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PLUNGER GUIDE FOR DIRECT PLUNGER ELEVATORS.

APPLICATION FILED MAY 22, 1903. RENEWED AUG. 9, 1909.

952,044. Patented Mar. 15, 1910.

Fig. 1.

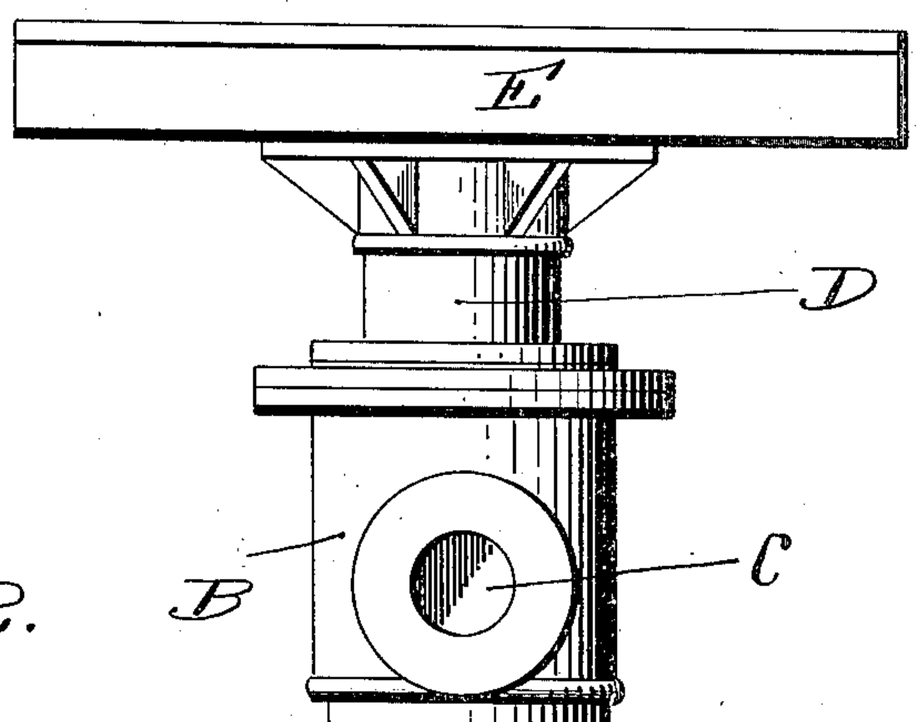
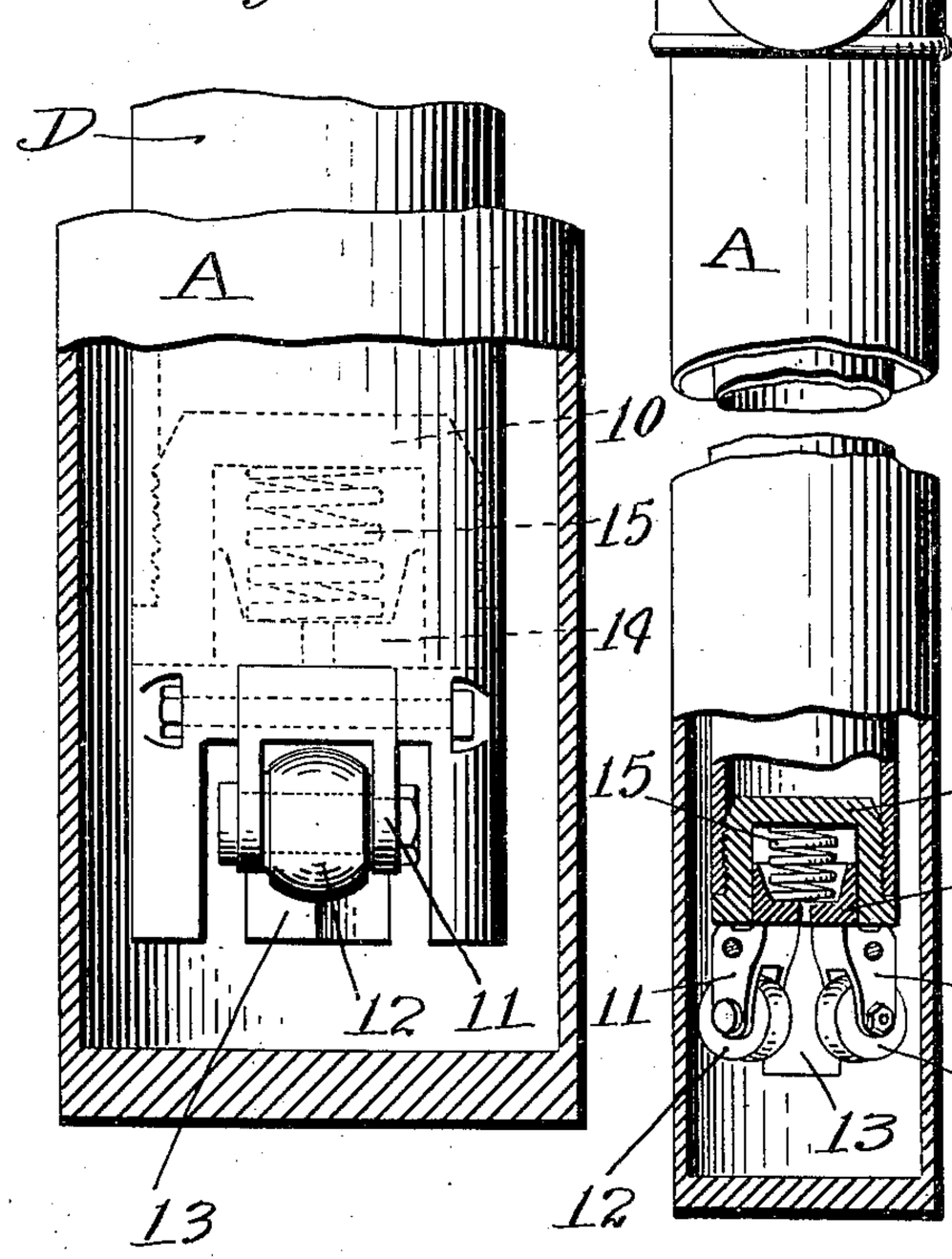


Fig. 2.



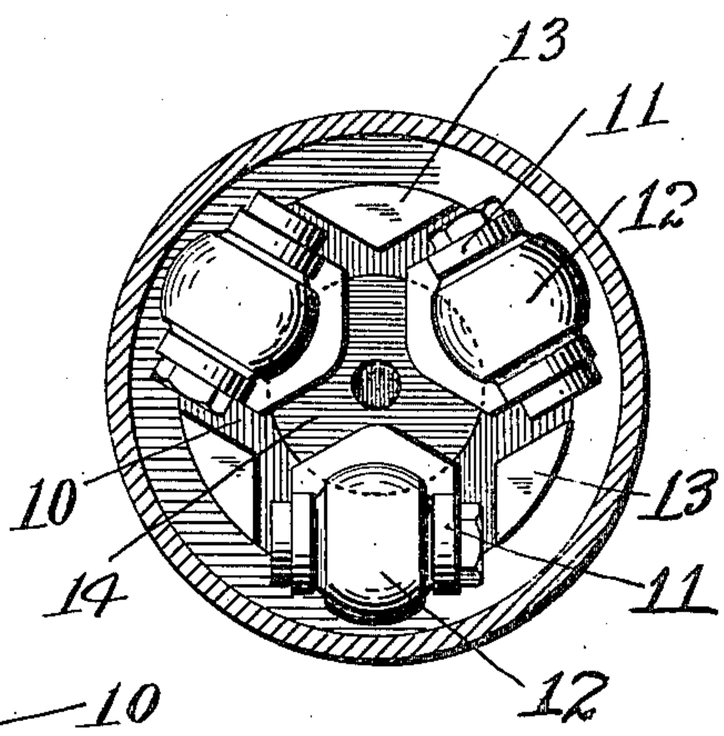


Fig. 3.

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THURE LARSSON AND AMOUR COLUMBUS SMITH, OF WORCESTER, MASSACHUSETTS, ASSIGNORS TO SAID LARSSON, W. E. D. STOKES, OF NEW YORK, N. Y., AND FRED A. JONES, OF WORCESTER, MASSACHUSETTS.

PLUNGER-GUIDE FOR DIRECT-PLUNGER ELEVATORS.

952,044. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed May 22, 1903, Serial No. 158,315. Renewed August 9, 1909. Serial No. 512,037.

To all whom it may concern:

Be it known that we, THURE LARSSON, a subject of the King of Sweden, and AMOUR COLUMBUS SMITH, a citizen of the United States, both residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Plunger-Guide for Direct-Plunger Elevators, of which the following is a specification.

This invention relates to a hydraulic elevator of the direct plunger type.

The especial object of this invention is to provide simple and efficient means for steadying a plunger and for preventing swaying or vibration of the end of the plunger within the casing.

To this end, this invention consists of the plunger guide and of the combinations of parts therewith as hereinafter described and more particularly pointed out in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a side view partially broken away of sufficient parts of a plunger elevator to illustrate the application of the invention thereto. Fig. 2 is an enlarged fragmentary view of the lower end of the plunger casing or cylinder, and Fig. 3 is a sectional view thereof, the end of the plunger being shown in bottom plan view.

A hydraulic elevator of the class to which this invention relates comprises a casing or cylinder which extends down into the ground, a distance corresponding to the length of the elevator run, a plunger which passes through a stuffing box at the upper end of the casing and extends down loosely into the casing, and an elevator car on the upper end of the plunger. In an elevator car of this class, the car is guided on suitable ways and the upper plunger is guided in the stuffing box at the upper end of the casing or cylinder.

In building elevators of this class for comparatively short runs the stuffing box for the plunger and the vertical ways for the car have been relied upon for guiding the plunger in its up and down travel, and although elevators as thus constructed have operated efficiently for short runs, for which they have ordinarily been regarded as best adapted, it has been found, in practice, that when a very long plunger is employed it is not desirable to leave the lower end of the plunger free or unsupported, that is to say, where a very long plunger is employed the lower end ot the plunger, in some cases, has had a tendency to vibrate or swing within its casing or cylinder. This is especially objectionable, because as the elevator is ascending, the length of the plunger within the casing growing shorter will tend to shorten and accentuate such vibrations so that said vibrations will be transmitted to the car, and in any case will tend to wear and displace the packings in the stuffing box. To overcome this objection, we have provided simple and efficient means for steadying the lower end of the elevator plunger without changing its line of travel, without interfering with the insertion of the end of the plunger through the stuffing box and without requiring the finishing or boring out of the inside of the plunger casing. The guiding devices which we have employed for this purpose preferably comprise a number of bearing arms which are expanding under spring tension. Each of these bearing arms is preferably provided with a roller for engaging the side of the plunger casing and this entire attachment or steadying device is preferably made in the form of a fixture which can be connected to the lower end of the plunger.

Referring to the drawings for a detailed description of an elevator provided with a plunger guide constructed according to the invention, A designates the casing or cylinder which extends down into the ground as shown in Fig. 1. At its upper end the casing A is provided with a top B, having an opening C to which the to and from pipe is connected. Extending down through the stuffing box at the upper end of the head B is a plunger or pipe D which carries the elevator car E at its upper end. These parts may be of any of the ordinary or approved construction and need not be herein further described at length.

The plunger guide or steadying attachment comprises a plug or counterbored body portion 10 which is threaded into the lower end of the plunger D. Pivotally connected to the plug 10 are bearers or arms 11 and journaled in each of the arms 11 is a convex faced wheel 12. Extending down between the adjacent arms 11 are foot pieces or guides 13, which serve to guide the end of

the plunger when the same is inserted through the stuffing box. Rested on the inner ends of the arms 11 is a plate or follower 14 which is normally forced down by a spring 15. In the use of a plunger-guide as thus constructed, the wheels 12 will engage the sides of the casing whenever the lower end of the lower plunger is bent or deflected from central position, the tension of the spring tending to force the arms outwardly will aid in preventing the plunger from vibrating while at the same time the use of this steadying attachment will not require finished surfaces inside of the casing.

We are aware that changes may be made in practicing our invention by those who are skilled in the art without departing from the scope thereof as expressed in the claims. We do not wish, therefore, to be limited to the construction herein shown and described but

What we do claim and desire to secure by Letters Patent of the United States is:

1. In a construction of the class described, the combination of a plunger casing, a plunger and a steadying attachment for the plunger comprising movable arms, a device located in the bottom of said plunger for engaging said arms to force them outwardly, and a spring for operating said device.

2. In a construction of the class described, the combination of a plunger casing, a plunger therefor, and a steadying attachment for the plunger comprising pivoted arms, a follower movably mounted on the plunger for engaging said arms and forcing them outwardly, and resilient means for moving the follower toward the arms.

3. In a construction of the class described, the combination of a plunger casing, a plunger therefor, a bottom plug connected with the plunger, arms pivotally mounted on said plug, rollers on said arms, a follower movably mounted within said plug, and means for forcing the follower against the arms to move them outwardly.

4. In a construction of the class described, the combination of a plunger casing, a plunger running in said casing, an elevator car on the upper end of the plunger, and a steadying attachment at the lower end of the plunger comprising a bottom plug, arms pivoted therein, rollers journaled in the arms, a follower, and a single coiled spring acting on the follower to spread the arms.

5. In a construction of the class described, the combination of a plunger casing, a plunger running therein, an elevator car on the upper end of the plunger, and a steadying attachment at the lower end of the plunger comprising a plug, at the lower end of the plunger, three bell-crank arms pivoted in the plug, a roller journaled in each of said bell-crank arms, a follower resting upon the horizontal members of said bell-crank arms, and a spring coiled in the plug and forcing down said follower to spread the bell-crank arms.

In testimony whereof we have hereunto set our hands, in the presence of two subscribing witnesses.

THURE LARSSON.
AMOUR COLUMBUS SMITH.

Witnesses:
LOUIS W. SOUTHGATE,
PHILIP W. SOUTHGATE.