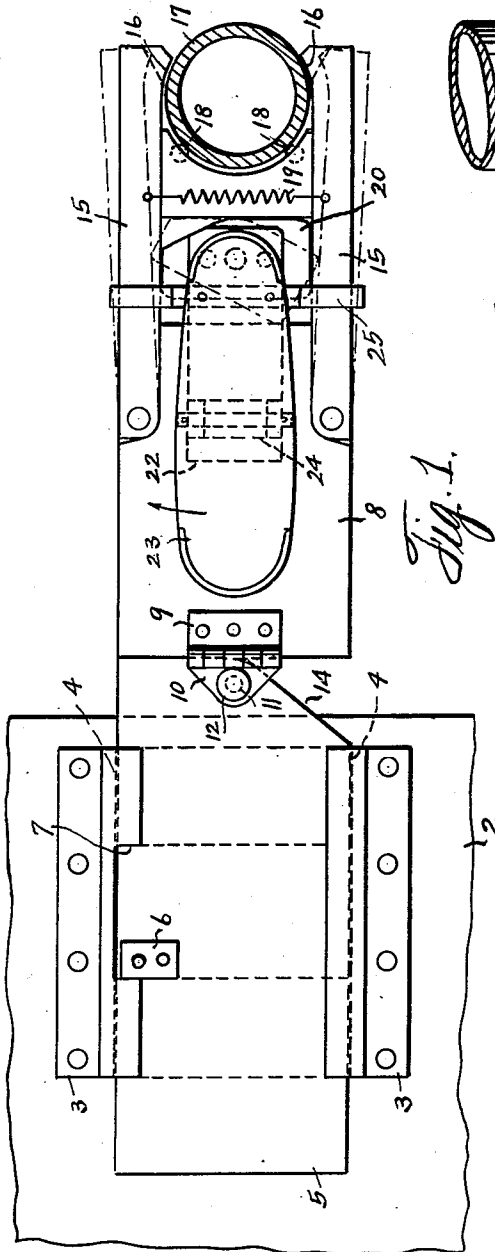


Fig. 1.

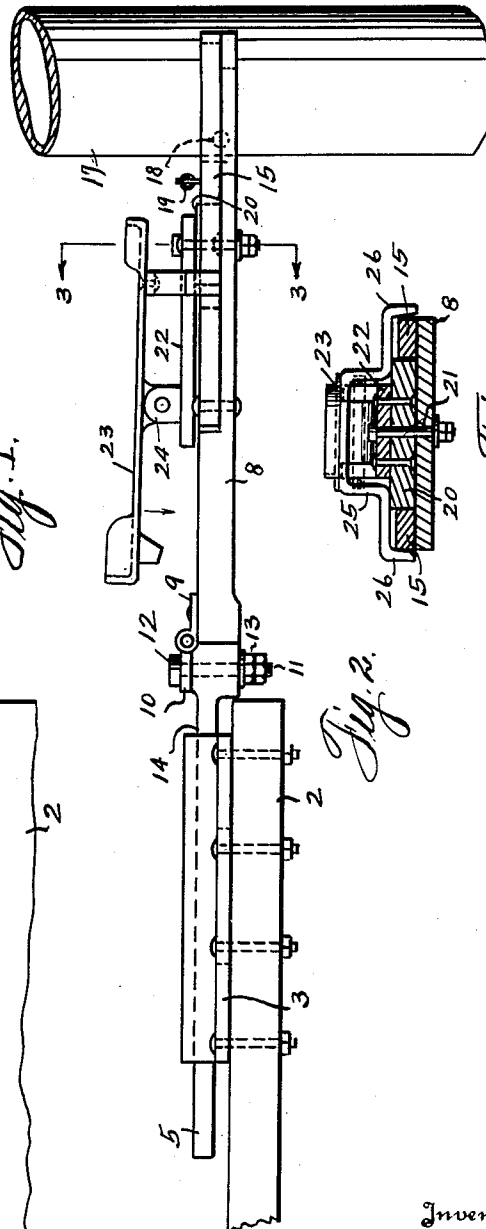


Fig. 2.

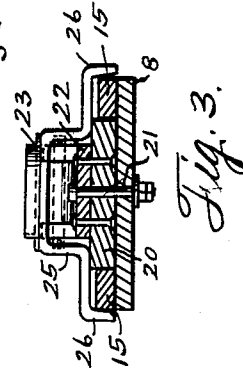


Fig. 3.

Inventor

Roy L. Carpenter,

Hardway Cather

Attorney

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2 Sheets-Sheet 2

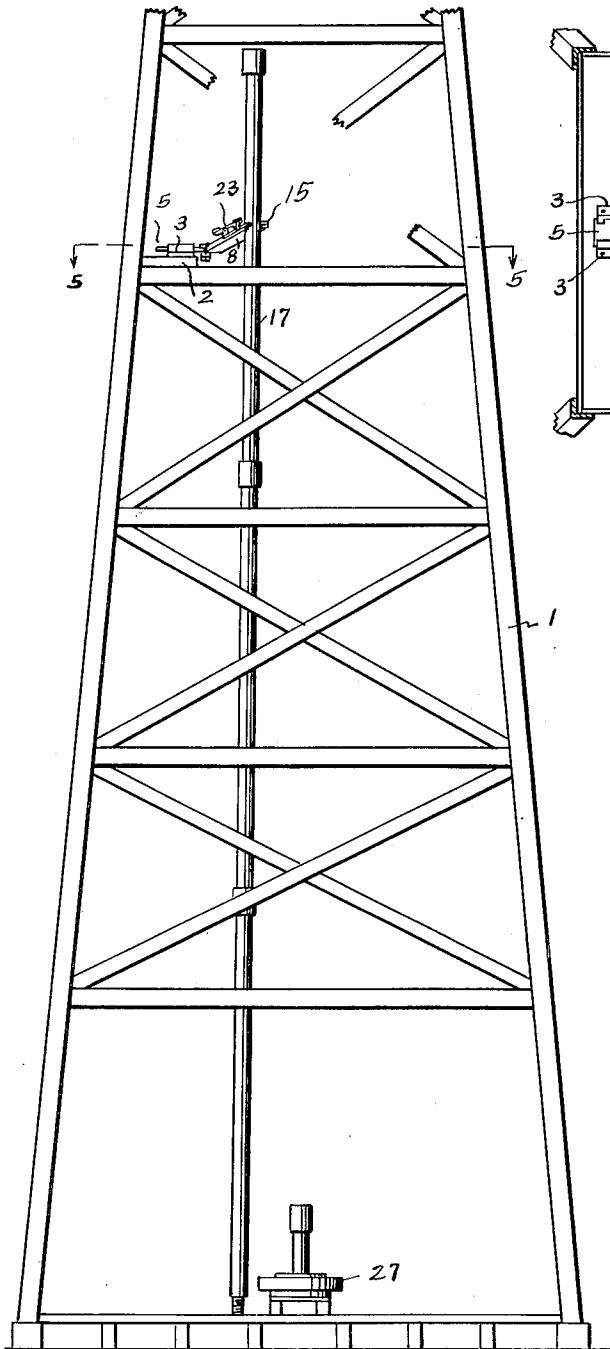


Fig. 4.

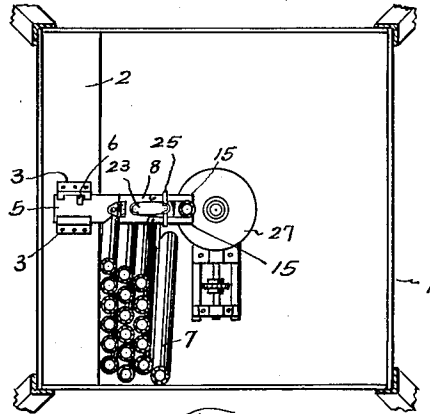


Fig. 5.

Inventor

Roy L. Carpenter

Hardway Cathey
Attorneys

UNITED STATES PATENT OFFICE

1,956,147

PIPE HANDLING APPARATUS

Roy L. Carpenter, Humble, Tex.

Application May 10, 1932, Serial No. 610,510

5 Claims. (Cl. 214-1)

This invention relates to pipe handling apparatus.

An object of the invention is to provide apparatus of the character described specially designed for use in connection with the carrying on of well drilling operations and by the use of which the drill stem, or other pipe to be made up and let down into the well bore or to be broken up in withdrawing the same from the bore, may be more expeditiously and easily handled.

Another object of the invention is to provide apparatus of the character described to be mounted on the "fourble board" of the derrick and by the use of which the workmen on said board may readily handle the pipe stacked, or to be stacked, in the derrick.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings wherein:

Figure 1 shows a plan view of the apparatus as mounted and applied to the pipe, said pipe being shown in section.

Figure 2 shows a side elevation thereof.

Figure 3 shows a sectional view taken on the line 3-3 of Figure 2.

Figure 4 shows a fragmentary side elevation of a derrick showing the apparatus mounted therein and

Figure 5 shows a transverse sectional view taken on the line 5-5 of Figure 4.

Referring now more particularly to the drawings wherein like numerals of reference designate similar parts in each of the figures the numeral 1 designates the derrick having the fourble board 2 arranged transversely across the derrick at one side at the required elevation and which forms a platform for the support of a workman.

On the fourble board and suitably secured thereto are the oppositely arranged spaced brackets 3, 3 whose inner margins are elevated and formed with the inside confronting tracks 4, 4 wherein the anchor board 5 is slidably mounted to move radially relative to the well bore.

This anchor board has a laterally extending stop 6, secured thereto which projects into a longitudinal notch 7 in the inner margin of the adjacent bracket 3 whereby the range of radial movement of the anchor board 5 may be limited.

The numeral 8 designates the foot board which is hinged at its outer end to the inner end of

the anchor board 5. The hinge forming this connection is formed of the hinge plates 9, 10 the former of which is secured to the foot board 8 and the latter of which is pivoted to work on a vertical axis by means of the pivot pin 11 which works through a vertical bearing in the plate 10 and in the anchor board 5 and is retained in place by the head 12 on one end and by the nut 13 on the other end. The adjacent ends of the boards 5, 8 are formed to abut as shown in Figure 2 when the foot board 8 is in horizontal position so as to maintain said last mentioned board in said position. The foot board 8 may be thus elevated or swung horizontally toward the stacked pipe as hereinafter explained and to permit this horizontal movement the corresponding inner corner of the anchor board 5 is beveled off as at 14.

On opposite sides of the foot board 8 are the pipe retaining arms 15, 15 whose outer ends are pivoted to said foot board and whose inner ends are inwardly curved as at 16, 16 to partially engage about the pipe, or drill stem 17 to be handled. The outer end of the foot board 8 between said arms 15, has an arcuate formation to conform to the contour of the pipe and is provided with antifriction bearings 18 to minimize the friction between the pipe and the foot board. The arms 15 are connected by a pull spring 19.

There is a cam plate 20, preferably rectangular in form which pivots about a vertical axis and is retained in place by the pivot pin 21, which extends through said cam plate and through foot board 8 beneath and is retained in place by a suitable head on one end and nut on the other end.

There is a pedal support 22 whose forward end is suitably anchored to the cam plate 20 and a pedal 23 is hinged to move only on a horizontal axis on said pedal plate by a suitable hinge 24.

Secured to the forward end of the pedal 23 underneath, there is a transverse yoke 25 having the downwardly turned ends 26, 26 adapted to engage over the clamp arms 15 to secure them in engaging relation with the pipe 17, but which may be disengaged from said arms by an appropriate movement of the pedal 23 to permit said arms to be spread apart and engaged around the section of the pipe to be handled.

When a string of pipe is being withdrawn from the well through the rotary drilling machine 27 on the derrick floor it will be broken up into what is commonly known as "fourbles" and these will be stacked adjacent the side of the derrick and against the fourble board 2 in the usual

manner as illustrated in Figure 5. When stacked the broken up sections of the pipe or drill stem assume an inclined position relative to the vertical as shown in Figure 5. When it is desired to make up the string of pipe and let it down into the well, an elevator is elevated by a traveling block in the well known manner and engaged about the upper end of a section by the workman on the board 2 and the engaged section is then further elevated clear of the derrick floor and if the elevator is engaged on the pipe section while said section is in a leaning or inclined position when the lower end of the section clears the floor of the derrick the section will be started to swing back and forth and will be difficult and more or less dangerous to handle. With the apparatus hereinabove described the section of the pipe to be engaged by the elevator may be readily swung by the workman on the board 2 into a more nearly vertical position and the elevator may be more easily by him engaged about said section and when the section is elevated it will not be liable to swing back and forth and may be more easily and safely handled by the workman on the derrick floor and more easily attached to the section of pipe beneath which is swung suspended from the rotary drilling machine in the well.

In use the anchor board 5 will normally be in its outer position as shown in Figure 1 with the yoke 25 elevated to release the arms 15 and with the cam plate 20 swung into diagonal position as indicated by dotted lines in Figure 1 so as to hold the arms 15 apart. The workman on the board 2 may then select a length or section of pipe and swing it outwardly from the stack and with his foot on the pedal 23 may swing the foot board 8 around into the proper position and then swing the selected section of pipe into position between the outer ends of the arms 15 and may then turn the pedal 23 to release the cam plate 20 from the arms 15 and said arms will then be swung inwardly around the pipe by the pull spring 19. In accomplishing this engagement of the apparatus with the pipe the foot board 8 may be swung upwardly as shown in Figure 4 for a more ready engagement and when engaged, may be swung down and around to carry the engaged pipe outwardly toward the center of the derrick and the workman may then move the entire apparatus with the engaged pipe out further toward said center, the anchor board sliding in the grooves or tracks 4 and while accomplishing this work the workman on the platform or board 2 may also engage the elevators about the section of pipe and may simultaneously swing the pedal 23 about its pivotal mounting to operate the cam plate 20 whereby the arms 15, 15 will be spread to release the pipe so that the pipe may swing outwardly clear of the apparatus for attachment to the string suspended in the bore beneath.

In withdrawing a string of pipe from the well and breaking it up and stacking it in the derrick the apparatus may also be used in an advantageous manner and in carrying on this work when a section to be broken out is elevated within reach of the workman on the board 2 the apparatus may be manipulated in an obvious manner to engage the arms 15 about the section of pipe while said arms are held apart by the cam plate 20 and said cam plate may then be released as hereinabove explained to cause the arms 15 to engage the pipe and the broken out section may then be swung over into position against the

stack and the arms 15 then released and the foot board 8 then manually elevated to clear the stacked section and swung around into position in readiness for engagement with the next succeeding section to be broken out.

The drawings and description disclose what is now considered to be a preferred form of the invention by way of illustration only while the broad principle of the invention will be defined by the appended claims.

What I claim is:

1. A device of the character described adapted to be mounted on an elevated support in a derrick and including a horizontally movable anchor, means for limiting the range of movement of said anchor, a foot piece mounted for vertical and horizontal movement on said anchor, means on said foot piece adapted to engage a pipe in the derrick and means on the foot piece and under the control of an operator for releasing said engaging means from the engaged pipe.

2. A device of the character described adapted to be mounted on an elevated support in a derrick and including a horizontally movable anchor, means for limiting the range of movement of said anchor, a foot piece mounted for vertical and horizontal movement on said anchor, means on said foot piece adapted to engage a pipe in the derrick, means for maintaining said engaging means in engaged position and means on the foot piece and under the control of an operator for releasing said engaging means from the engaged pipe.

3. A device of the character described adapted to be mounted on an elevated support in a derrick and including an anchor, a foot piece mounted for vertical and horizontal movement on the anchor, pipe engaging arms pivoted on said foot piece, a pedal on said foot piece means operable by the pedal and engageable with said arms for holding the arms in non-engaging position and means on the pedal and movable thereby into engagement with the arms to hold said arms in engagement with the pipe.

4. A device of the character described adapted to be mounted on an elevated support in a derrick and including an anchor mounted to move approximately horizontally on said support, a footboard mounted for vertical and lateral movement on said anchor, pipe retaining arms pivoted at one end on said footboard and whose other ends are shaped to engage about a pipe, means yieldingly connecting said arms, a cam member on the footboard mounted to pivot on an approximately vertical axis between said arms, a pedal support on said cam, a pedal mounted on said pedal support to pivot on an approximately horizontal axis.

5. A device of the character described adapted to be mounted on an elevated support in a derrick and including an anchor mounted to move approximately horizontally on said support, a footboard mounted for vertical and lateral movement on said anchor, pipe retaining arms pivoted at one end on said footboard, and whose other ends are shaped to engage about a pipe, means yieldingly connecting said arms, a cam member on the footboard mounted to pivot on an approximately vertical axis between said arms, a pedal support on said cam, a pedal mounted on said pedal support to pivot on an approximately horizontal axis, and a yoke on the pedal and movable with the pedal into one position to engage said arms and into another position to release said arms.

ROY L. CARPENTER.