Sept. 10, 1940. W. J. MILLER 2,214,429

MUD BOX

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Fig. 1

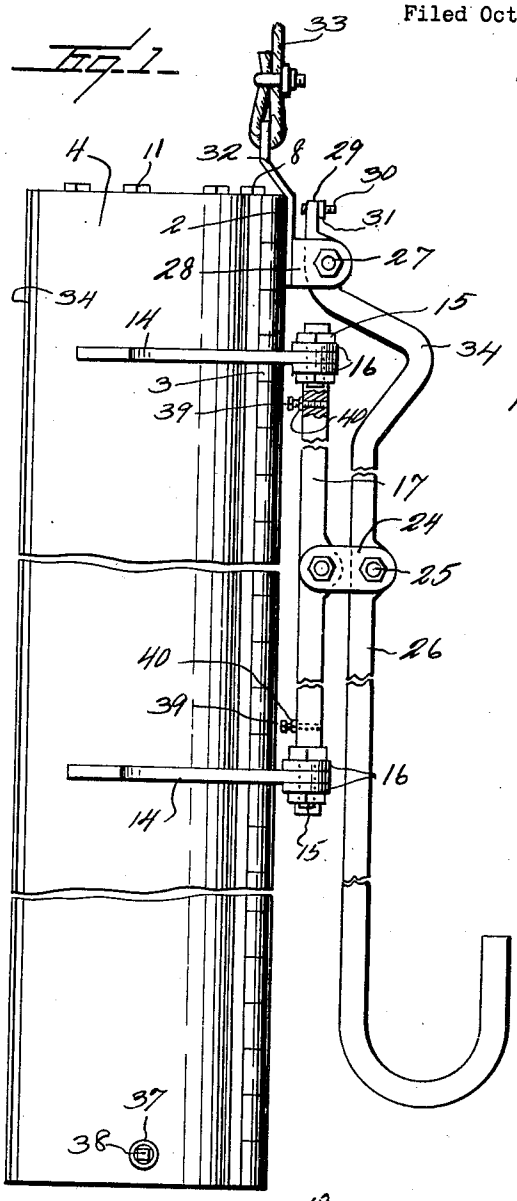


Fig. 3

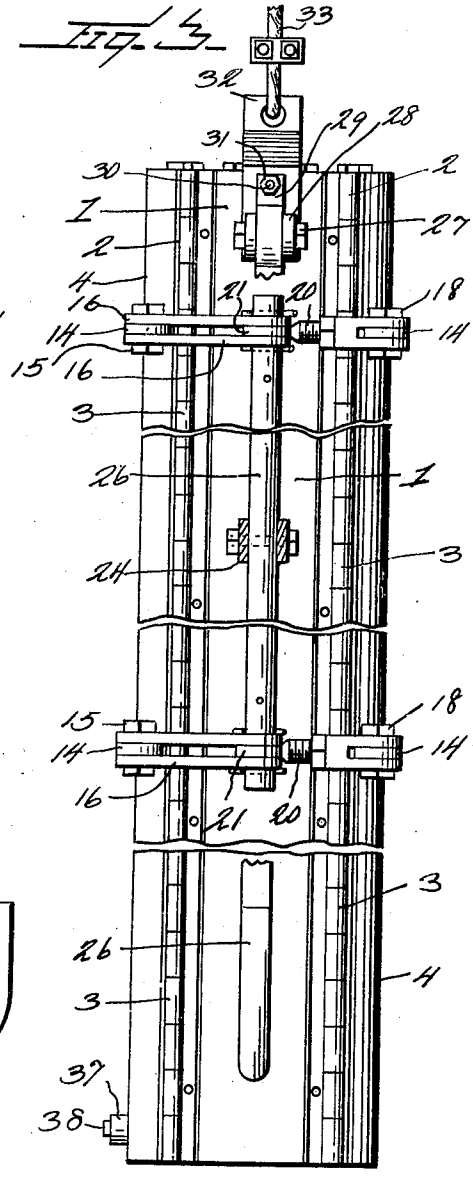
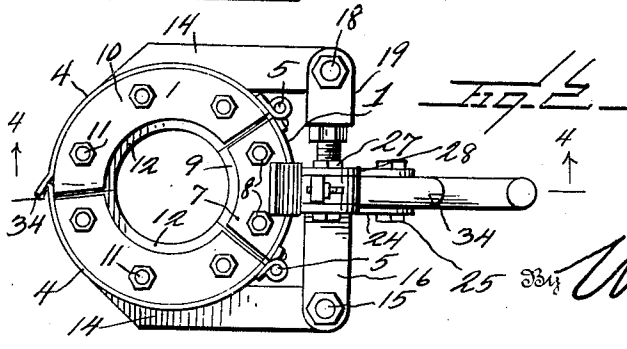


Fig. 2



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Fig. 4

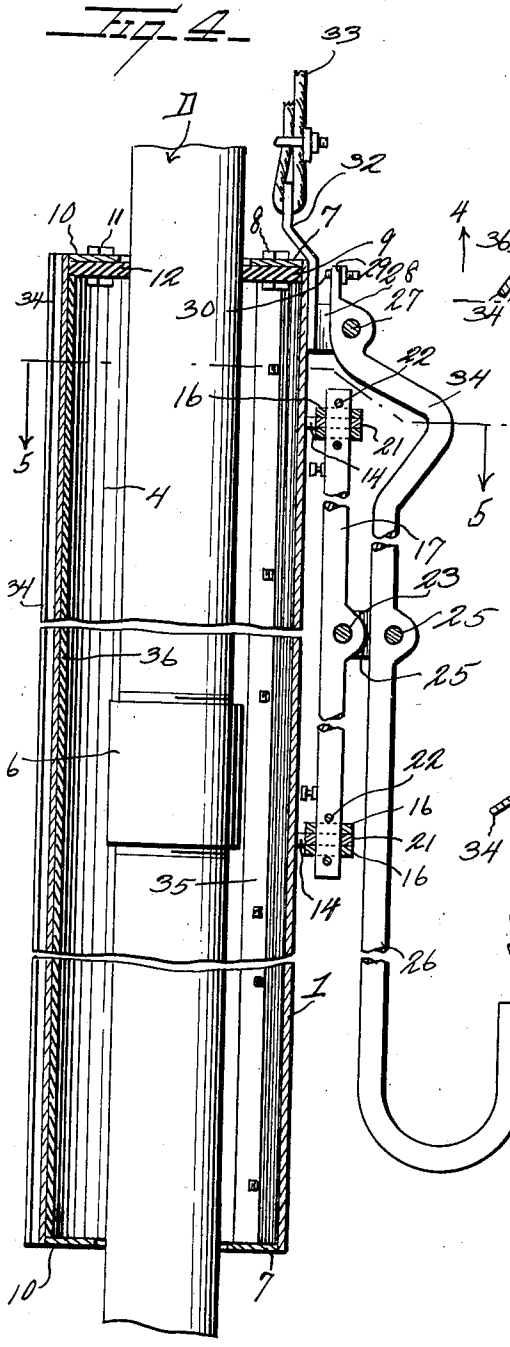


Fig. 5

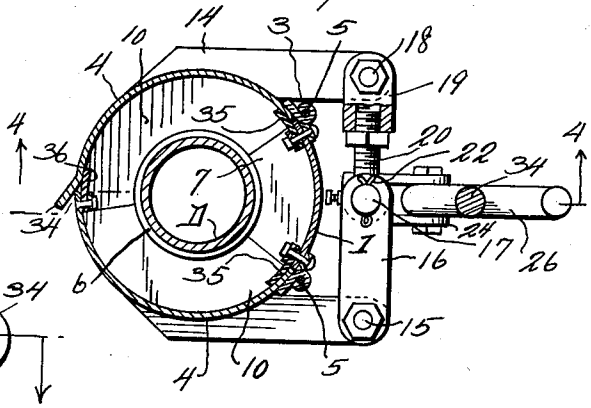
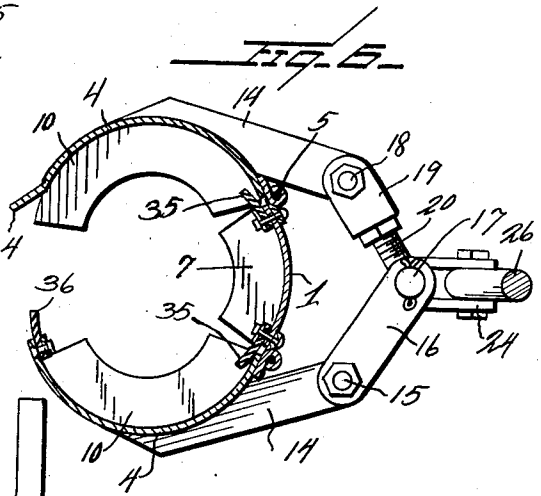


Fig. 6



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Patented Sept. 10, 1940

2,214,429

UNITED STATES PATENT OFFICE

2,214,429

MUD BOX

William J. Miller, Los Angeles, Calif.

Application October 24, 1939, Serial No. 301,059

10 Claims. (Cl. 166—16)

This invention relates to a mud box particularly intended for use with the pipe or tubing of a rotary drilling rig, and it is an object of the invention to provide a box of this kind for use in connection with large size pipes or to carry a heavy load.

It is also an object of the invention to provide a box of this kind including hingedly mounted side plates operatively connected at spaced points therealong with an equalizing bar, together with means associated with said equalizing bar for swinging the side plates into either open or closed position.

Another object of the invention is to provide a box of this kind including hingedly mounted side plates having means to assure proper relative relation of said side plates when closed and wherein is provided an equalizing bar for swinging said side plates with regulatable means for limiting the inward movement of the equalizing bar past center.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved mud box whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:

Figure 1 is a view in side elevation of a mud box constructed in accordance with an embodiment of my invention with a portion broken away;

Figure 2 is a view in top plan of the box as illustrated in Figure 1 with the suspending cable omitted;

Figure 3 is a view in rear elevation of the structure as illustrated in Figure 1 with parts in section and the intermediate portion of the pull lever broken away;

Figure 4 is a longitudinal sectional view taken substantially on the line 4—4 of Figure 2 and also Figure 5 with the device in applied position and the drill tube or stem in elevation;

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 4;

Figure 6 is a transverse sectional view taken through the box in open adjustment.

In the embodiment of my invention as illustrated in the accompanying drawings, 1 denotes an elongated back plate arcuate in cross section. The side or longitudinal marginal portions of the plate 1 are provided therealong with the spaced sleeves or knuckles 2 between which are snugly received the spaced knuckles 3 carried by the inner longitudinal side or marginal portions of the side plates 4 also arcuate in cross section. Disposed through the interfitting knuckles or sleeves 2 and 3 are pintles 5 whereby the side plates 4 are hingedly connected to the back plate 1.

When the plates 4 are in closed position they coact with the back or rear plate 1 to provide a substantially cylindrical box which, when in applied or working position, surrounds a drill tube or stem D above and below the connection 6 between adjacent sections of the tube or stem D.

The opposite end portions of the back plate 1 have welded or otherwise securely fastened thereto the inwardly disposed flanges 7 and bolted, as at 8, to the inner face of the top flange 7 is the arcuate packing block 9 of a rubber compound. This block 9 is adapted to tightly contact with a peripheral portion of the drill tube or stem D to which the box is applied.

The upper and lower end portions of the side plates 4 also have welded or otherwise securely applied thereto the inwardly disposed flanges 10 to the inner faces of the top flanges of which are bolted, as at 11, or otherwise secured thereto the packing blocks 12 for close contact with peripheral portions of the tube or stem D.

The several packing blocks 9 and 12 and the lower flanges 7 and 10 are so formed that when the side plates 4 are in closed position around the drill tube or stem D said blocks 9 and 12 coact to provide packing elements entirely surrounding the tube or stem D at all points above and below the connection or joint 6 between adjacent sections of the drill tube or stem D after said connection or joint has been raised up above the rotary.

The side plates 4 have secured thereto at desired points spaced lengthwise thereof the rearwardly directed arms 14. The arms 14 of one of the side plates 4 have their outer end portions pivotally connected, as at 15, to the outer end portions of the links 16. These links 16 extend inwardly of the plate 1 and the inner end portions of these links 16 have freely disposed therethrough the end portions of an elongated equalizing bar 17. The arms 14 of the second side plate 4 have pivotally connected, as at 18, to the outer end portions thereof the clevises 19 in each of

which threads a shank 20. The outer portion of each of these shanks 20 is formed to provide a flattened head 21 which is received between the inner end portions of a pair of links 16 and thru which head the equalizing bar 17 is also freely directed. This bar 17 throughout its major portion and particularly at those portions which are disposed through the links 16 and heads 21, is circular in cross section. The bar 17 above and below each pair of links 16 has disposed therethrough the cotter pins 22 whereby the bar 17 is maintained in desired assembly with respect to the links 16 and the shanks 20.

The bar 17 at its longitudinal center has pivotally secured thereto, as at 23, the spaced short links 24. These links 24 extend outwardly and rearwardly from the bar 17 and are pivotally connected, as at 25, with the intermediate portion of a pull lever 26 passing between said links 24.

The lever 26 is disposed in a direction lengthwise of the rear plate 1 and the upper portion of said lever 26 is pivotally supported, as at 27, between a pair of outstanding gears 28 carried by the upper end portion of the back or rear plate 1. This lever 26 is of such length desired and upon swinging the lower end portion of the lever 26 outwardly the side plates 4 will have their outer marginal portions separated a distance sufficiently to allow the box to be readily applied to or removed from working position with respect to the drill tube or stem D. In applying the box to the stem or drill tube D, inward swinging movement of the lever 26 will cause the side plates 4 to assume a closed position whereby the stem or drill tube D is entirely surrounded as clearly illustrated in the accompanying drawings. The upper or pivoted end portion of the lever 26 is continued by an extended portion 29 through which is threaded a shank 30. This shank 30 constitutes an adjustable stop and is maintained in its selected adjustment by a jam nut 31. As is believed to be obvious, the extent of outward movement of the side plates 4 will be determined by contact of the inner extremity of the shank 30 with the rear or back plate 1 and more particularly the upstanding hanger 32 welded or otherwise fixedly secured to the upper portion of the back or rear plate 1. This plate or hanger 32 is adapted to have secured thereto a cable 33 whereby the box in its entirety may be suspended in the derrick.

The lever 26 inwardly of its pivotal mounting 27 is outwardly offset, as at 34, so that there will be no interference between the upper portion of the lever 26 and the connections between the upper arms 14 and the equalizing bar 17.

It is to be noted that the flanges 10 of one of the side plates 4 (Figures 2 and 6) terminate a distance inwardly from the outer longitudinal edge of such plate. The flanges 10 of the second side plate extend beyond the outer longitudinal edge of said second plate so that the flanges 10 of said second plate will slip beyond the longitudinal margin of the first plate when said plates 4 are closed, thus assuring the closed plates 4 having their outer marginal portions in proper alignment so that a true circle of the box is assured.

The longitudinal marginal portion of the second plate 4 is defined by an outwardly disposed and angularly related lip 34 which serves as a striker or guide to facilitate the full closing of the plates 4.

The side or longitudinal marginal portions of the back or rear plate 1 are provided therealong with the sealing strips 35 to lap the adjacent marginal portions of the side plates 4 when in closed position to prevent leakage between the closed plates 1 and 4. The outer longitudinal marginal portion of one of the plates 4 also carries a closing or sealing strip 36 to lap the adjacent outer longitudinal marginal portion of the second plate 4.

The lower portion of one of the side plates 4 is provided with a drain nipple 37, herein disclosed as closed by a removable plug 38. This nipple 37 provides means for recovering samples when making a drill stem test.

The opposite end portions of the equalizing bar 17 have threaded therein the bolts or set screws 39 projecting from the bar 17 in a direction toward the rear or back plate 1. Engaged on these bolts or set screws 39 are the jam nuts 40 whereby the bolts or screws may be effectively maintained in desired adjustment. The contact of the outer ends of these bolts or set screws 39 with the back or rear plate 1 limit the extent of movement of the equalizing bar 17 inwardly beyond the vertical center. The limiting of this movement is of importance because undue movement of the bar 17 inwardly beyond its center requires considerable outward pull upon the lever 26 to unlock the side plates 4 for outward swinging movement. It is believed to be obvious that upon slight movement of the bar 17 inwardly beyond the vertical center the side plates 4 are effectively held against opening or outward swing.

The bottom flanges 7 and 10 do not have any packing associated therewith as it is not desired that these lower flanges 7 and 10 have sealing contact with the drill tube or stem D. On the contrary, these lower flanges 7 and 10, when the box is closed, are slightly spaced from the tube or stem D to allow fluid within the closed box to re-enter the well after the stem or drill tube D has been lifted.

The invention as comprised in this application is an improvement over the mud box as embodied in my pending application Serial No. 268,090 filed April 15, 1939. The invention as embodied in this present application particularly differs from what is shown in my previously filed application with respect to the equalizing bar 17 with which the lever 26 is operatively engaged together with the features of the extended portions of certain of the flanges 10 lapping the outer marginal portion of a second side plate 4. The present invention also comes within the scope of the invention as embodied in my prior application and, therefore, the present application may be considered a continuation in part of this former application Serial No. 268,090.

From the foregoing description it is thought to be obvious that a mud box constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:

1. A mud box for embracing a drill tube comprising a back plate, side plates hingedly con-

nected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantialy close the ends of the box when the box is enclosed around the drill tube, rearwardly disposed arms carried by the side plates to substantially close the ends of the izing bar, operative connections between the bar and the arms, a lever pivoted to the back plate, and an operative connection between the lever and the central portion of the bar.

2. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantially close the ends of the box when the box is enclosed around the drill tube, rearwardly disposed arms carried by the side plates at spaced points therealong, an equalizing bar, operative connections between the bar and the arms, a lever pivoted to the back plate, and an operative connection between the lever and the central portion of the bar, the pivotal connection of the lever being at a point above the arms and bar.

3. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantially close the ends of the box when the box is enclosed around the drill tube, rearwardly disposed arms carried by the side plates at spaced points therealong, an equalizing bar, operative connections between the bar and the arms, a lever pivoted to the back plate, an operative connection between the lever and the central portion of the bar, and means for regulating the extent of inward movement of the bar.

4. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantially close the ends of the box when the box is enclosed around the drill tube, rearwardly disposed arms carried by the side plates at spaced points therealong, an equalizing bar, operative connections between the bar and the arms, a lever pivoted to the back plate, an operative connection between the lever and the central portion of the bar, and endwise adjustable members carried by the bar for contact with the back plate to limit the extent of inward movement of the bar.

5. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantially close the ends of the box when the box is enclosed around the drill tube, rearwardly disposed arms carried by the side plates at spaced points therealong, an equalizing bar, operative connections between the bar and the arms, a lever pivoted to the back plate, and an operative connection between the lever and the central portion of the bar, the pivoted end portion of the lever being extended to provide means to limit the extent of swinging movement of the lever proper away from the back plate.

6. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantially close the ends of the box when the box is enclosed around the drill tube, rearwardly disposed arms carried by the side plates at spaced points therealong, an equalizing bar, operative connections between the bar and the arms, a lever pivoted to the back plate, an operative connection between the lever and the central portion of the bar, the pivoted end portion of the lever being extended, and a stop adjustably engaged with said extended portion of the lever for contact with the back plate to limit the extent of swinging movement of the lever proper away from the back plate.

7. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, inwardly disposed flanges carried by the opposite end portions of the back plate and the side plates, the end flanges of one of the side plates extending beyond the outer marginal portion of said plate, said extended portions of the flanges lapping the outer marginal portion of the second side plate when said plates are in closed position.

8. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected with the back plate, inwardly disposed flanges carried by the opposite end portions of the back plate and the side plates, the end flanges of one of the side plates extending beyond the outer marginal portion of said plate, said extended portions of the flanges lapping the outer marginal portion of the second side plate when said plates are in closed position, the end flanges of the second side plate terminating inwardly of its outer margin.

9. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantially close the ends of the box when the box is enclosed around the drill tube, rearwardly disposed arms carried by the side plates at spaced points therealong, an equalizing bar, operative connections between the bar and the arms, a lever pivoted to the back plate, an operative connection between the lever and the central portion of the bar, and means carried by the upper portion of the back plate for suspending the box within a derrick.

10. A mud box for embracing a drill tube comprising a back plate, side plates hingedly connected to the back plate, means carried by the opposite end portions of the back plate and the side plates to substantially close the ends of the box when the box is enclosed around the drill tube, the means at one end portion of the back plate and side plate being so constructed and assembled to have tight engagement with the drill tube when the box is closed and the means at the opposite end being so constructed and arranged to allow for drainage from within the box when the box is enclosed.

WILLIAM J. MILLER.

CERTIFICATE OF CORRECTION.

Patent No. 2,214,429. September 10, 1940.

WILLIAM J. MILLER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 6-7, claim 1, strike out "to substantially close the ends of the izing" and insert instead --at spaced points therealong, an equalizing--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of case in the Patent Office.

Signed and sealed this 15th day of October, A. D. 1940.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)