July 21, 1936. F. J. YOUNG ET AL 2,048,208

DOOR TYPE SLIP ELEVATOR

Filed March 8, 1933 3 Sheets-Sheet 1

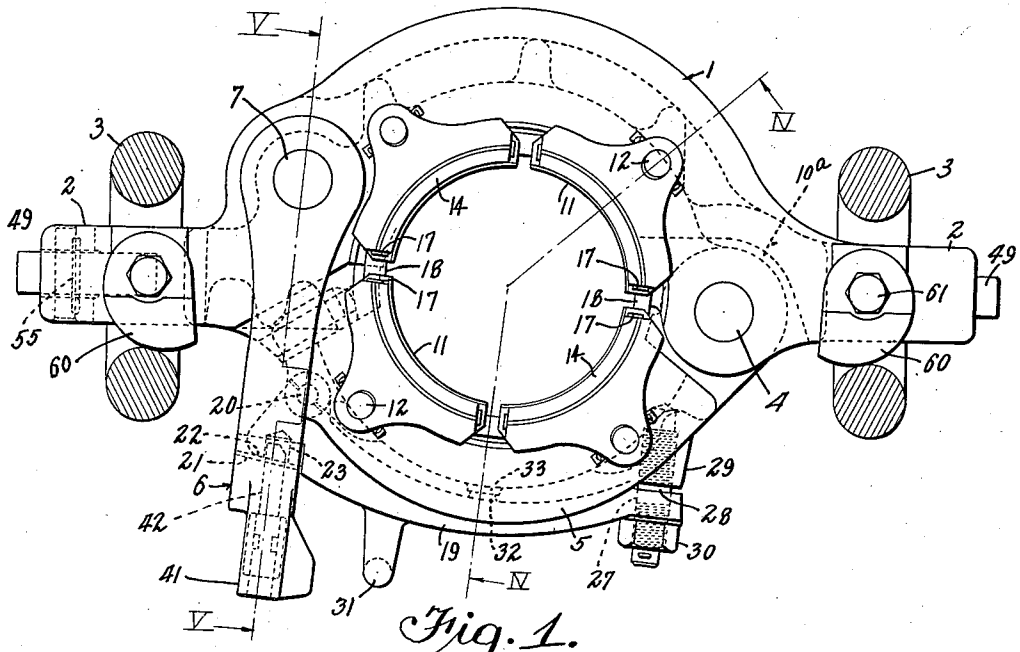
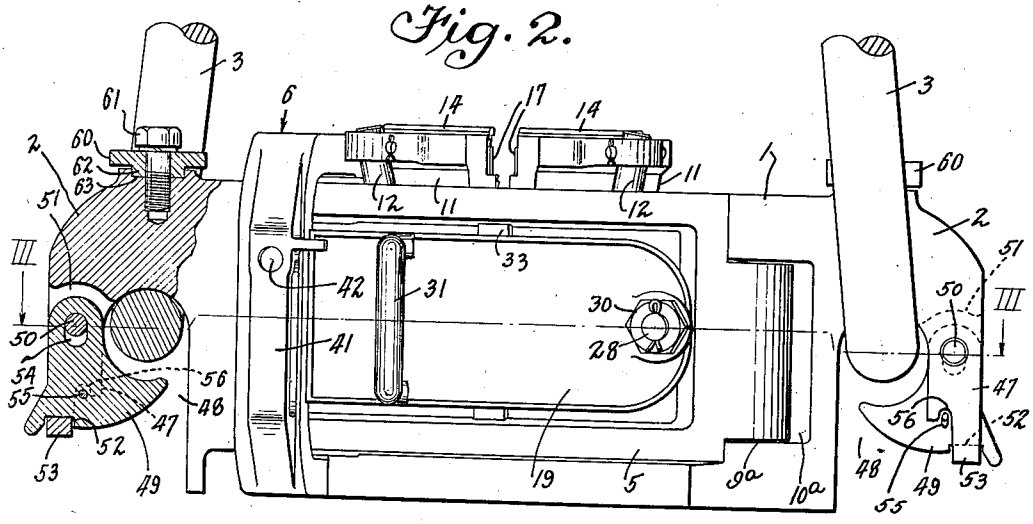


Fig. 1.

Fig. 2.



Inventors

Forrest Joseph Young

Daniel Ward Walters

Edward Timbs

By Lyon & Lyon

Attorneys

July 21, 1936. F. J. YOUNG ET AL 2,048,208

DOOR TYPE SLIP ELEVATOR

Filed March 8, 1933 3 Sheets-Sheet 2

Fig. 3.

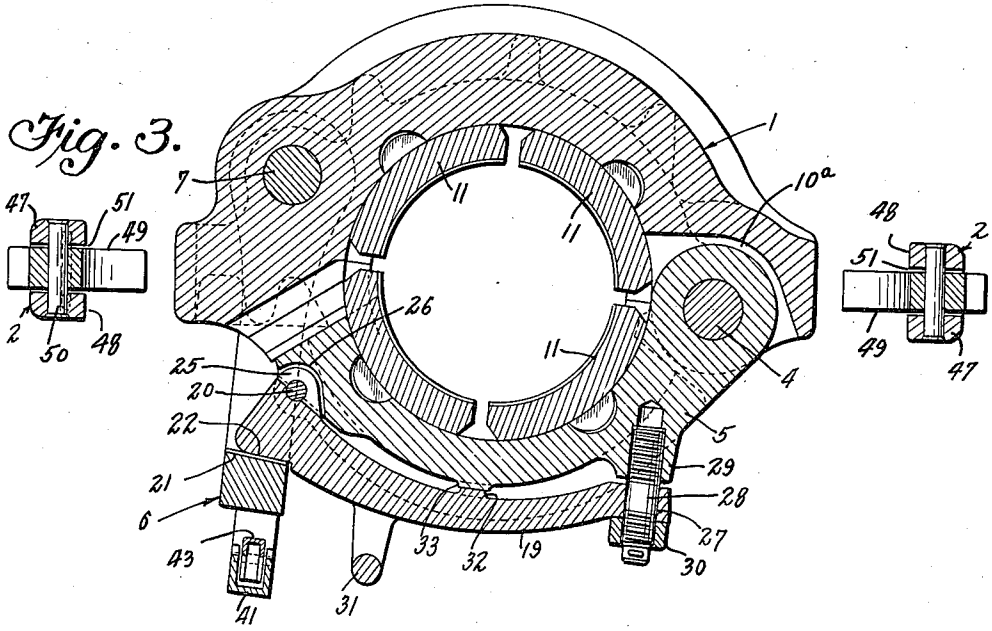


Fig. 4.

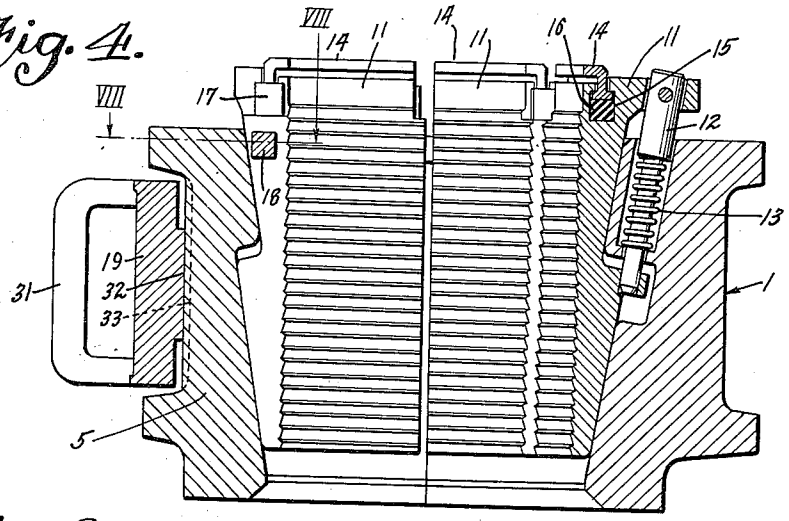
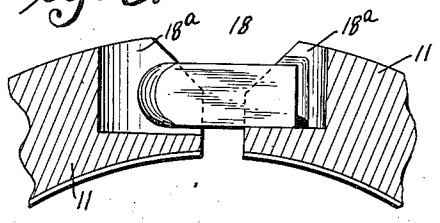


Fig. 8.



Inventors
Forrest Joseph Young
Daniel Ward Walters
Edward Timbs

By Lyon & Lyon

Attorneys

July 21, 1936. F. J. YOUNG ET AL 2,048,208

DOOR TYPE SLIP ELEVATOR

Filed March 8, 1933 3 Sheets-Sheet 3

Fig. 5.

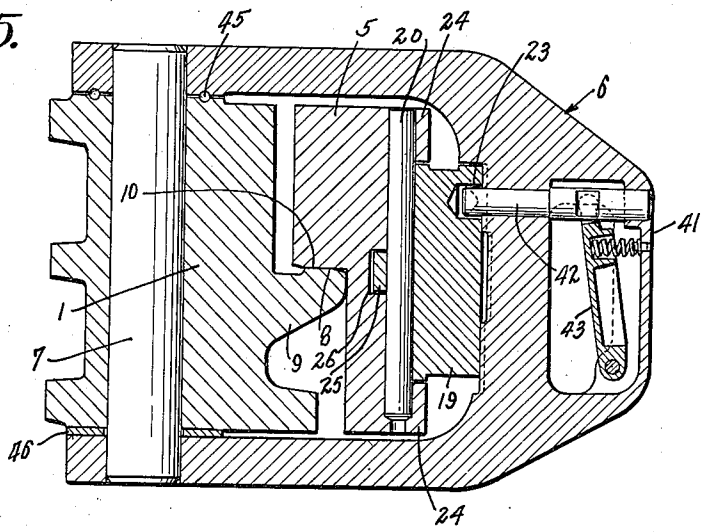


Fig. 6.

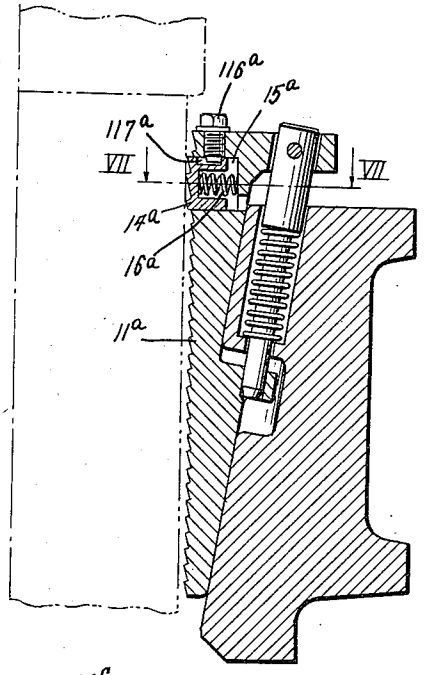
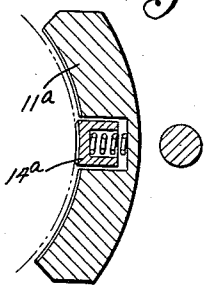


Fig. 7.



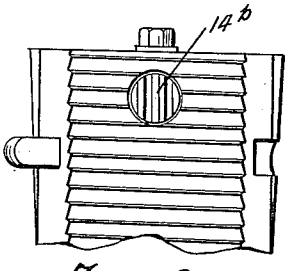


Fig. 9.

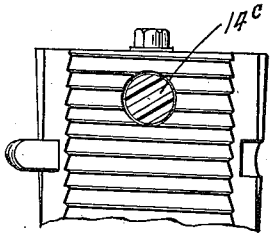


Fig. 10.

Inventors

Forrest Joseph Young

Daniel Ward Walters

Edward Timbs

By Lyon & Lyon Attorneys

Patented July 21, 1936 2,048,208

UNITED STATES PATENT OFFICE

2,048,208

DOOR TYPE SLIP ELEVATOR

Forrest Joseph Young, Los Angeles, Daniel Ward Walters, West Los Angeles, and Edward Timbs, Los Angeles, Calif., assignors, by mesne assignments, to The National Superior Company, Toledo, Ohio, a corporation of Delaware

Application March 8, 1933, Serial No. 660,030

7 Claims. (Cl. 294—90)

This invention relates to elevators of the side door type including slips for gripping pipe, casing or the like as utilized in the drilling formation or operation of wells, particularly oil wells. This invention is related to an improvement over the structures as disclosed in the co-pending applications of Forrest Joseph Young, et al., for Door type slip elevator, Serial No. 547,870, filed June 30, 1931, now Patent No. 1,920,617, and Serial No. 610,044, filed May 9, 1932.

An object of our invention is to provide a well elevator of the door type in which there is provided an improved form of latching means for the door or gate and in which latching means there is provided a means enabling the easy and ready release of the gate in the event the slips of the elevator do not become released when it is desired to remove the elevators from the pipe or casing.

Another object of our invention is to provide a latch releasing means having a novel construction which permits carrying extremely high pressures without requiring the structural components of undue proportions.

Another object of our invention is to provide a latch releasing means for the gate of a door type slip elevator which includes a means permitting the adjustment of the latch for the door or gate of the elevator.

Another object of our invention is to provide a door type slip elevator which includes slips adapted to be actuated by yieldably mounted abutment or setting means which permit the casing collar of the drill stem supported by the elevator to set the slip into engagement with the casing and yet prevent the total casing load being carried through the drilling or casing collar.

Another object of our invention is to provide an improved form of slip setting means in a slip type elevator for setting the slips into engagement with the casing or drill pipe, which means does not require the co-action of a shoulder or abutment on the casing or drill pipe surface.

Another object of our invention is to provide in a well elevator an improved type of bail or link retaining means which holds the links or bails effectively in place but permits a convenient removal of the links or bails when desired.

Another object of our invention is to provide a well elevator of the gate type which is supported by bails or links and in which elevator means are provided for holding the elevator and bails in position to prevent tipping of the elevator when the gate is opened, and which means are adjustable to accommodate different sizes or proportions of links or bails.

Other objects and advantages of this invention it is believed will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a top plan view of a door type slip elevator embodying our invention.

Figure 2 is a front elevation thereof.

Figure 3 is a horizontal sectional view of the elevator taken substantially on the line 3—3 of Figure 2, illustrating the elevator with the lifting links or bails removed.

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a vertical sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a vertical sectional view of a modified form of well elevator embodying our invention.

Figure 7 is a horizontal sectional view taken substantially on the line 7—7 of Figure 6.

Figure 8 is a horizontal fragmental sectional view taken substantially on the line 8—8 of Figure 4.

Figure 9 is a fragmental elevation of a slip showing a modified form of our invention.

Figure 10 is a fragmental elevation of a slip illustrating a further modification embodying our invention.

In the preferred embodiment of our invention as illustrated in the accompanying drawings, 1 indicates the body of a well elevator having elevator link or bail-receiving ears 2 for the reception of any desired form of elevator links or bails 3.

Pivotally secured to one side of the elevator body 1 on a hinge pin 4 is a gate 5. The gate 5 is supported at its respective ends so that the portion of the load received from the drill stem or casing supported by the elevator is transmitted to the body 1. In order to accomplish this, the free end of the elevator gate 5 is undercut to provide a supporting shoulder 10 which is adapted to rest or seat upon a seat or shoulder 8 formed on the supporting lug 9 of the body 1. At its pivoted end the gate 5 is supported upon a shoulder 9a formed at the lower portion of the hinge recess 10a into which the hinge cylinder of the gate 5 is fitted.

Means are provided for latching the gate 5 in closed position which means preferably includes a yoke type latch 6 which is pivotally secured to the body by a yoke hinge pin 7. The

yoke type latch 6 is illustrated as being of substantially the same construction as is illustrated in the two copending applications of Forrest Joseph Young, et al., above referred to and passes over the free end of the gate 5 and includes a latch pin 42 which extends horizontally through the handle portion 41 of the latch 6 to fit within a latch pin recess 23 formed in the end of the releasing lever 19. A spring pressed actuating arm 43 is pivotally supported within and protected by the handle 41 and provides the means for actuating the latch pin horizontally.

As the elevator embodying our invention incorporates tapered slips 11 within its bore for engaging and supporting the drill stem or pipe, it becomes desirable at many times to have means for releasing the latch 6 when the slips fail to release from the drill stem casing or pipe when the load is relieved off from the slips 11, and in order to accomplish this result and to permit a slight release of the latch yoke 6 so that the slips may move outwardly away from the drill stem to a point where they will release under the influence of their supporting structure, we prefer to provide a releasing lever 19 which is interposed between the free end of the gate 5 and the latch 6 to provide the latching surface 22 in which the latch pin recess 23 is formed. The releasing arm 19 is pivotally supported at the free end of the gate upon a bearing pin 20 which has its axis located approximately in a vertical plane coincident with the plane of the inner side face 21 of the latch yoke 6. The releasing lever 19 is positioned between spaced ears 24 formed on the gate and within which is retained the bearing pin 20. The pin passes through an ear or lug 25 formed on the lever 19, the lug fitting within a recess 26 provided in the gate to retain the lever on the gate at the latch end. The latch pin 20 has a bearing contact with the gate for substantially half of its circumference between the ears 24 and the recess 26 and a bearing contact along the face of the lever 19 for substantially the other half of its pin circumference. This construction provides a substantial bearing area between the gate pin and lever to connect the reaction developed in the load transmitted to the gate by the wedging action of the slips 11 between the pipe and the elevator. The lever 19 is curved to approximately the exterior contour or configuration of the body 1 and terminates at its free end with a bolt hole 27 through which a bolt or stud 28 is passed. The stud 28 is threaded into a boss 29 formed on the gate 5 of the elevator and at its outer end is a threaded nut 30 for clamping the free end of the releasing lever 19 to the gate of the elevator.

A handle 31 is preferably cast integral with the releasing lever 19 to provide a handle for the operation of the gate 5. Formed on the inner face of the releasing lever 19 is a boss 32 which is in position to engage a corresponding boss 33 formed on the outer face of the gate 5. The clearance or relative positions of the bosses 32 and 33 will determine the position of the face 22 of the releasing lever 19 with relation to the latch face 21 of the yoke 6 when the nut 30 is threaded to clamp the releasing lever 19 in position. It is therefore possible, when wear occurs between the faces 21 and 22, to reestablish a correct latching relation between these surfaces by filing the contacting faces of the bosses 32 and 33, thereby permitting the face 22 to move more perfectly into contact or latching relation with the face 21 on the screwing up of the nut 30. By this means an easy adjustment is provided for the latch means for the gate 5 of the elevator.

The slips 11, as herein illustrated, are of substantially the same construction as illustrated in the copending applications of Forrest Joseph Young, et al., above referred to in that it is preferred that the body 1 and gate 5 be formed to provide a stepped tapered axial bore within which the correspondingly tapered and stepped segmental slips are positioned in the manner as specifically set forth in the copending applications above referred to. As shown in said copending applications above set forth, the slips are mounted within the elevator body 1 and gate 5 on guide pins 12 which cooperate with compression springs 13 to normally hold the slips in a released position.

In the modification of our invention as illustrated in Figures 1 to 4, the upper ends of the slips 11 are provided with bumper segments 14 which are fitted within arcuate recesses 15 formed in the upper ends of the bodies on the slips 11.

In order to provide a yieldable connection between the bumper segments 14 and the bodies of the slips 11 blocks of rubber 16, or other resilient material or any other preferred form of yieldable element, is inserted within the recesses 15 on the under side of the bumper segments 14 to normally urge the bumper segments 14 upwardly away from the upper end of the slips 11. The bumper segments 14 are slipped into the slips 11 from the sides thereof and thin plates 17 are welded to the sides of the slips 11 over the recesses 15 to hold the bumper segments in place after they have been mounted in position.

In order to prevent one slip 11 from advancing ahead of the other slips due to the non-concentricity of the drill stem or pipe with relation to the bore of the elevator or other reason, the slips 11 are preferably linked together by means of interlocking lugs 18 (Figure 8) which fit within complementary recesses 18a formed on the lateral faces of the adjacent slips 11.

In the modification of our invention as illustrated in Figures 6 and 7, the slips 11a are illustrated as formed with yieldable bumper elements or bumper plungers 14a positioned so as to extend laterally from the face of the slips 11a to seat the slips 11a into engagement with the periphery of the drill stem pipe or casing independently of the collar of the drill stem pipe or casing, thus enabling the structure to be utilized in connection with flush type drill stems or pipe having no projections or collars upon its exterior periphery.

The bumper plunger 14a is mounted within recesses 15a formed within the upper end of the slips 11a and are normally urged outwardly into pipe engaging position by means of springs or yieldable members 16a.

In order to limit the outward extent of the plungers 14a stop members consisting of cap screws 116a are threaded through the upper ends of the slips 11a to fit within slots 117a formed within the plungers 14a. The outer peripheries of the plunger members 14a are provided with serrated surfaces so as to increase the frictional contact between them and the periphery of the pipe in order to insure the setting of the slips as the pipe is lowered or the elevator is raised after the gate 5 of the elevator has been closed.

As illustrated in Figures 9 and 10, in order to prevent rotation of the drill stem or pipe within the elevator or to prevent rotation of the elevator

with relation to the drill pipe after the gate of the elevator has been closed, it may be preferable to form one of the plungers 14b with its serrated interior periphery formed with vertical rather than horizontally extending serrations, or, as illustrated in Figure 10, the serrations on the inner peripheries of the plungers 14c are formed in oppositely inclined positions which likewise function to prevent rotation of the elevator with relation to the pipe upon relative vertical movement of the pipe and elevator.

In order to perfect the free swinging of the latch yoke 6, we prefer to provide anti-friction bearing means comprising a plurality of balls 45 positioned in race grooves formed around the pins 7 and formed between the upper arm of the yoke 6 and the body 1. In order to assemble the balls 45, we provide a washer plate 46 on the pin 7 between the body 1 and the lower arm of the yoke 6. When the plate 46 is removed, the yoke is lifted vertically an amount equal to the thickness of the space occupied by the washer plate and the balls inserted into the race grooves—the yoke is then lowered into engagement with the balls and the plate 46 assembled preliminary to placing the pin 7 in position. The pin 7 is preferably welded into position with the yoke 6.

As elevators of the type illustrated may be of comparatively heavy construction and may, due to the hanging up of the drill pipe or casing, be lifted clear of their supporting links or bails 3, and as it is many times desirable to remove the links or bails 3 from the elevator with the elevator supported upon the floor of the drilling rig or in a like position, we prefer to form the lifting lugs 2 so that they extend downwardly to provide downwardly extending side portions 47 terminating at a distance above the lower surface of the body 1 and having a bottom opening 48 through which the links or bails 3 are passed.

In order to detachably retain the links in engagement with the lugs 2 to support the elevator in relation to the links or bails 3 when relative movement occurs between the elevator and the links due to the hanging up of the drill pipe or casing, we prefer to provide inwardly extending hook blocks 49 which are pivotally mounted on pins 50 within openings 51 on the side extensions 47. The lower portions of the hook members 49 have notched recesses 52 which fit over a transverse bar 53 which forms the lower wall of the opening 51. Any downward force on the hook or cantilever member 49 is opposed by a reaction taken between the inner vertical face of recess 52 and the bar 53.

In order to remove the bails 3 we provide an elongated opening or slot 54 in the hook members 49 for reception of the pin 50 which permits raising the hook members 49 vertically for the end of the hook to clear the bar 53 and rotation of the hooks outwardly and away from the opening 48. To prevent any accidental displacement of the hook members 49, there is provided a lock pin 55 which passes through the hook and engages the recesses 56 formed in the said extensions 47 of the ears 2.

In order to prevent tipping of the elevator body 1 on the bails 3 when the gate 5 is open due to displacement of the center of mass on opening of the gate 5, we prefer to provide locking cams 60 which are adjustably secured to the lifting lugs 2 with a clamping screw 61. The cam 60 has a circular boss 62 which fits within a recess 63 formed in the elevator lug 2. This construction permits transmitting any load on the cam 60 directly to the elevator lug without subjecting the screw 61 to any transverse shearing loads. To fit the individual link opening, the cam 60 is rotated until the cam surface engages the inner surface of the bail 3 and the clamp screw 61 is then adjusted to clamp the cam 60 is position. With the cam adjusted as described, the door or gate can be opened and any tendency to tilt will be opposed by the cam 60. The cams 60 are located a substantial distance above the axis of tilting, that is, the link bearing surface on the under side of the lifting lugs 2.

Having fully described our invention and the preferred forms that the same may take, it is to be understood that we do not wish to be limited to the details of construction as herein specifically set forth as our invention is susceptible of wide modification without departing from the spirit of our invention as defined in the appended claims.

We claim:

1. In an elevator, the combination of a body having lifting lugs at its opposite sides, said lugs having downwardly extending portions cooperating with a portion of the body to define a pair of inverted, substantially U-shaped link receiving recesses, bails adapted to engage in the lifting-lug recesses for supporting the elevator, hook members pivotally supported on the downwardly extending end portions of said lifting-lugs and extending inwardly relative to the body to close the link receiving recess, and means on the lifting lugs for securing the hook members in position.

2. In an elevator, the combination of a body having lifting lugs at its opposite sides, said lugs having downwardly extending portions cooperating with a portion of the body to define a pair of inverted, substantially U-shaped link receiving recesses, hook plates loosely pivoted on said lifting lugs and extending inwardly to close the link receiving recesses, said plates being vertically movable on said pivots, latch means carried by said lugs to lock said plates in link retaining position, and released by the vertical movement of the plates.

3. In an elevator, the combination of a body having lifting lugs at its opposite sides, a gate pivotally supported on said body, means to releasably secure said gate in closed relation to said body, bails adapted to engage the lifting lugs for supporting the elevator, and a cam member having a contour of varying radii pivoted on the body and movable about such pivot to engage one of the bails to hold the elevator body from tilting with relation to the bail when the gate is opened.

4. In an elevator, the combination of a body having lifting lugs at its opposite sides, a gate pivotally supported on said body, means to releasably secure said gate in closed relation to said body, bails adapted to engage the lifting lugs for supporting the elevator, and a cam member pivoted on a vertical axis on the body and movable about such pivot to engage one of the bails to hold the elevator body from tilting with relation to the bails when the gate is opened.

5. In an elevator, the combination of a body having lifting lugs at its opposite sides, a gate pivotally supported on said body, means to releasably secure said gate in closed relation to said body, bails adapted to engage the lifting lugs for supporting the elevator, a circular recess provided on one side of said body, a rotary cam member having a complementary circular boss fitting within said recess, said cam member being

movable to engage the bail to hold the elevator body from tilting with relation to the bail when the gate is opened, and means to hold said cam member in position.

6. In an elevator, the combination of a body having lifting lugs at its opposite sides, said lugs having downwardly extending portions cooperating with a portion of the body to define a pair of inverted, substantially U-shaped link-receiving recesses, bails adapted to engage in the lifting lug recesses for supporting the elevator, bail retaining members, means to pivotally support said members on said lifting lugs, said bail retaining members extending inwardly relative to the body to close the link-receiving recess, and releasable means on the lifting lugs for holding the members in the bail retaining position.

7. In an elevator, the combination of a body having lifting lugs at its opposite sides, said lugs having downwardly extending portions cooperating with a portion of the body to define a pair of inverted substantially U-shaped link-receiving recesses, bails adapted to engage in the lifting lug recesses for supporting the elevator, bail retaining members, means to pivotally support said members on said lifting lugs, said bail retaining members extending inwardly relative to the body to close the link receiving recess, and releasable means on the lifting lugs for holding the members in the bail retaining position.

FORREST JOSEPH YOUNG.
DANIEL WARD WALTERS.
EDWARD TIMBS.