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2,298,507

ELEVATOR

Filed Oct. 6, 1939

2 Sheets-Sheet 1

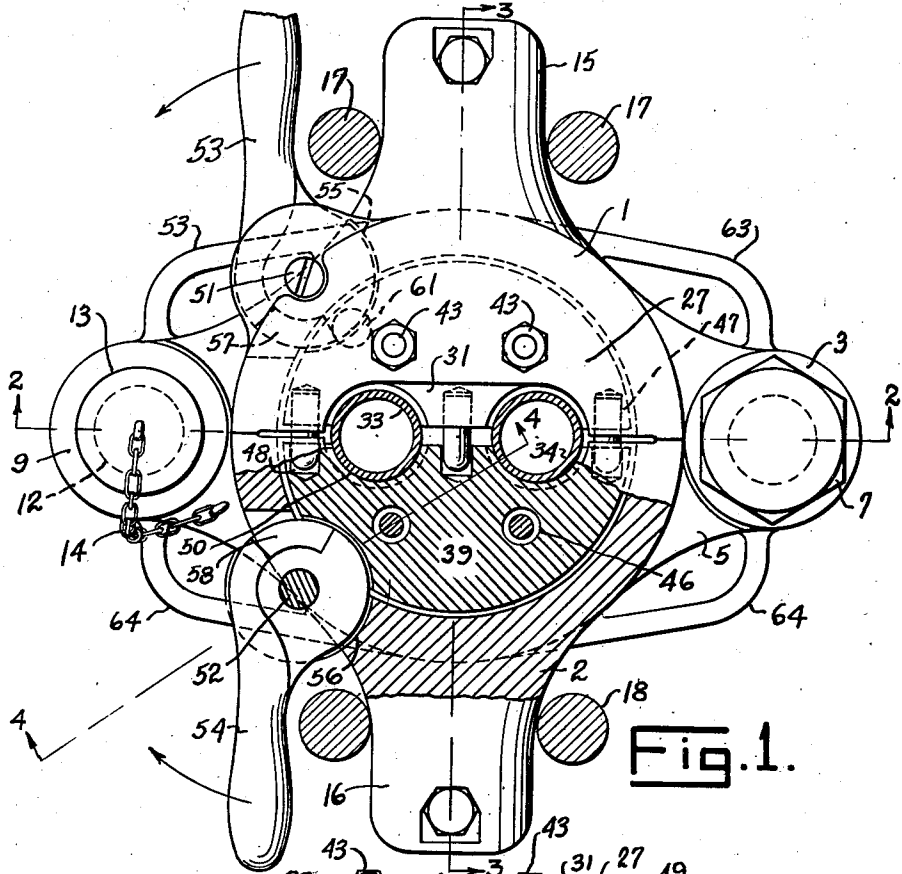


Fig. 1.

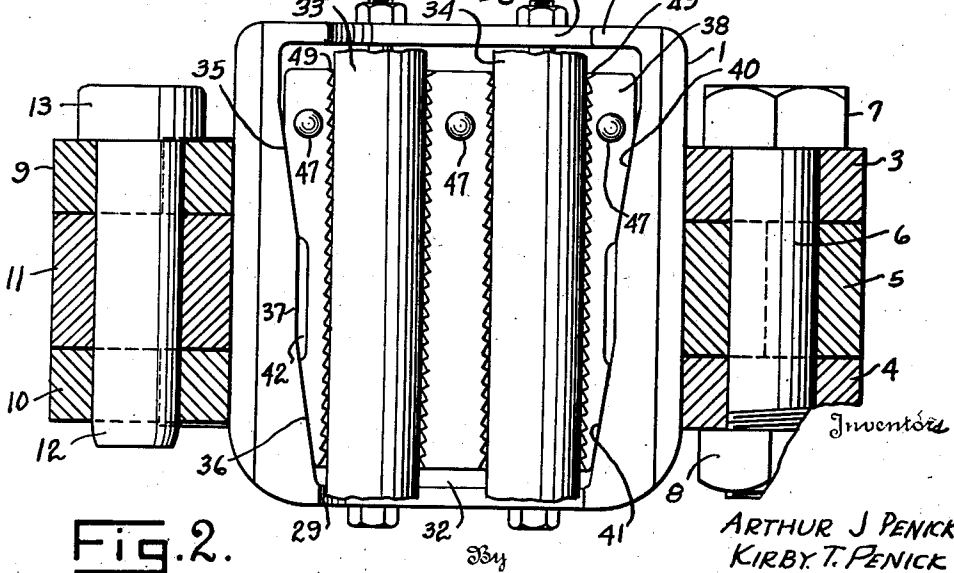


Fig. 2.

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2 Sheets—Sheet 2

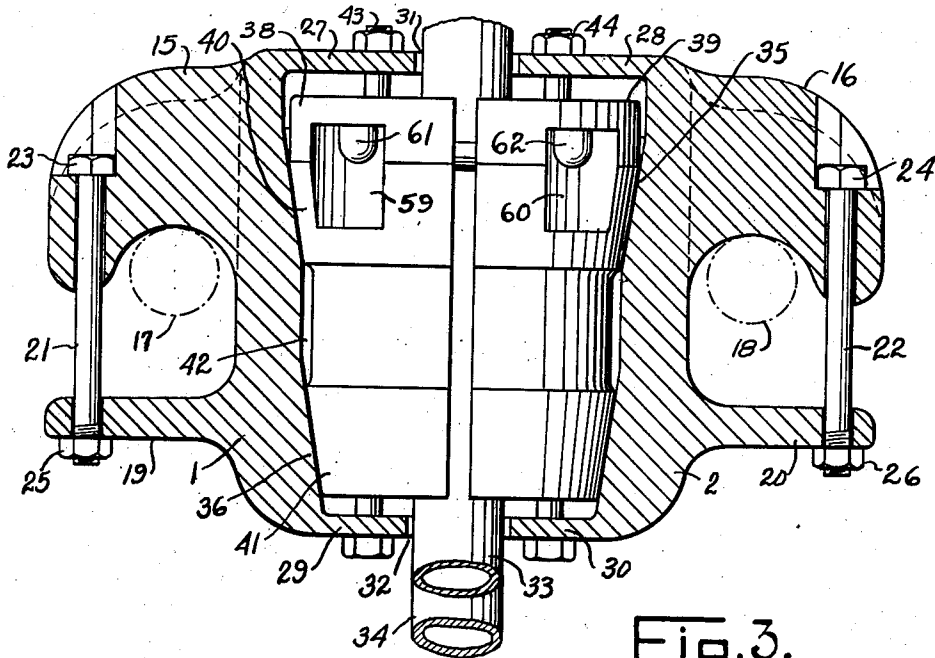


Fig. 3.

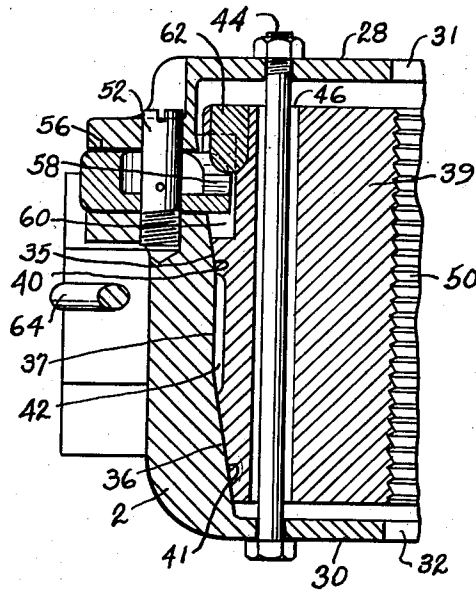


Fig. 4.

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ELEVATOR

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Application October 6, 1939, Serial No. 298,281

4 Claims. (Cl. 24—263)

This invention relates to an elevator.

An object of the invention is to provide an elevator particularly adapted for handling a plurality of strings of pipe or tubing while simultaneously making up or breaking out the strings, in lowering the same into or withdrawing the same from a well.

Another object of the invention is to provide, in an elevator, a novel slip jaw assembly for engaging and supporting a plurality of strings of pipe or tubing.

The invention also embodies novel means for actuating the slip jaws into active or inactive positions.

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 elevator shown partly in section.

Figure 2 shows a vertical, sectional view taken on the line 2—2 of Figure 1.

Figure 3 shows a vertical, sectional view taken on the line 3—3 of Figure 1, and

Figure 4 shows a fragmentary, vertical, sectional view taken on the line 4—4 of Figure 1.

Referring now more particularly to the drawings, wherein like numerals of reference designate the same parts in each of the figures, the numerals 1 and 2 designate complementary sections of the elevatory body which are substantially similar in general contour. At one side the section 1 is provided with the upper and lower spaced hinge members 3, 4, and fitted closely between the hinge members 3, 4 there is a hinge member 5 carried by the section 2. The hinge members 3, 4, 5 have an aligned bearing to receive the hinge bolt 6 having the enlarged head 7 on its upper end and whose lower end is threaded to receive the retaining nut 8. A hinge between the sections, 1, 2 is thus formed.

At the other side the section 2 is provided with the upper and lower spaced lugs 9, 10 and the section 1 is provided with an intermediate lug 11 adapted to fit between the lugs 9, 10, when the elevator is in closed position and these lugs 9, 10, 11 have a bearing through them to receive the latch bolt 12 whose upper end is provided with an enlarged head 13. Upon removal of the bolt 13 the elevator may be swung into open position. When the elevator is closed about the tubing the latch bolt 12 may be inserted into place to secure the elevator about the tubing. The latch bolt may be maintained against loss by means of a suitable flexible tie member such as a chain 14.

The body sections 1 and 2 have the bail engaging hooks 15, 16 extending radially outwardly therefrom with which the elevator bails 17, 18

may be engaged. Spaced beneath these respective hooks are the arms 19, 20 extending radially outwardly from the respective body sections and retaining bolts 21, 22 are fitted downwardly through the bail hooks and through the corresponding arms 19, 20 and are retained in place by the heads 23, 24 at their upper ends and the nuts 25, 26 at their lower ends.

The bails 17, 18 are provided for engagement with the hook of the conventional travelling block which is operable in the derrick by the appliances commonly used for such purposes.

The body sections 1 and 2, at their upper and lower ends, have the opposing complementary inwardly extending flanges 27, 28 and 29, 30 as more accurately shown in Figures 3 and 4. These upper and lower flanges have the central cutaway portions providing the oblong upper and lower slots 31, 32 to permit the passage, through the elevator of the tubing or pipe, such as 33, 34.

The elevator body has the inside, upper and lower, downwardly tapering seats 35, 36, which are spaced apart as shown in Figure 2 to provide an inside cylindrical inner wall 37 between them. These upper and lower seats are approximately circular in horizontal cross-section when the body sections are in closed position as more clearly shown in Figure 1.

Within the respective body sections 1, 2 are the slip jaws 38, 39. These jaws are complementary, each jaw having the upper and lower downwardly tapering external faces 40, 41 shaped to conform to the contour of and shaped to fit closely onto, the respective upper and lower seats 35, 36. Between the external faces 40, 41 the jaws are countersunk to provide the space 42 to reduce the friction area between the slip jaws and the elevator body.

The slip jaws are loosely mounted in the body and are of somewhat less length than the distance between the upper flanges 27, 28 and the lower flanges 29, 30 as shown in Figures 3 and 4. They are retained against displacement by the vertical rods 43, 43 and 44, 44. These retaining rods 43, 44 are fitted through the upper and lower flanges and through enlarged bores as 45, 46 in the slip jaws and are retained in place by enlarged heads at one end and nuts screwed onto their other ends as shown in Figure 4. The slip jaws thus have a limited upward and outward, or downward and inward movement as is necessary in order to release them from, or cause them to engage, the tubing.

The slip jaws are maintained in horizontal alignment by means of dowels 47 projecting outwardly from the face of one jaw and fitting loosely into aligned sockets as 48 in the opposing face of the other jaw.

The facing sides of the slip jaws have the complementary vertical grooves 49, 49 and 50, 50 which

are internally toothed as shown in Figures 2 and 4 thus providing arcuate gripping faces to engage about and to grip the corresponding strings of tubing 33, 34. In handling the tubing with the elevator, as the tubing is to be elevated and broken up, the elevator is engaged about the tubing and then elevated and held elevated by the usual tubing slips. These slips are engaged about the strings of tubing beneath tubing couplings and the upper sections of the strings are unscrewed from the couplings so as to be laid aside. While the upper sections of the tubing are being unscrewed the slip jaws 38, 39 should be moved upwardly and outwardly on their seats in the elevator body so as to release the tubing. Means have been provided for so moving said slip jaws which will now be described.

Mounted to rotate on the vertical pivot pins 51, 52 are the grip members or handles 53, 54 whose inner ends are fitted through the transverse slots 55, 56 of the body sections 1 and 2. The inner ends of these handles are disc-like in form and have the arcuate cams 57, 58 on their upper faces. The slip jaws 38, 39 have the external recesses 59, 60 into which the inner ends of the handles project as shown more clearly in Figure 4 and depending into the recesses 59, 60 and bearing against the cams 57, 58 are the bosses 61, 62 whose lower ends are rounded off and ride on the cam faces 57, 58. The operator may swing the grip members 53, 54 toward each other in the direction indicated by the arrows in Figure 1 causing the cam faces to act through the bosses 61, 62 and elevate the slip jaws causing them to move upwardly and outwardly so as to release the tubing.

When the upper sections of the tubing have been unscrewed from the string beneath they may be swung to one side and with the jaws in said released position the operator may then withdraw the pin 12 permitting the elevators to swing open and release the pipe and the elevator may then be lowered and engaged about the upper end of the string beneath for the purpose of again elevating the string as before. When the elevator has been engaged about the tubing the grips 53, 54 may again be swung about toward each other so as to elevate the slip jaws to permit the elevator sections to be closed about the tubing with the slip jaws out of engagement with the tubing so that the pin 12 may be easily inserted through the aligned bearings of the lugs 9, 10, 11 and thereupon the grips 53, 54 may be swung apart into the position shown in Figure 1 to permit the jaws to move downwardly and inwardly into their lower position and into engagement with the tubing. It will thus be seen that provision is made for moving the slip jaws upwardly and outwardly in the elevator body out of contact or engagement with the tubing when it is desired to withdraw the pin 12 or to insert it so that the bearings through the lugs 9, 10, 11 may easily be brought into alignment to permit withdrawal or insertion of the pin 12 without binding.

It is obvious that the elevator may be manipulated in a similar manner to that above described while making up the tubing and lowering the string into the well.

It may be here noted that the sections 1 and 2 are provided with grips 63, 63 and 64, 64 for easy handling of the elevator in carrying on the work for which it is intended.

The drawings and description are illustrative merely, while the broad principle of the invention will be defined by the appended claims.

What we claim is:

5 1. An elevator of the character described comprising an elevator body formed of complementary sections, means for hinging said sections together at one side, means for releasably securing the sections together at the other side, said body 10 having an inside, downwardly converging seat, complementary slip jaws having external recesses and depending bosses therein and shaped, externally, to conform to the contour of and to fit on said seat and whose facing sides are shaped to fit around and simultaneously grip a plurality of strings of tubing and manually operable means 15 mounted in the body and working in the recesses against the bosses whereby the jaws may be moved upwardly and outwardly.

20 2. An elevator of the character described comprising an elevator body formed of two complementary sections hinged together at one side, a latch for releasably securing said sections together at the other side, said body having an inside, downwardly converging seat, a pair of 25 complementary slip jaws shaped to fit said seat, whose inside faces are shaped to fit around and grip a plurality of strings of tubing, means on the jaws to align the jaws with each other, flanges on the sections having tubing receiving openings and substantially enclosing the seat and jaws, means for loosely mounting each of said jaws 30 in the respective section, and means on the sections including cams effective to move the jaws out of wedging relationship in the seat.

3. An elevator of the character described comprising an elevator body formed of two complementary sections hinged together at one side, a latch for releasably securing said sections together at the other side, said body having an inside, downwardly converging seat, a pair of complementary slip jaws shaped externally to fit said seat and whose inner sides present confronting flat faces having a pair of complementary vertical 35 grooves which are internally toothed forming gripping faces adapted to engage about and grip separate strings of tubing in side by side relation, flanges on the sections, having tubing receiving openings substantially enclosing the seat and jaws, means for loosely mounting each of said jaws in the respective section, means on the jaws to cause one to align with the other, depending bosses on the sections and cam means 40 on the sections arranged to co-act with the bosses to move the jaws out of seating relationship in the seat.

4. An elevator of the character described comprising an elevator body having an inside downwardly converging seat, complementary slip jaws 45 shaped, externally, to conform to the contour of and to fit on said seat and whose inner sides are shaped to fit around and simultaneously grip a plurality of strings of tubing, means mounted in the body for elevating the jaws relative to the seat, said elevating means and the respective jaws 50 being provided one with cam means and the other with means to co-act with the cam means whereby, upon appropriate manipulation of the elevating means, said slip jaws will be elevated relative to the seat.

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