June 28, 1932. N. K. SMITH 1,864,864

FRICTION GRIP ELEVATOR

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Fig. 1

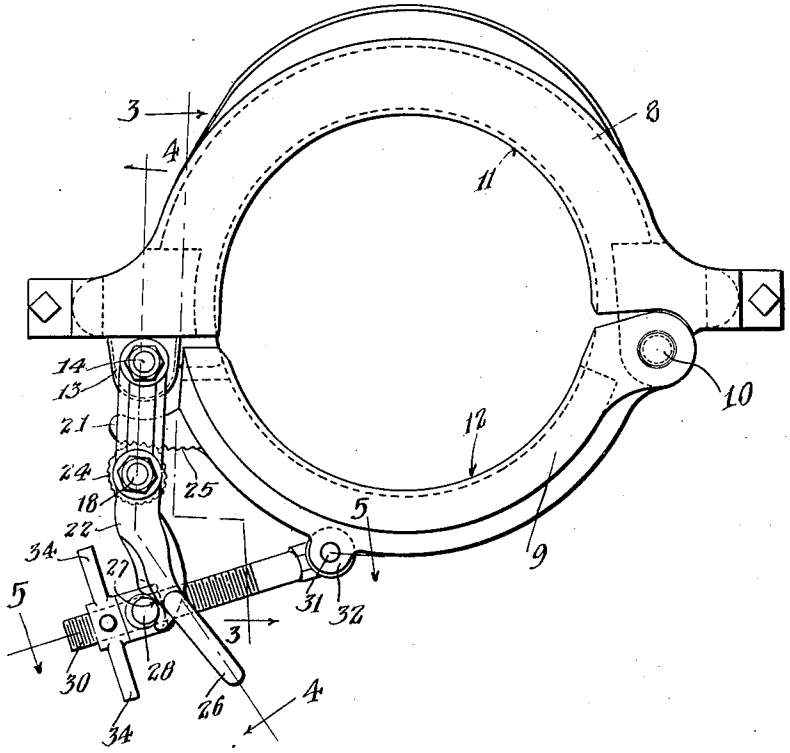
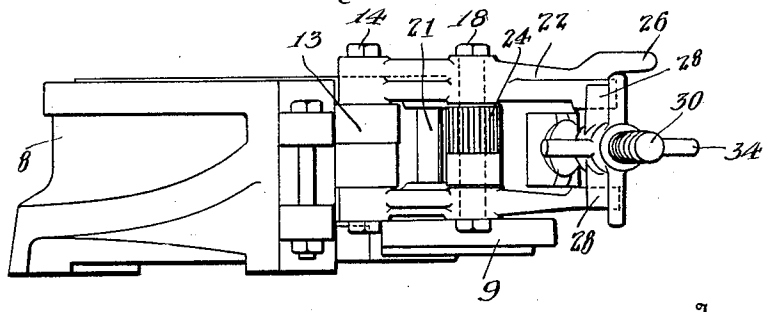


Fig. 2



Inventor

Nelson K. Smith

By Lyon & Lyon

Attorneys

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Fig. 3

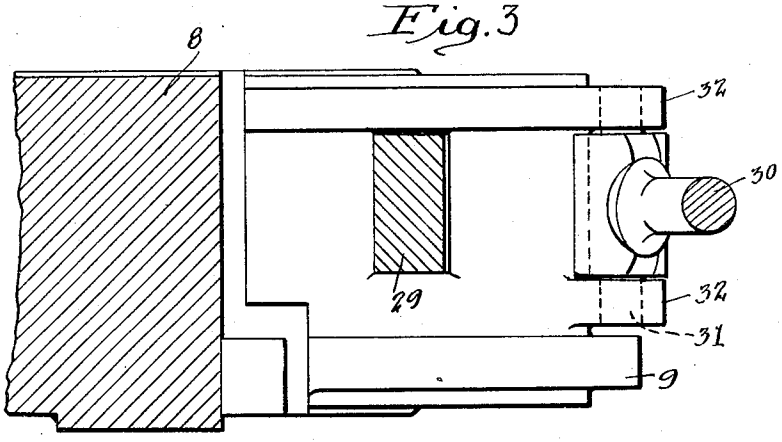


Fig. 4

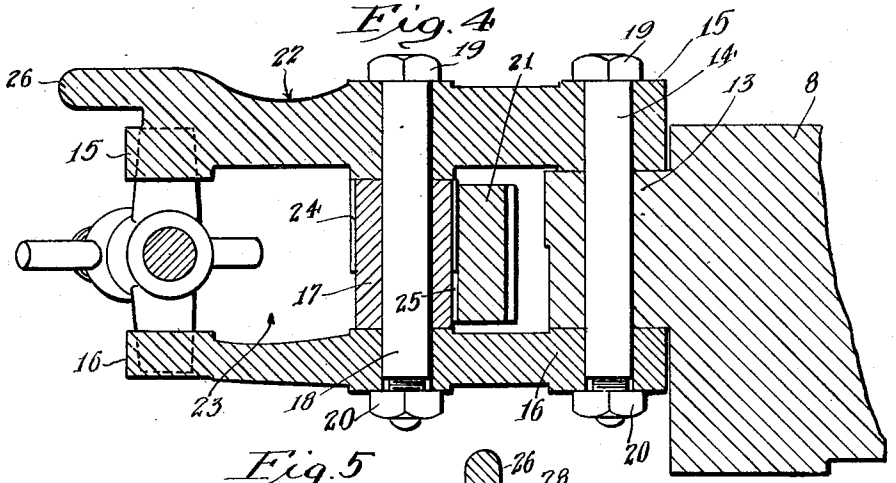
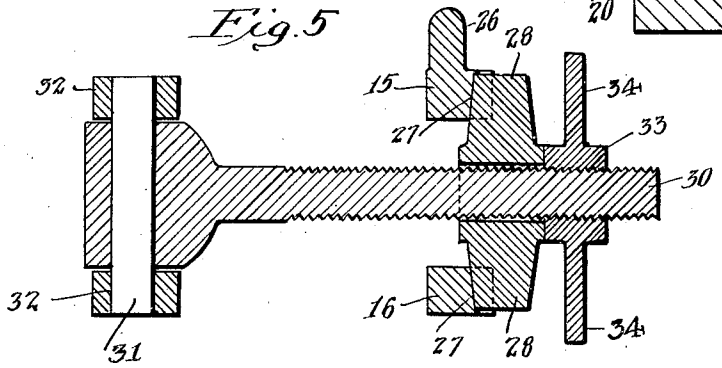


Fig. 5



Inventor

Nelson K. Smith

By Lyon & Lyon

Attorneys

Patented June 28, 1932 1,864,864

UNITED STATES PATENT OFFICE

NELSON K. SMITH, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO BYRON JACKSON CO., OF LOS ANGELES, CALIFORNIA, A CORPORATION OF DELAWARE

FRICTION GRIP ELEVATOR

Application filed October 6, 1930. Serial No. 486,637.

This invention relates to friction grip elevators, and, more particularly, to the construction of the latching means whereby the jaws of the elevator are securely held in frictional engagement with the casing or other pipe or tubing that is to be raised and lowered by the elevator.

An object, in general, of this invention is to intensify the frictional grip of elevators of this type so as to insure against slippage of the pipe through the elevator, after the elevator has been closed and the latch secured.

Another important object is simplicity of construction and operation.

Another important object is to provide a latching means that has a wedging effect in closing.

Another important object is to obtain a comparatively great leverage in the latch for closing of the same.

This elevator is especially useful for handling surface casing or large water strings. Such a casing or string has no collar and, accordingly, the standard types of casing elevators, designed to engage the collar, are impractical to use with such a casing or string. This elevator is designed to clamp upon the casing or water string, hence the necessity of providing for a very powerful and evenly distributed frictional grip of the elevator jaws upon the casing or water string.

Other objects and advantages will appear in the subjoined detailed description.

The accompanying drawings illustrate the invention:

Figure 1 is a plan view of a friction grip elevator constructed in accordance with the provisions of this invention, the gate and latch being shown in closed positions.

Fig. 2 is an edge view of Fig. 1 from the left thereof.

Fig. 3 is an enlarged fragmental vertical section on the irregular line indicated by 3—3, Fig. 1.

Fig. 4 is an enlarged fragmental vertical section on the irregular line indicated by 4—4, Fig. 1.

Fig. 5 is an enlarged vertical section on the line indicated by 5—5, Fig. 1.

Referring to the drawings, there are provided two members 8, 9, in movable relation, said members constituting jaws or, in other words, the member 8 constituting the body of the elevator and the member 9 the gate or door of said elevator. The jaws 8, 9, in this instance, are hingedly connected by a pivot or pin 10.

The jaw 8 may be provided with a bowed reinforcing rib as shown in Figure 1.

The jaws 8, 9 have arcuate inner faces 11, 12, respectively, said faces being substantially semi-circular so that when the jaws are closed together the faces 11, 12 will substantially form a circle so as to grip the pipe or casing that is to be handled by the elevator. The jaws 8, 9 may be of any suitable construction effective for gripping the pipe or casing and, because the jaws are to frictionally engage the pipe or casing, they should be made exceedingly strong.

The latching means is constructed as follows: The jaw 8 is provided with an ear 13 through which extends a pivot 14. The pivot 14 also passes through upper and lower latch members 15, 16 which carry between them an abutment 17. In this instance, the abutment 17 is rotatably connected to the members 15, 16, being mounted on a pin 18 that passes through the members 15, 16. In the present instance, the pivot 14 and pivot 18 are in the form of bolts, the heads 19 whereof seat against the upper face of the member 15 and the nuts 20 whereof seat against the lower face of the member 16.

The abutment 17 is designed to engage an abutment or lug 21 that projects from the outer face of the jaw 9 near the free end of said jaw 9. When the jaws are closed together and the latch members 15, 16 are swung inwardly, the lug 21 passes between the latch members 15, 16. The latch members 15, 16 together constitute a latch arm or lever, indicated in its entirety by the character 22, and, being spaced, they form an opening 23 therebetween. The lug 21 projects through the opening 23.

In this instance, the abutment 17 is toothed, as indicated at 24, similar to a spur pinion. In fact, the member 17 constitutes a spur

pinion in this instance. Also the face of the lug 21, that is adjacent to the abutment 17, is toothed, as indicated at 25, for meshing with the teeth 24. The toothed face 25 constitutes a rack.

The outer portion of the toothed face 25 of the lug 21 is closer to the pivot 14 than is the inner portion of said face 25, so that, as the latch arm moves toward its closed position, a wedging action is produced by the abutment 17 upon the lug 21 so as to wedgedly force the jaws 8, 9 toward one another. Thus, the abutment 17 has a rolling contact with the lug 21 so as to minimize the friction therebetween when closing and opening the latch, while, at the same time, the latch arm exerts considerable leverage upon the lug 21 in the closing movement of said arm.

The latch member 15 is provided with an extension constituting a handle 26 by which the latch arm 22 is conveniently operated.

The outer end of each of the arms 15, 16, is provided with a concave seat 27 in which is adapted to seat studs or lugs 28 that project from a member or sleeve which is in sliding engagement with a swinging arm 30. The arm 30 is pivoted at 31 to ears 32 that project from the outer face of the jaw 9. In this instance, the pivot 31 is slightly to one side of a point midway between the ends of the jaw 9.

To force the studs 28 inwardly so as to press them against the latch arm 22, there is provided a nut 33 that is threaded onto the arm 30, said nut being provided with a number of radial spokes 34 constituting handles for readily turning the nut.

It will be seen that the studs 28 may be disengaged from said seats by loosening nut 33 and then turning studs 28 about shaft 30 into or out of registration with the seats 27.

The invention described above operates as follows: Assuming that the parts are in the positions shown in Figure 1, and that it is desired to open the elevator, the operator will give the nut 33 a few turns to relieve pressure of the studs 28 on the lever 22. The studs 28 will then be turned sufficiently to bring the studs 28 into horizontal position, in which position they will readily pass through the opening 23 in the latch lever. Said lever will then be swung outwardly, thus relieving the lug 21 from engagement of the abutment 17, and causing said abutment to be swung entirely out of the path of movement of the lug 21, thus permitting the jaw 9 to be swung into open position so that casing can be placed in or removed from the elevator.

A reversal of the above described operations will effect closing together of the elevator jaws and securing of the latch in latching position.

It is to be noted that, by turning the nut 33 to tighten it against the member 29, a very great pressure can be exerted of the studs 28 upon the latch lever 22 and, that, in turn, the latch lever exerts considerable leverage upon the abutment 17 to force said abutment along the face 25 of the lug 21, which face 25 is eccentric to the pivot 14 of the latch arm, thus to force the jaws toward one another, thereby securely clamping the casing or other tubing in the jaws.

From the foregoing it will be seen that the latching means includes two take-up devices, one of them constituted, in this instance, by the abutment 17 and the eccentric face 25 of the lug 21, that is positive in action and by which great leverage can be exerted for forcing the jaws together and for holding the jaws against any movement tending to loosen their grip upon the casing or water string. The other take-up device is constituted by the nut 33 and screw threaded arm 30 and it affords a ready means for increasing the gripping action by reason of the nut 33 forcing the latch arm inwardly toward the pipe, thus to force the abutment 17 further inwardly along the eccentric face 25 than would be possible for the operator to do by his merely forcing the latch arm inwardly by pressure of his hand applied directly to the latch arm.

I claim:

1. A friction grip elevator comprising hingedly connected jaws, an arm pivotally connected with one of the jaws and provided with a pinion, a lug on the other jaw provided with a rack in eccentric relation to the pivot of said arm, said rack adapted to be engaged by said pinion when the arm is in one position, and a means to releasably hold said arm in said position.

2. A friction grip elevator comprising hingedly connected jaws, arms pivotally connected with the respective jaws, a take-up means between one of the arms and its associated jaw operable by movement of said one arm in one direction to force the jaws together, and a take-up means on the other arm engageable with the first mentioned arm and operable to force the first mentioned arm in said direction.

3. A friction grip elevator comprising hingedly connected jaws, a lever pivotally mounted directly on one of the jaws, means operable by movement of said lever increasing distances in one direction to force the jaws more and more closely together, and means connected with the other jaw and releasably engaging the lever to force the lever in said direction.

4. A friction grip elevator comprising hingedly connected jaws, a lever pivotally mounted directly on one of the jaws, means operable by movement of said lever increasing distances in one direction to force the jaws more and more closely together, an arm connected with the other jaw, and means on

the arm releasably engaging the lever to force the lever in said direction.

5. A friction grip elevator comprising hingedly connected jaws, a lever pivotally connected with one of the jaws, means operable by movement of said lever increasing distances in one direction to force the jaws more and more closely together, an arm connected with the other jaw, a nut threaded onto said arm, and means on the arm releasably engaging the lever, said last mentioned means being engaged by the nut.

6. A friction grip elevator comprising hingedly connected jaws, a lever pivotally connected with one of the jaws, means operable by movement of said lever increasing distances in one direction to force the jaws more and more closely together, an arm connected with the other jaw, a nut threaded onto said arm, and means on the arm releasably engaging the lever, said last mentioned means being loosely engaged by the nut.

7. A friction grip elevator comprising hingedly connected jaws, a lever pivotally connected with one of the jaws, means operable by movement of said lever increasing distances in one direction to force the jaws more and more closely together, an arm connected with the other jaw, and a member shiftably and rotatably mounted on said arm and including a stud engaged with and disengaged from the lever when the member is turned to different positions.

8. A friction grip elevator comprising hingedly connected jaws, a lever pivotally connected with one of the jaws, means operable by movement of said lever increasing distances in one direction to force the jaws more and more closely together, an arm connected with the other jaw, a member shiftably and rotatably mounted on said arm and provided with a stud engaged with and disengaged from the lever when the member is turned to different positions, and a nut threaded onto the second mentioned arm and engaging said member.

9. A friction grip elevator comprising hingedly connected jaws, an arm pivotally connected with one of the jaws and provided with an abutment, a lug on the other jaw having a face, any point on which is spaced farther from the pivot of said arm than any other point between said first point and one end of said face, said face adapted to be engaged by the abutment when the arm is in one position, and a means to releasably hold said arm in said position.

10. A friction grip elevator comprising hingedly connected jaws, an arm pivotally connected with one of the jaws and provided with an abutment, a lug on the other jaw provided with a face, any point on which face is spaced farther from the pivot of said arm than any other point between said first point and one end of said face, said face adapted to be engaged by the abutment when the arm is in one position, and a take-up means connected with said other jaw to releasably hold said arm in said position.

11. A friction grip elevator comprising hingedly connected jaws, an arm pivotally connected with one of the jaws and provided with a rotatable abutment, a lug on the other jaw having a face, any point on which is spaced farther from the pivot of said arm than any other point between said first point and one end of said face, said face adapted to be engaged by the abutment when the arm is in one position, and a means to releasably hold said arm in said position.

Signed at Los Angeles, California, this 27th day of September, 1930.

NELSON K. SMITH.