Jan. 8, 1946. R. A. COE 2,392,462

CASING ELEVATOR

Filed May 22, 1944 4 Sheets-Sheet 1

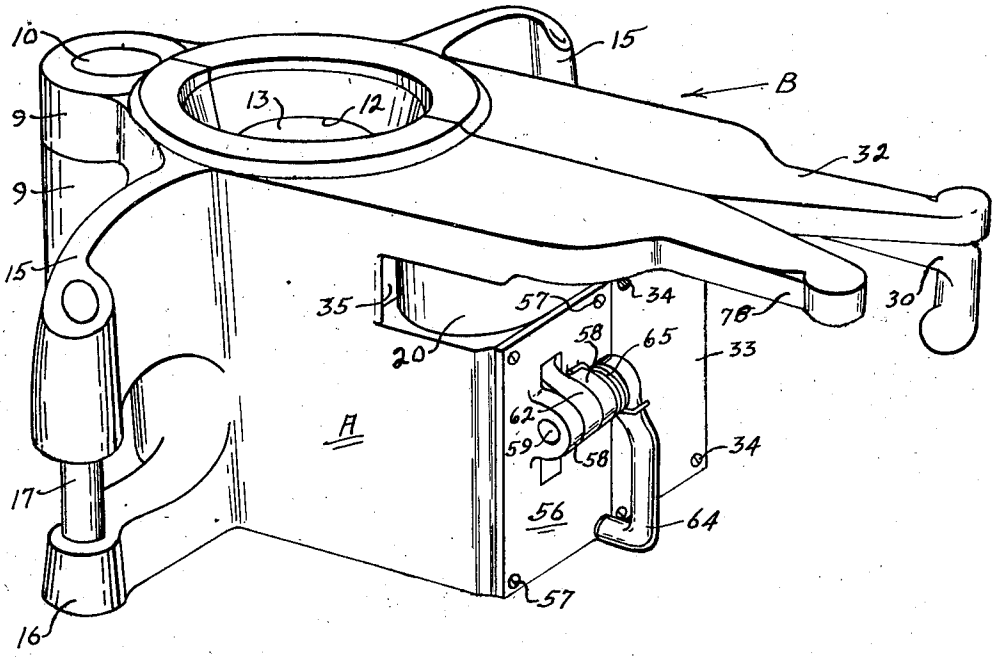
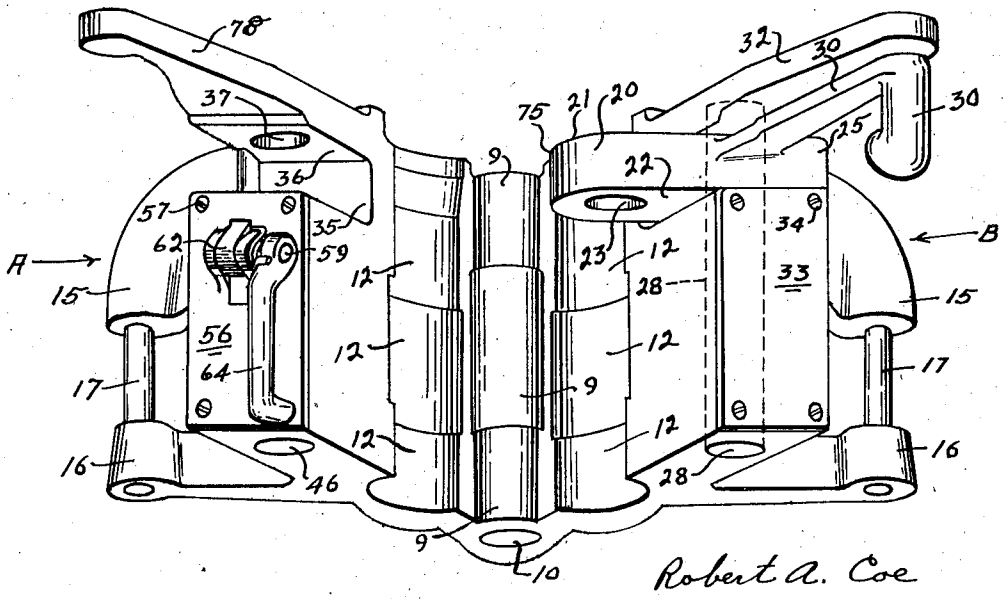


FIG. 1



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FIG. 2

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CASING ELEVATOR

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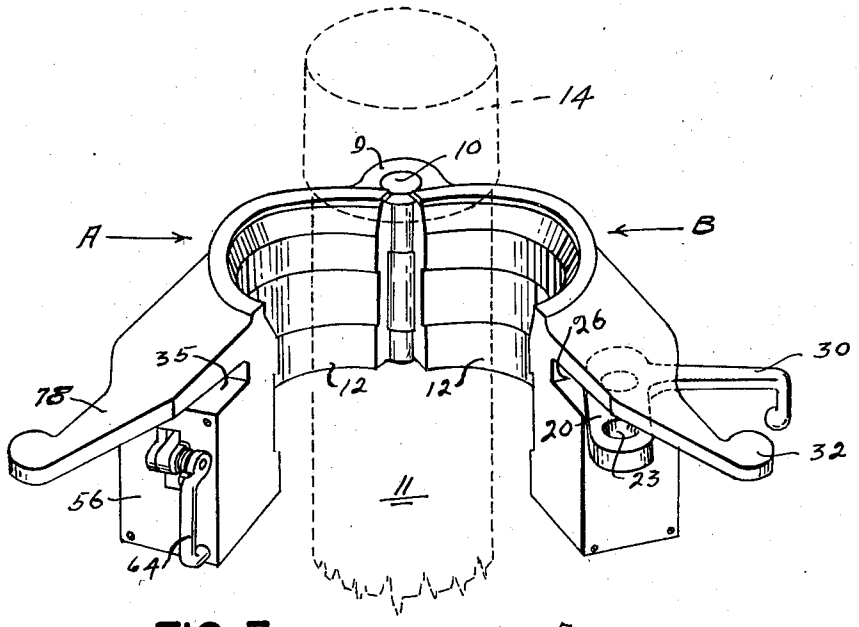


FIG. 3

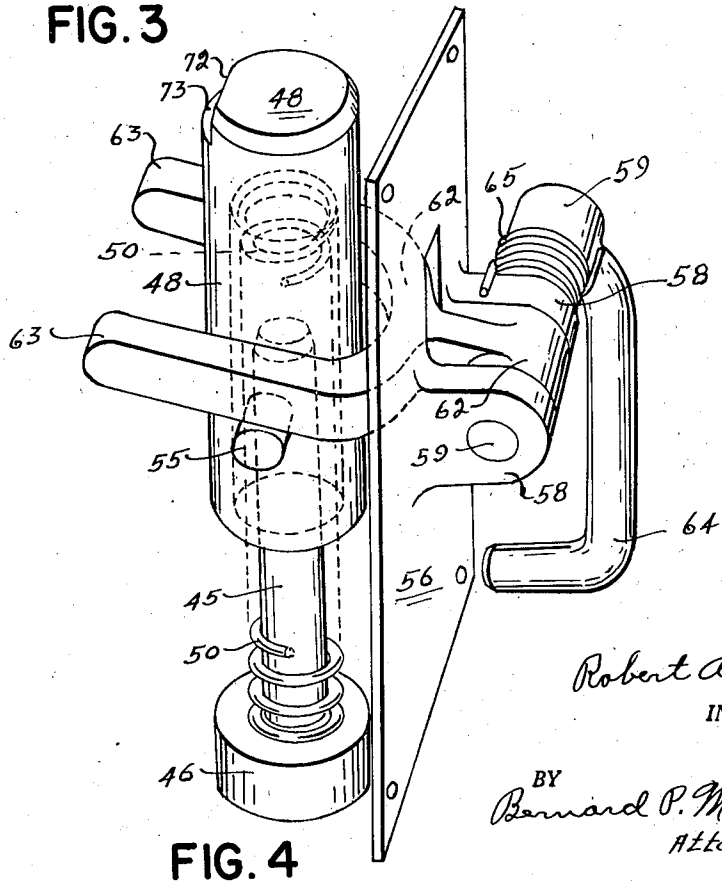


FIG. 4

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CASING ELEVATOR

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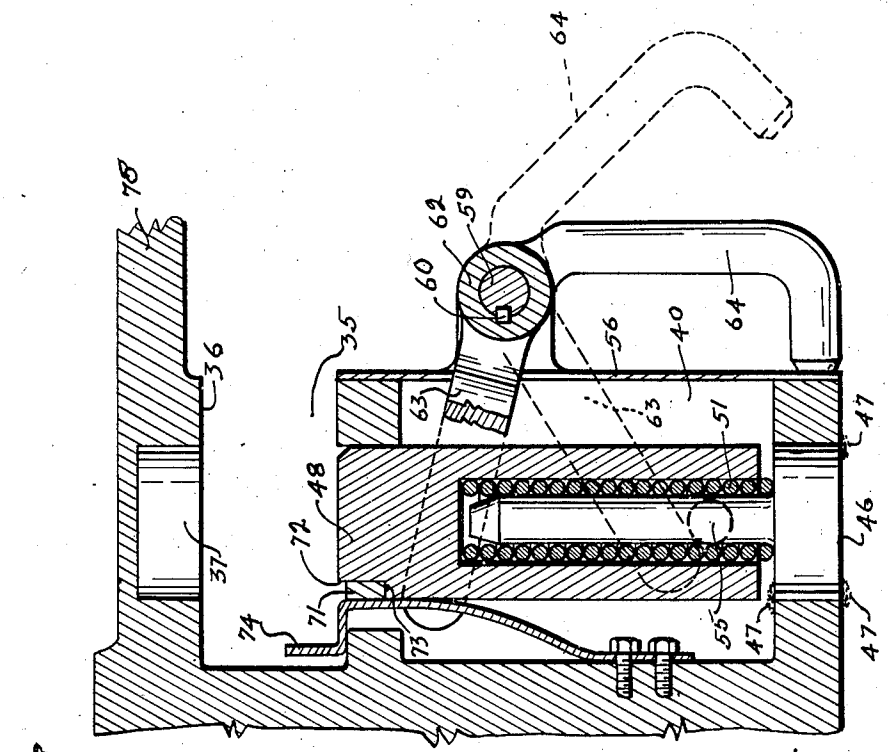


FIG. 6

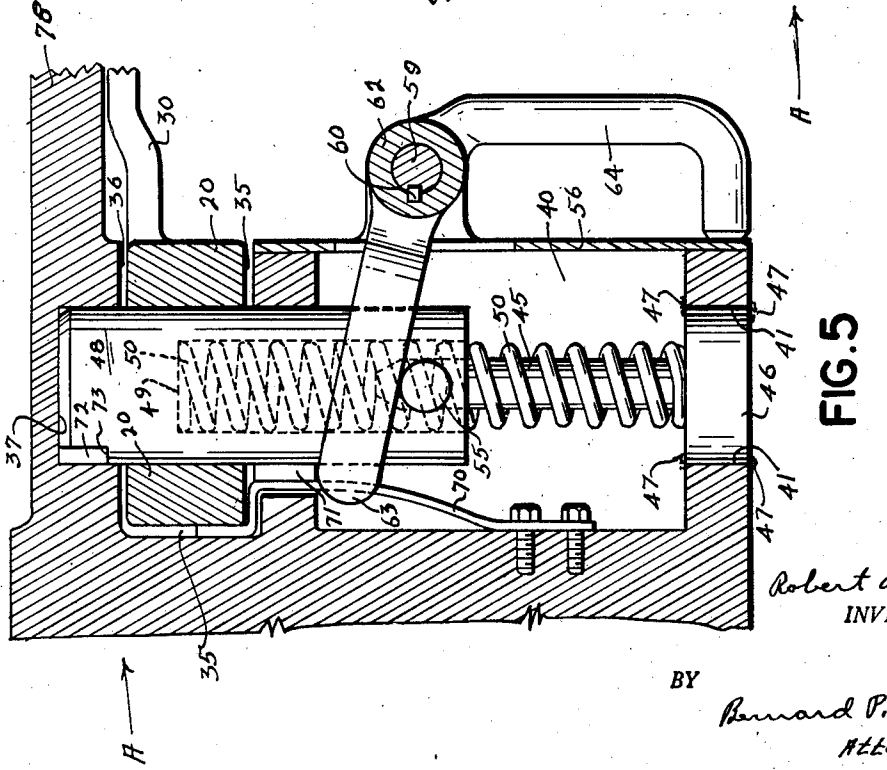


FIG. 5

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CASING ELEVATOR

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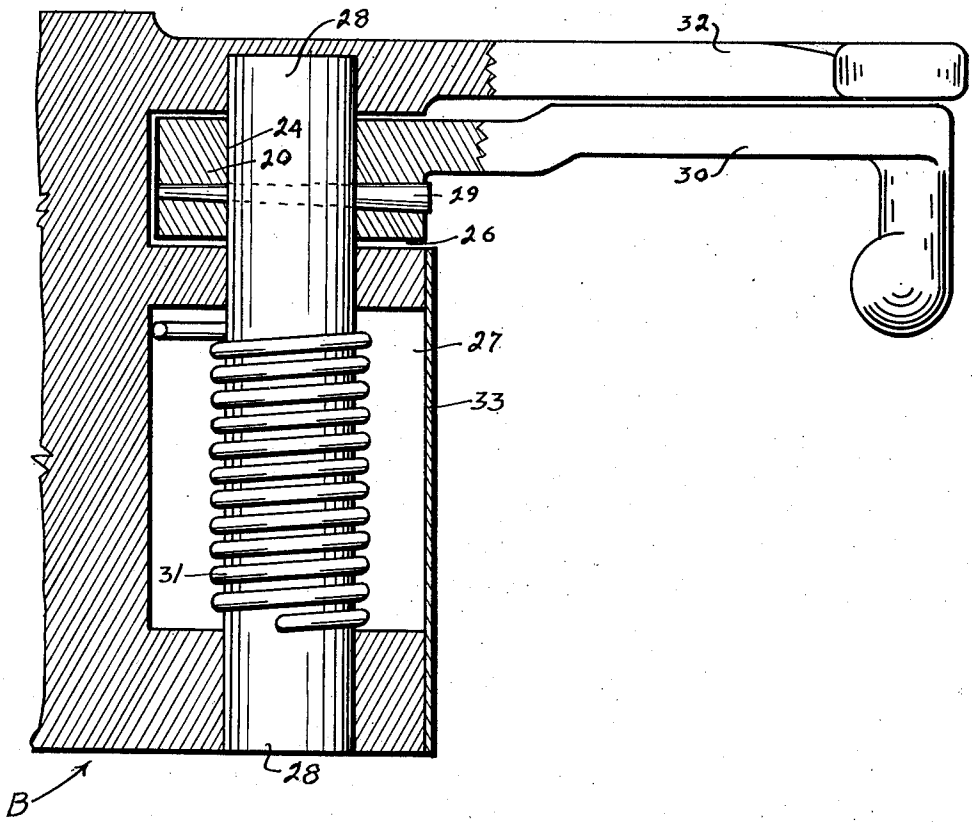


FIG. 7

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UNITED STATES PATENT OFFICE

2,392,462

CASING ELEVATOR

Robert A. Coe, Oklahoma City, Okla.

Application May 22, 1944, Serial No. 536,728

10 Claims. (Cl. 294—90)

My invention relates to elevators for handling pipe, particularly drill pipe, in a well derrick.

The present invention pertains to elevators for lowering and raising pipe into and out of wells, more particularly oil wells, and pertains more specifically to elevators of the jawtype, wherein two arcuate body halves or members are hinged together at the rear, so that their forward edges may be swung together to surround or envelope a pipe beneath a shoulder thereon.

The prime object of the present invention is to provide, in a jaw-type elevator, a horizontally swinging latch for said forward edges, and a positive means for locking such latch in closed position.

A further object is to provide, in such an elevator, a latch and latch locking mechanism which is sufficiently strong to withstand the prying effect normally exerted when a string of "external up-set," or tapered pipe is being supported thereon.

A still further object is to provide, in an elevator of the type described, a latch locking mechanism which will be instantaneous and automatic in operation.

Another object is to provide, in an elevator of this type, a latch locking mechanism which may be manually released instantaneously.

Another object is to provide a latch lock releasing means, which cannot be inadvertently fouled and released by contact with derrick members, cables, or other elements usually present in an oil well derrick.

Still another object of the present invention is to supply an elevator of the class described, which is so designed that it may be made for either a left or right handed operation, and can be converted from left to right hand operation, or vice versa, without a change in the form of the body halves.

Other objects will be apparent from the following description when taken in conjunction with the accompanying four-sheet drawings, wherein:

Figure 1 is a perspective view of the elevator looking downwardly thereon, the body halves being shown in closed or latched positions;

Figure 2 is a perspective view looking upwardly into the front of the elevator as it appears when in open position, the latch being shown in position to be locked;

Figure 3 is a perspective view of the open elevator with the latch in fully open position, and showing in dotted lines the position of a pipe therein;

Figure 4 is a perspective view detailing the latch locking mechanism, the bolt thereof being shown in locking position;

Figure 5 is a fragmentary vertical sectional view of the front portion of one body half detailing the latch locking mechanism as it appears when in closed or "locking" position;

Figure 6 is a similar view showing the locking mechanism as it appears when in retrieved or "open" position; and,

Figure 7 is a fragmentary vertical sectional view of the front portion of the other body half, and detailing the hinge mechanism for the latch.

Like characters of reference designate like parts in all of the figures.

In the drawings:

The reference character A indicates the left hand body half or member, looking from the front of the elevator, and B indicates the right hand body half.

The rear portions of the two body halves A and B are provided with interengaging hinge loops 9 which are vertically bored alignedly to receive a hinge pin 10 whereby the front edges of the two halves may be swung apart to permit entry therebetween of a vertically disposed pipe 11 (Fig. 3). Interiorly, the body halves are each provided with a vertically extending semi-circular groove 12 which grooves combine, when the body halves are closed together, to form a central bore 13 adapted to closely envelope the pipe section 11 beneath an enlargement 14 carried thereby.

The body halves A and B are each provided with laterally projecting bail arms 15 and 16 which are vertically spaced from each other to receive therebetween a usual elevator bail, not shown, for operatively supporting the elevator in a well derrick in a usual manner. Removable pins 17 are provided to span the space between the arms 15 and 16 so as to retain the bails in place.

The mechanism thus far described, the parts of which have been indicated by the reference numerals 9 to 17 inclusive, is not new nor is it individual to this particular invention alone, since a similar structure is found in most well pipe elevators of the "jaw type."

The invention per se resides in the means for latching the forward edges of the two body halves together, and in the mechanism for locking and un-locking the latching means. This structure will next be described.

The latch is best illustrated in Figs. 2, 3 and 7, and consists substantially of a substantially rec-

tangular latch body 20 having flat upper and lower surfaces 21 and 22 respectively.

The latch body 20 has a vertical through perforation 23 at one end, and a similar through perforation 24 adjacent to its other end. The perforation 24 lies adjacent to the right hand end 25 of the latch body 20 (Fig. 2), and this end of the body 20 is nested in a cavity 26 formed in the upper portion of the forward end of the elevator body half B. Said end of the body half B also has a cavity 27 which lies below the above mentioned cavity 26, and a pivot pin 28 extends upwardly through both cavities 27 and 26, and through the perforation 24 in the latch body 20. A tapered dowel pin 29 extends laterally through the latch body 20 and through the pivot pin 28 so that the pivot pin must rotate when the latch body is moved. The latch body, adjacent the end 25, is provided with a forwardly projecting actuating handle 30 by which the latch body 20 may be manually rotated in the elevator body half B with the pivot pin 28 acting as an axis. Within the cavity 27, there is provided around the pivot pin 28 a helical spring 31. The spring 31 is adapted to bear against the walls of the cavity 27 and to urge the pivot pin 28 to rotate in a direction which brings the latch body 20 to the position shown in Fig. 2, and to normally hold the same in such position. The elevator body half B is preferably equipped with a forwardly projecting guard member 32 which lies directly above the handle 30 when said handle is in its normal position (Fig. 2). It is obvious that the handle 30 may be moved manually toward the right hand, and such movement will overcome pressure of the spring 31 and will bring the latch body 20 to the position shown in Fig. 3. A removable facing plate 33 is held by studs 34 to the forward end of the body half B in a position to close the forward end of the cavity 27.

The upper forward end of the elevator body half A, is provided with a cavity or socket 35 which is of a proper vertical dimension to closely nest the left hand end of the latch body 20 when the elevator body halves A and B are swung together about the pipe 14. The upper surface 36 of the cavity 35 is provided with a circular indentation 37 for a purpose more fully described hereinbelow. The indentation 37 and cavity 35 are so arranged and located that when the two elevator body halves A and B are swung together the perforation 23 in the latch body 20 aligns with the indentation 37 in the upper surface of the cavity 35. The forward end of the elevator body half A is also provided with a cavity 40, lying below the cavity 35, and the bottom of the cavity 40 has a perforation 41 which lies below and in axial alignment with the indentation 37.

As a means for locking or latching the latch body 20 within the cavity 35, the following structure is provided:

A vertical disposed pin 45, having an enlarged head 46, is inserted upwardly into the perforation 41 in the bottom of the cavity 40, and projects upwardly into the cavity. The head 46 is welded or otherwise rigidly attached to the elevator body half A as shown at 47. A latch pin 48 has a partial vertical bore 49 extending upwardly from its lower end, and is adapted to seat over the pin 45. A compression spring 50 surrounds the pin 45 and the upper end of the spring is nested in the bore 49 of the latch pin 48. The spring 50 therefore normally urges the latch pin 48 upwardly into the indentation 37. If the elevator body halves A and B are in closed position, and if the latch body 20 is in its normal position (Fig. 2), the latch pin 48 will therefore be forced by the spring 50 upwardly through the perforation 23 in the latch body 20, and into the indentation 37. It is evident that so long as the latch pin 48 is in its uppermost position, extending through the perforation 23 of the latch body 20, the two elevator body halves A and B will be firmly locked in a closed position. In order to open the elevator body halves, it therefore becomes imperative that a means be provided for drawing the latch pin 48 downwardly against the action of the compression spring 50. This mechanism is best illustrated in Fig. 4 and will next be described.

The latch pin 48 has two outwardly extending horizontal trunnions 55. A closure plate 56 is removably mounted, by studs 57, over the forward face of the elevator body half A in a position to close the cavity 40. The forward face of the plate 56 is provided with two forwardly projecting spaced ears 58 which are laterally perforated to receive a pivot pin 59. Intermediate the ears 58, the pivot pin 59 is held by a key 60 to the forward end 61 of a bifurcated yoke member 62 having rearwardly projecting legs or tines 63. When the plate 56 is in place, the tines 63 project rearwardly into the cavity 40 on each side of the latch pin 48 to straddle the same, and the tines rest upon the upper surfaces of the two trunnions 55. One end of the pivot pin 59 extends beyond one of the ears 58, and to said end is rigidly mounted an actuating handle 64. A helical spring 65 surrounds the laterally extending end of the pivot pin 59 and acts to normally hold the handle 64 in a position lying adjacent the plate 56. This spring 65 therefore normally holds the tines 63 of the yoke 62 at the upper end of their throw in the cavity 40. It is obvious that manual movement of the handle 64 outwardly from the plate 56 to the position shown in dotted lines in Fig. 6, will move the tines 63 of the yoke 62 downwardly, and this movement will force the tines to contact the trunnions 55 and move the latch pin 48 downwardly against the action of the compression spring 50. This movement will, of course, draw the latch pin 48 out of the perforation 23 in the latch body 20, and the latch body 20 can therefore be swung outwardly to the position shown in Fig. 3. Further right hand pressure upon the handle 30 will open or swing the elevator body halves apart or to the positions shown in Fig. 3.

It is obvious that with only the structure above described being provided, when the body halves were once opened, and the handle 64 was then released, the spring 50 would immediately urge the latch pin 48 to return to its uppermost position. This would, of course, prevent the re-entry of the latch 20 into the cavity 35 if the elevator body halves A and B were to be again swung together. As a means for latching the latch pin 48 in its lowermost position, the rear wall of the cavity 40 is provided with a strap spring element 70 which extends upwardly into the rear portion of the cavity 35. The spring element 70 has a laterally projecting lug 71 which continuously bears against the side of the latch pin 48. The upper end of the latch pin 48 is provided with an indentation 72. This indentation forms an upwardly facing shoulder 73 over which the lug 71 latches, when the latch pin 48 reaches the lowermost end of its throw. The spring element 70 has an upper end 74 which extends, as stated hereinbefore, into the cavity 35, and when the lug 71 is latched over the shoulder 73, the end portion 74 of the spring element 70 remains

spaced a slight distance from the rear wall of the cavity **35**. When the elevator body halves A and B are swung together, the left hand end **75** of the latch body **20** contacts the upper end **74** of the spring element **70**, and draws the lug **71** out of contact with the shoulder **73** of the latch pin **48**. This permits the latch pin **48** to immediately travel upwardly through the perforation **23** in the latch body **20**, and into the indentation **37**. This travel is, of course, caused by action of the compression spring **50**.

Since the cavity **26** in the body half B is similar in locality and dimension to the cavity **35** in the body half A, and since the cavity **27** in the body half B is similar in locality and dimension to the cavity **40** in the body half A, it is obvious that the elevator could be made to operate with either the left or right hand simply by changing the plates **33** and **56**, and changing the pin **45** and its accompanying structure over into the other body half in lieu of the pivot pin structure. It is pointed out that the body half A has a guard element **78** which is substantially identical to the element **32** of the body half B. It is also obvious that the latch mechanism could well be made to operate with both the left and right hand by merely placing the pin and yoke structure of the body half A also in the body half B.

From the foregoing descriptions it is thought obvious that an elevator latch and latch locking structure has been disclosed which accomplishes all of the objects set forth hereinabove.

I claim:

1. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch pivotally mounted on a vertical axis and carried by one body half, said latch having one end projecting toward the second body half, the projecting end portion of said latch having a vertical through perforation; a socket in the second body half within which the projecting portion of said latch is adapted to nest when the two body halves are swung together; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; and means for manually withdrawing said latch pin from said perforation.

2. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch pivotally mounted on a vertical axis and carried by one body half, said latch having one end projecting toward the second body half, the projecting end portion of said latch having a vertical through perforation; a socket in the second body half within which the projecting portion of said latch is adapted to nest when the two body halves are swung together; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; spring means for urging said latch pin to travel toward and normally remain at the end of its throw in which it engages within said perforation; and means for manually withdrawing said latch pin from said perforation.

3. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch pivotally mounted on a vertical axis and carried by one body half, said latch having one end projecting toward the second body half, the projecting end portion of said latch having a vertical through perforation; a socket in the second body half within which the projecting portion of said latch is adapted to nest when the two body halves are swung together; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; means for manually withdrawing said latch pin from said perforation; and means for automatically locking said latch pin in its withdrawn position.

4. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch pivotally mounted on a vertical axis and carried by one body half, said latch having one end projecting toward the second body half, the projecting end portion of said latch having a vertical through perforation; a socket in the second body half within which the projecting portion of said latch is adapted to nest when the two body halves are swung together; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; spring means for urging said latch pin to travel toward and normally remain at the end of its throw in which it engages within said perforation; means for manually withdrawing said latch pin from said perforation; and means for automatically locking said latch pin in its withdrawn position.

5. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch pivotally mounted on a vertical axis and carried by one body half, said latch having one end projecting toward the second body half, the projecting end portion of said latch having a vertical through perforation; a socket in the second body half within which the projecting portion of said latch is adapted to nest when the two body halves are swung together; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; spring means for urging said latch pin to travel toward and normally remain at the end of its throw in which it engages within said perforation; means for manually withdrawing said latch pin from said perforation; means for automatically locking said latch pin in its withdrawn position; and means carried by said latch pin locking means for automatically releasing the same when the latch is returned to its socket.

6. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch, pivotally mounted upon one body half and adapted to be swung horizontally into a socket in the second body half, said latch having a vertical through perforation in its swinging end portion; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; and means for manually withdrawing said latch pin from said perforation.

7. In a well pipe elevator, the combination with

two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch, pivotally mounted upon one body half and adapted to be swung horizontally into a socket in the second body half, said latch having a vertical through perforation in its swinging end portion; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; spring means for urging said latch pin to travel toward and normally remain at the end of its throw in which it engages within said perforation; and means for manually withdrawing said latch pin from said perforation.

8. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch, pivotally mounted upon one body half and adapted to be swung horizontally into a socket in the second body half, said latch having a vertical through perforation in its swinging end portion; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; means for manually withdrawing said latch pin from said perforation; and means for automatically locking said latch pin in its withdrawn position.

9. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch, pivotally mounted upon one body half and adapted to be swung horizontally into a socket in the second body half, said latch having a vertical through perforation in its swinging end portion; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; spring means for urging said latch pin to travel toward and normally remain at the end of its throw in which it engages within said perforation; means for manually withdrawing said latch pin from said perforation; and means for automatically locking said latch pin in its withdrawn position.

10. In a well pipe elevator, the combination with two arcuate hinged together body halves adapted to be swung together to surround a pipe, of a latching mechanism for holding the two halves in closed relation, including: a latch, pivotally mounted upon one body half and adapted to be swung horizontally into a socket in the second body half, said latch having a vertical through perforation in its swinging end portion; a vertically disposed latch pin reciprocatably mounted in the second body half and adapted to pass through said perforation; spring means for urging said latch pin to travel toward and normally remain at the end of its throw in which it engages within said perforation; means for manually withdrawing said latch pin from said perforation; and means for automatically locking said latch pin in its withdrawn position; and means carried by said latch pin locking means for automatically releasing the same when the latch is returned to its socket.

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