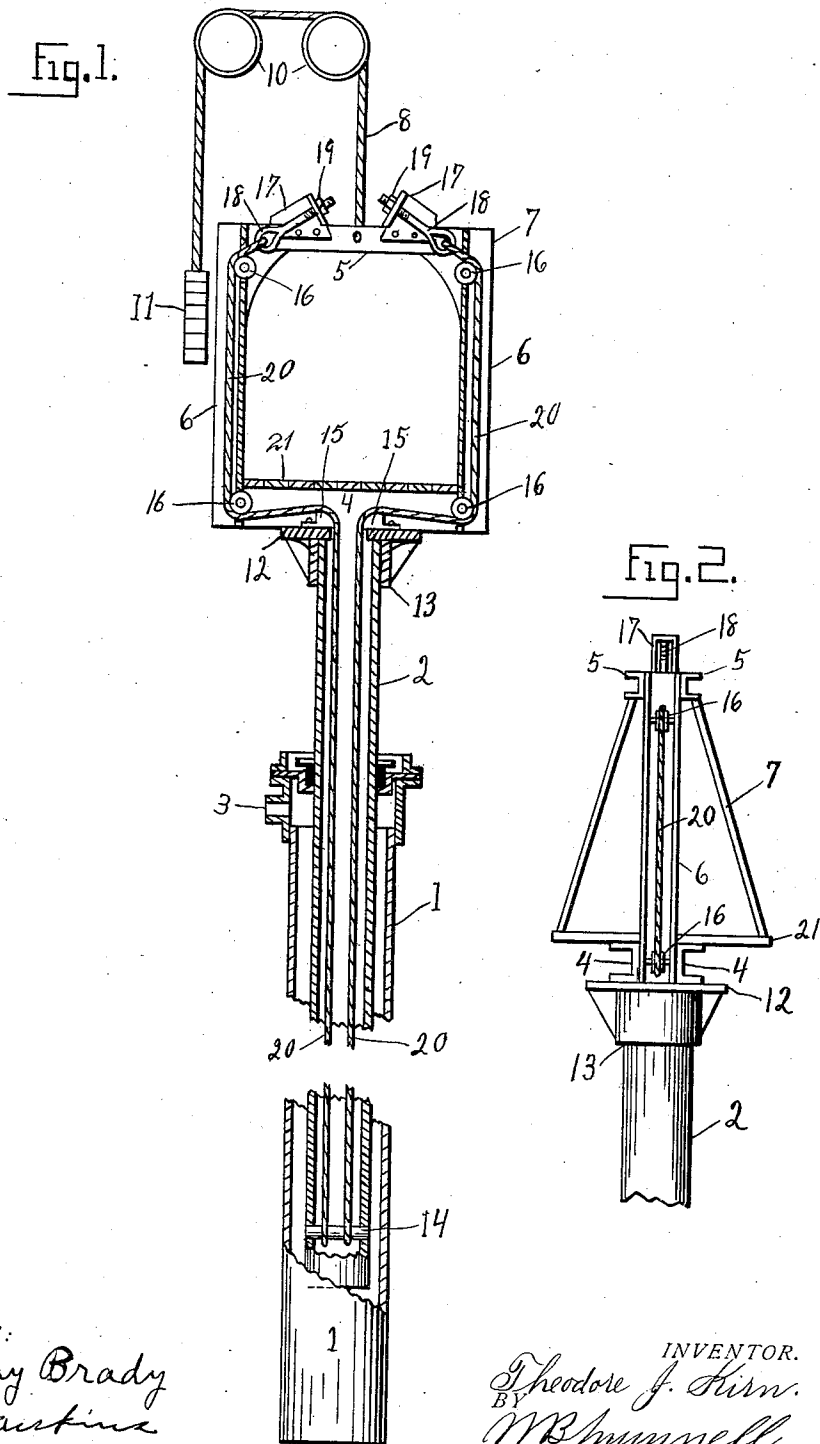


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PLUNGER ELEVATOR.  
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WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## PLUNGER-ELEVATOR.

1,060,907.

Specification of Letters Patent.

Patented May 6, 1913.

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*To all whom it may concern:*

Be it known that I, THEODORE J. KIRN, a citizen of the United States, residing at the city of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Plunger-Elevators, of which the following is a specification.

This invention relates to plunger-elevators, and has for an object the provision of means for the prevention of accidents due to the accidental breaking of the plunger or its separation from the car.

In hydraulic elevators the combined weight of the car and plunger generally exceeds that of the counterweight but the latter exceeds in weight that of the car alone. Should the plunger break or become detached from the car, there would be nothing to balance the counterweight and it would pull the car to the top of the shaft without any means of control. There is always danger that such an accident will happen, because the varying loads and strains on the plunger tend to weaken the joints and fastenings. A structural weakness or a defect in the fastening cannot be easily discovered even by careful inspection, and it is therefore important to provide means for preventing the car from being overcome by the counterweight if there should happen to be any defects in the plunger or its fastenings.

With the foregoing in view this invention consists of the details of construction, and arrangement of parts hereinafter set forth and illustrated in the accompanying drawing, that forms a part of this specification.

Referring to the drawing, in which like reference characters indicate like parts in the different views; Figure 1, is a vertical section of an embodiment of my invention; Fig. 2, is a side elevation of the platform and a portion of the depending plunger.

1 indicates the main cylinder, in which a plunger—2—reciprocates, 3 is the inlet and exhaust port of the main cylinder, leading to a suitable main valve and source of power-supply. Sills—4, 4— and head-rails—5, 5— spaced apart by vertical side members—6, 6— form a frame—7— on which is laid a floor—21—. Secured in a suitable manner to the head-rails is a cable—8— running over sheaves—10, 10— and carrying a counterweight—11—. Suitably secured to the sills 4—4 is a plate—12—

which carries the usual socket—13— from which depends the plunger 2. A pin—14— is arranged transversely through the plunger at some suitable point in its length, grooved guide-blocks—15, 15— are mounted on the plate 12 on either side of, and projecting slightly over, the top of the plunger; sheaves—16, 16, 16, 16,— are mounted on the spacing members 6, 6 near the upper and lower ends thereof; suitably secured on top of the head-rails are brackets—17, 17— through which extend threaded eye-bolts—18, 18— that are provided with nuts—19, 19—. Cables, or other suitable means of connection,—20, 20— are secured by some suitable means to the transverse pin 14 and extending up through the plunger separate at the upper end thereof and passing, one on each side of the frame, over the guide blocks 15 and sheaves 16 are connected to the eye-bolts 18. By means of the nuts 19 the cables may be tightened as much as may be desired. It can be seen that if for any reason the socket 13 or plunger should break the construction described will prevent the plunger from becoming separated from the frame, in addition the taut cable serves to put the plunger under continuous stress in one direction, giving it additional strength and keeping the joints tight. This latter feature is of advantage, because when the water gets into the plunger its buoyancy, is reduced and the efficiency of the elevator reduced.

It is to be understood that the pin 14 may be placed anywhere in the length of the plunger, the essential point to be observed being that the weight of the plunger above the point where it is inserted shall be approximately equal to that of the counterweight. It is also to be understood that any suitable connective may be used between the pin 14 and the eye-bolts 18, 18.

Having described my invention so that any one skilled in the art pertaining thereto may make and use the same, I claim:—

1. In a hydraulic elevator, the combination of a frame comprising sills and head-rails spaced apart, a depending plunger secured to the sills, a flexible connection between the plunger and the head-rails independent of the structural connection therebetween.

2. In a hydraulic elevator, the combination of spaced sills and head-rails, a depending plunger attached to the sills, a

connection between said plunger and head-rails independent of the connection between said sills and rails.

3. The combination with sills and head-rails and spacing members connecting the same of a depending plunger attached to the sills, of connecting means between said plunger and head-rails independent of said spacing members.

4. A frame comprising sills and head-rails in spaced relationship, a depending plunger attached to said sills, means of connection within said plunger and a cable extending from said means to a connection with said head-rails.

5. A frame comprising sills and head-rails in spaced relationship, a depending plunger attached to said sills, a means of connection within said plunger, guide members associated with said sills, means of connection associated with said head-rails, a cable connecting said means and passing over said guide members.

6. A frame comprising sills and head-rails, spacing members connecting the same, a depending plunger attached to the sills, a transverse pin within the plunger, guide blocks associated with the sills, guide sheaves associated with the spacing members, adjusting means associated with the head-rails, and a connective extending from said pin to said adjusting means.

7. A frame comprising sills and head-rails, spacing members connecting the same, a depending plunger attached to the sills, a transverse pin within the plunger, guide members associated with the sills, guide sheaves attached to the spacing members, an eye-bolt associated with the head-rails, and a connective extending from said pin to said eye-bolt and passing over said guide members and sheaves.

8. A frame comprising sills and head-rails, spacing members connecting the same, a depending plunger attached to the sills, a transverse pin within the plunger, guide members associated with said sills and spacing members, an eye-bolt associated with the head-rails, and a connective extending from said pin to said eye-bolt.

9. A frame comprising sills and head-rails in spaced relationship, a depending plunger rigidly secured to said sills, a flexible connective extending from a connection in the lower interior portion of the plunger to a connection on the head-rails, said flexible connective adapted to suspend the plunger from the head-rails in the event of the plunger separating from the sills.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."