May 12, 1931. J. G. FITZPATRICK ET AL 1,804,758

ELEVATOR

Filed Dec. 23, 1929

Fig. 1.

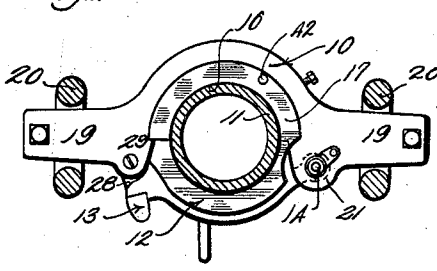


Fig. 2.

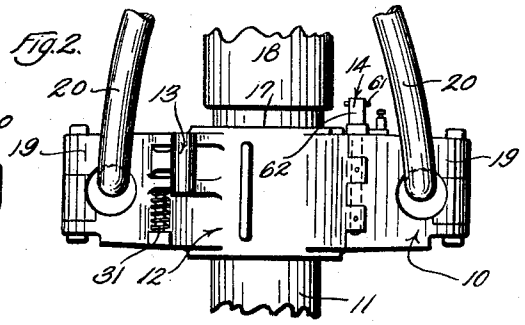


Fig. 3.

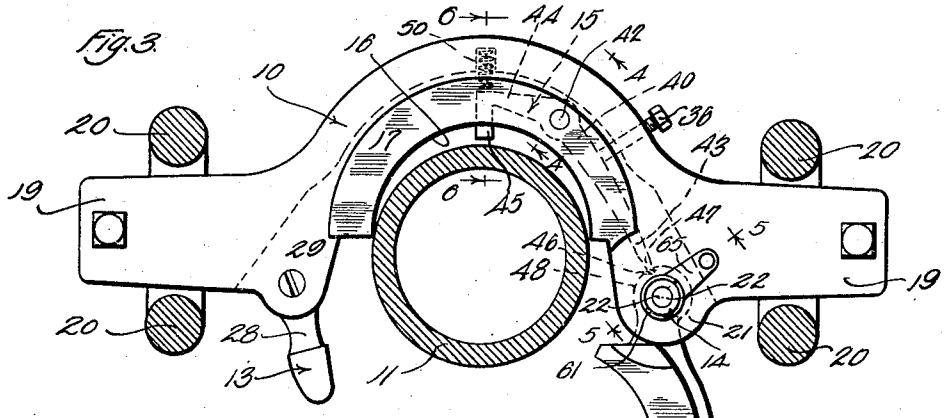


Fig. 4.

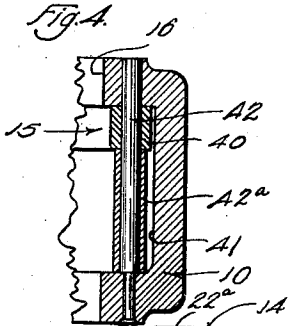


Fig. 5.

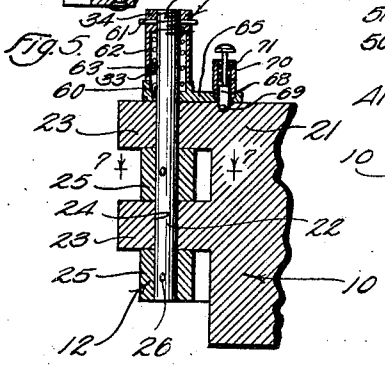


Fig. 6.

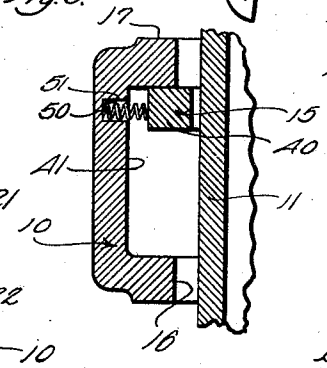
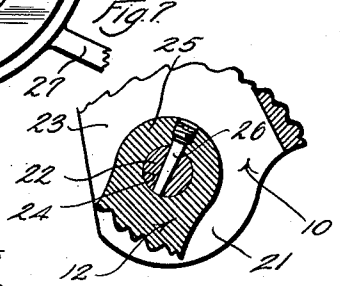


Fig. 7.



Inventors
Robert W. Flint
and
Joseph G. Fitzpatrick
by
W. H. Maxwell
Their Attorney

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UNITED STATES PATENT OFFICE

JOSEPH G. FITZPATRICK AND ROBERT W. FLINT, OF ANAHEIM, CALIFORNIA, ASSIGNORS TO JOSEPH F. FLINT, OF LONG BEACH, CALIFORNIA

ELEVATOR

Application filed December 23, 1929. Serial No. 416,112.

This invention relates to an elevator for handling well drilling tools and equipment.

Elevators employed in well drilling rigs for handling drill pipe, casing, etc. are operated vertically in the derrick through lines and traveling blocks. The usual method employed in arranging an elevator around a part standing in a derrick, is to position an operator in an elevated place in the derrick to swing the elevator into position around the part. This arranging of the elevator around a pipe or casing is often done when the elevator is in motion and often the gate or door of the elevator is not properly closed or latched. In the event that the door or gate of the elevator is not securely latched by the operator, the elevator may engage a pipe coupling or other projecting part on the pipe and raise the pipe some distance and then allow it to fall to the derrick floor.

It is a general object of the invention to provide an elevator for handling well casing, drill pipe, or other well drilling equipment, in which the door or gate is closed automatically upon the body of the elevator being arranged around the casing or other part to be handled.

Another object of the invention is to provide an elevator of the character mentioned in which the gate or door when in the open position is urged toward the closed position and is held against shifting to the closed position by a trip or latch mechanism which permits the door to swing shut only upon the body of the elevator being positioned around the casing or other part to be handled.

It is another object of the invention to provide an elevator of the character mentioned in which the latch mechanism referred to above offers but very slight resistance to the arranging of the body of the elevator around a casing, or the like.

Another object of the invention is to provide an elevator in which the gate is normally positively held open in a position where the body may be easily and readily arranged around a casing.

A further object of the invention is to provide an elevator of the character mentioned in which the means for automatically closing the gate may be reversed so that it will operate to open the gate upon the latch of the elevator being released.

Other objects and features of our invention will be best and more fully understood from the following detailed description of a typical form and application of the invention, throughout which description reference is had to the accompanying drawings, in which:

Fig. 1 is a top or plan view of an elevator embodying the present invention showing the gate in the closed position. Fig. 2 is a side elevation of the elevator. Fig. 3 is an enlarged top or plan view of the elevator showing the gate in the open position. Fig. 4 is an enlarged vertical detailed sectional view taken as indicated by line 4—4 on Fig. 3. Fig. 5 is an enlarged vertical detailed sectional view taken as indicated by line 5—5 on Fig. 3. Fig. 6 is an enlarged vertical detailed sectional view taken as indicated by line 6—6 on Fig. 3, and Fig. 7 is a detailed transverse sectional view taken as indicated by line 7—7 on Fig. 5.

The device provided by this invention may be embodied in various types of side door elevators for handling well drilling equipment and may be embodied in elevators for handling various forms of well drilling equipment such as drill pipe, casing, etc. In the following detailed description I will describe the invention in connection with a typical side door elevator adapted to handle well casing. The invention, however, is not to be considered as limited to the particular form of elevator about to be described or to the particular application referred to, but is to be taken as including any features or modifications that may fall within the scope of the claims.

The invention provides, generally, an elevator having a body section 10 adapted to be arranged around a casing 11, a gate or door section 12, a latch 13 on the elevator for holding the gate 12 closed about the casing 11, means 14 for automatically shifting the gate 12 to the closed position and reversible to automatically shift the gate 12 to an open position upon the latch 13 being released, and trip or latch means 15 normally holding the

means 14 against operating the gate to the closed position and operable to release the means 14 upon the body 10 of the elevator being arranged around the casing 11.

The body 10 in the particular type of elevator illustrated in the drawings is of substantially U-shaped configuration having an opening 16 extending into it from one side to receive the casing 11. The walls of the opening 16 are preferably curved to conform to the configuration of the casing 11. The upper end or side 17 of the body 10 is preferably made flat to receive a coupling collar 18, or like part, on the casing 11. Bale ears 19 project outwardly from opposite sides of the body 10 to receive bales 20 for carrying the elevator.

The door or gate section 12 is pivotally attached to one of the side parts of the body 10 and is in the nature of a closure adapted to extend across the open side of the opening 16. The inner side of the gate 12 is preferably curved to conform to the configuration of the casing 11. The gate 12 is pivotally attached or mounted on a side part 21 of the body 10 by means of a vertical pivot pin 22. The pivot bolt or pin 22 extends through openings in vertically spaced tongues 23 provided on the side part 21 of the body 10. The pivot bolt 22 is rotatable in the openings 24 of the tongues 23. Vertically spaced tongues or lugs 25 are provided on an end of the gate 12 and the pivot bolt 22 is carried by the lugs 25. In the particular case illustrated there is a lug 25 arranged between two spaced tongues 23 of the body and one lug 25 immediately below the lower tongue 23. The pivot bolt 22 is rigidly secured to the lugs 25. In the form of the invention shown in the drawings pins 26 are screw threaded through openings in the lugs 25 of the gate and extend into transverse openings in the pivot bolt 22. In accordance with the invention the pivot bolt 22 projects outwardly from the body 10 of the elevator. In the particular case illustrated the pivot bolt 22 has a portion 22^a projecting upwardly from the upper side of the body 10. A suitable handle 27 may be provided on the gate 12.

The latch 13 is provided to hold the gate 12 in the closed position about the casing 11. Any suitable form of latch may be embodied in the elevator. In the case shown a latch 28 is pivotally carried on a side part 29 of the body 10 and is adapted to cooperate with an outwardly projecting lug 30 on the gate 12. A spring 31 may be provided for yieldingly urging the latch 28 into position to cooperate with the projection 30 to hold the gate 12 in the closed position.

The means 14 for urging the gate 12 into the closed position acts to close the gate 12 when the means 15 is released. The means 14 is reversible so that it may be set to shift the gate 12 to the open position when the latch 13 is released. The means 14 includes a helical torsional spring 33 surrounding the upwardly projecting portion of the pivot pin 22^a, a nut 34 threaded on the upwardly projecting portion 22^a of the pin 22, and a setting sleeve or member 60 provided to reverse the action of the spring 33. The spring 33 surrounds the portion 22^a of the pivot pin and is arranged between the nut 34 and the member 60.

The nut 34 is threaded on the upper end of the projecting portion 22^a of the pivot bolt. The nut 34 may be set or held against rotation on the bolt by means of a key 61 extending transversely through the bolt 22 and the nut. The opening in the bolt passing the key 61 may be axially elongated to permit the nut to be adjusted. The nut is provided with a downwardly extending barrel portion 62 surrounding or extending downwardly over a considerable part of the projecting portion 22^a of the pivot bolt and providing a socket 63. The socket 63 is preferably comparatively deep and is provided to carry the spring 33.

The member 60 is rotatably mounted on the projecting portion 22^a of the pivot bolt immediately adjacent the upper side 17 of the body. It is preferred that the member 60 rest directly on the body of the elevator and that the lower end of the barrel portion 62 of the nut be immediately adjacent the upper side of the member 60. A socket may be provided in the upper side of the member 60 to receive the lower end of the spring 33. An operating handle or arm 65 projects radially outward from the member 60. The spring 33 is arranged in the socket 63 of the nut 34 and its lower portion seats in the socket of the member 60. The barrel 62 and the member 60 completely encase the spring 33. The extreme upper end portion of the upper convolution of the spring 33 extends into an opening in the inner end of the socket 63. The extreme lower end of the lower convolution of the spring 33 extends into an opening in the bottom of the socket.

The arm 65 is provided on the member 60 so that the member may be rotated to impart torsional action or strain to the spring 33 in either rotative directions. The invention provides means for releasably setting the arm 65 against movement relative to the body 10. A spring pressed pin 68 is carried by the arm 65 and is adapted to cooperate with an opening 69 in the upper side 17 of the body to releasably hold the member 60 and the arm against movement or rotation. The pin 68 is slidably and vertically arranged in a housing or shell 70 on the outer end of the arm 65. The pin 68 projects from the upper end of the shell 70 and may be provided at its upper end with a suitable head. The pin 68 extends through an opening in the arm 65 to normally project into the opening 69 in the body. A

suitable spring 71 may be arranged under compression in the shell 70 to act against a shoulder on the pin 68 to yieldingly urge the pin downward. With the construction just described the pin 68 may be lifted out of the opening 69 and the arm 65 may be operated to rotate the member 60.

The spring 33 may be twisted or set so that it will act to turn the pivot pin 22 in a direction to shut the gate 12 by turning or rotating the member 60 in one direction. By turning the member 60 in an opposite direction, the spring may be acted upon so that it will tend to urge the gate 12 from a closed position to an open position. It will be obvious that the spring 33 may be formed so that it will develop or accumulate sufficient force or power to properly shift the gate upon the member 60 being turned or rotated but once or a very few times.

The latch means 15 normally holds the gate 12 against movement when it is in the open position and is released so that the means 14 may operate to shut the gate upon the body 10 of the elevator being arranged around the casing 11. The means 15 includes a lever 40 pivotally arranged in a recess 41 in the walls of the opening 16 of the body. The lever 40 is pivotally mounted on a vertical pivot pin 42. A collar 42^a is arranged on the pivot pin 42 to hold the lever 40 against longitudinal movement on the pin 42. In the particular case illustrated in the drawings the lever 40 is mounted between the upper end of the collar 42^a and the upper wall of the recess 41. The recess 41 extends circumferentially around the wall of the opening 16 and carries the lever 40 so that it is free to pivot on the pin 42. The lever 40 includes an arm 43 extending toward the pivot bolt 22, and an arm 44 having a part 45 which normally extends into the opening 16 of the body.

The end of the arm 43 extends into a recess 46 in one of the lugs 25 of the gate 12 when the gate is in the open position. The recess 46 provides a substantially radial shoulder 47 and has a wall 48 to cooperate with the end of the arm 45 of the lever 12. The end of the lever arm 43 seats against the wall 48 of the recess 46 when the gate 12 is open so that the gate 12 is prevented from shifting. The wall 48 of the recess engages the end of the arm 43 in such a manner as to prevent the gate 12 from being shifted to the closed position. The part 45 of the arm 44 projects into the opening 16 of the body and is adapted to be engaged by the casing 11. In the preferred form of the invention the part 45 projects into the opening 16 at a point intermediate the side portions 21 and 29 of the body. The lever 40 is mounted so that the end of the arm 43 is shifted out of the recess 41 upon the part 45 of the arm 44 being operated outwardly through engagement with the casing 11.

The invention provides means for normally yieldingly holding the lever 40 in a position where the part 45 extends into the opening 16. A coil spring 50 may be arranged under compression between the outer side of the arm 44 and the body 10. In the preferred form of the invention the spring 50 seats in a socket 51 in the outer wall of the recess 41 and engages the outer side of the arm 44.

In accordance with the invention optional means is provided for setting or locking the lever 40 in an inoperative position. A screw 36 may be threaded through an opening in the body 10 to engage the outer side of the arm 45. If desired the screw 36 may be operated to a position where it engages the lever 40 to hold the arm 43 free of the tongue 25 of the gate and the part 45 out of the opening 16.

In employing the device the means 14 may be set so that it operates to urge the gate 12 from the open position to the closed position or may be set to shift the gate 12 from the closed position to the open position. If it is desired to set the means 14 so that it operates to automatically close the gate 12 upon the body 10 being arranged around the casing 11, the member 60 is rotated so that the spring 33 will act to impart rotative force to the pin 22 in the proper rotative direction to swing the gate shut. The force which the spring 33 exerts may be varied by adjusting the nut 34 or by rotating the member. When the means 14 is adjusted or set in the manner described and the body 10 is arranged around the casing 11, the part 45 engages the casing 11 and the lever 40 is operated. Upon shifting the lever 40 the arm 43 is shifted free of the recess 46 and the spring 33 is permitted to shift the gate 12 to the closed position. The latch 13 acts to retain the gate 12 in the closed position. The spring 50 automatically returns the lever 40 to its normal position where the arm 43 extends into the recess 46 when the gate is again opened. It is to be noted that the lever 40 acts to hold the gate 12 in an open position where the body may be freely and easily arranged around the casing 11. It will be seen that it is unnecessary to manually swing the gate 12 closed when the means 14 is set to operate as above described. If it is desired to set the means 14 so that it will operate to automatically shift the gate 12 to a fully opened position upon the latch 13 being released, the member 60 is rotated in a direction to cause the spring 33 to act through the pivot bolt 22 to swing the gate 12 outwardly upon the releasing of the latch 13.

Having described only a typical preferred form of our invention, we do not wish to limit ourselves to the specific details set forth, but wish to reserve to ourselves any changes or variations that may appear to those skilled

in the art or fall within the scope of the following claims.

Having described our invention, we claim:

1. An elevator of the character described including, a body adapted to be arranged around an object, a gate pivotally attached to the body and adapted to retain an object in the body, a pivot pin connecting the body and gate, and means acting torsionally directly on the pivot pin for shifting the gate to the closed position.

2. An elevator of the character described including, a body adapted to be arranged around an object, a gate pivotally attached to the body and adapted to retain an object in the body, a pivot pin connecting the body and gate, and means acting to turn the pivot pin for shifting the gate to the closed position, including a spring connected with the pivot pin.

3. An elevator of the character described including, a body adapted to be arranged around an object, a gate pivotally attached to the body and adapted to retain an object in the body, a pivot pin connecting the body and gate, and means acting torsionally to turn the pivot pin for shifting the gate to the closed position including a torsional spring connected to the pivot pin.

4. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, and means for automatically closing the gate section upon the body section being arranged around a casing including a torsional spring rigidly connected with the pivot pin and one of the sections.

5. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, and means for automatically closing the gate section upon the body section being arranged around a casing including a torsional spring connected with the pivot pin and one of the sections, and means for varying the force exerted by the spring.

6. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, and means for automatically shifting the gate section including a torsional spring connected with the pivot pin and one of the sections, and means for reversing the direction of the rotative force exerted by the spring.

7. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, and means for automatically closing the gate section upon the body section being arranged around a casing including a member rotatable on the pivot pin, means for releasably holding the member against movement relative to one of the sections, and a spring connected with the member and the pivot pin.

8. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, a latch for releasably holding the gate section in the closed position, and means acting on the pin for automatically shifting the gate from the closed position to the open position upon the latch being released.

9. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, a latch for releasably holding the gate section in the closed position, means acting through the pins for automatically shifting the gate from a closed position to an open position upon the latch being released and means for reversing the action of the first-mentioned means to close the gate upon the body section being arranged around a casing.

10. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, a latch for releasably holding the gate section in the closed position, and means for automatically shifting the gate from the closed position to the open position upon the latch being released, including a torsional spring connected with one section and with the pivot pin.

11. In an elevator, two sections, one a body adapted to be arranged around a casing, the other a gate pivotally connected with the body, a spring for automatically shifting the gate from an open to a closed position, means holding the spring against operation and operable to release the spring for operation upon the body being arranged around a casing, and means for rendering the first mentioned means inoperative.

12. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly secured to one section, a latch releasably holding the gate in the closed position and reversible means operable to operate the gate from the closed position to the open position upon the latch being released and to operate the gate from the open position to the closed position upon the body being arranged around a casing.

13. In an elevator, two sections, one a body, the other a gate, the body section being adapted to be arranged around a casing, a pivot pin connecting the sections and rigidly se-

cured to one section, a latch releasably holding the gate in the closed position, and reversible means operable to operate the gate from the closed position to the open position upon the latch being released and to operate the gate from the open position to the closed position upon the body being arranged around a casing, including a torsional spring connected with the pivot pin, and means for reversing the action of the spring.

In testimony that we claim the foregoing we have hereunto subscribed our names this 10th day of December, 1929.

JOSEPH G. FITZPATRICK.
ROBERT W. FLINT.