2 Sheets—Sheet 1.

C. W. BALDWIN & W. BURDON.

Hydraulic Hoisting Apparatus.

No. 197,310. **Patented Nov. 20, 1877.**

Fig 1.

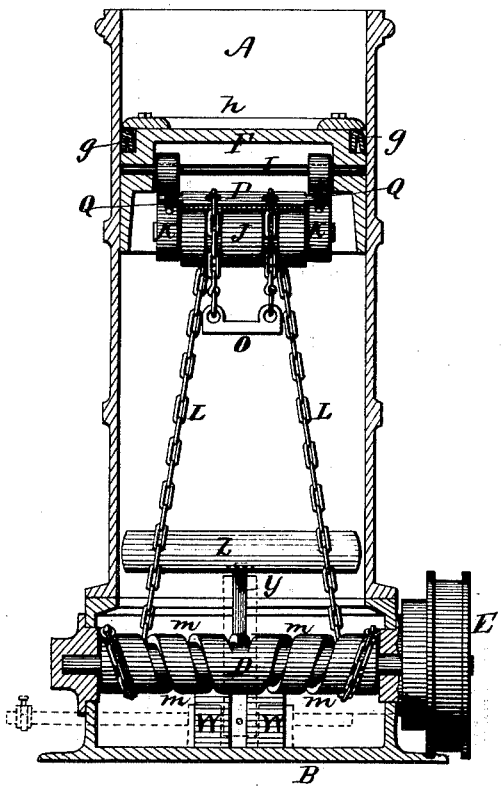
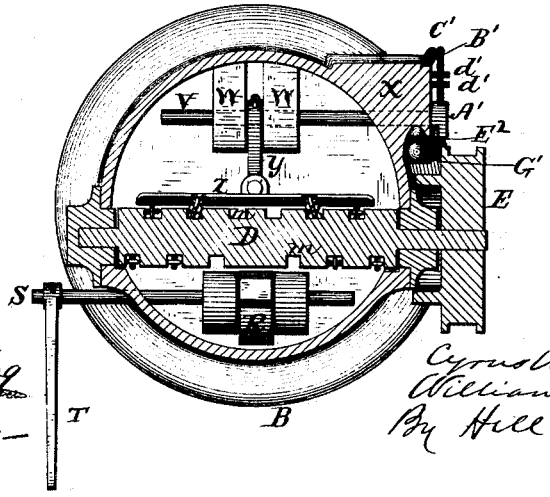


Fig 2.



Witnesses.
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2 Sheets—Sheet 2.

C. W. BALDWIN & W. BURDON.

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Fig 3.

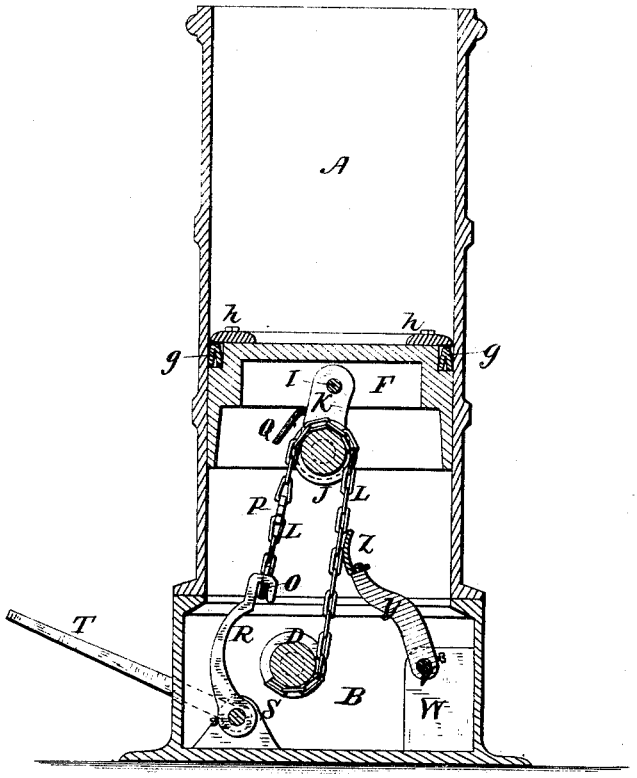
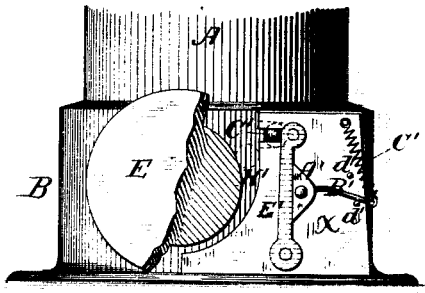


Fig 4.



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UNITED STATES PATENT OFFICE.

CYRUS W. BALDWIN AND WILLIAM BURDON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN HYDRAULIC HOISTING APPARATUS.

Specification forming part of Letters Patent No. **197,310**, dated November 20, 1877; application filed August 3, 1877.

To all whom it may concern:

Be it known that we, CYRUS W. BALDWIN and WILLIAM BURDON, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Hydraulic Hoisting Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, is a vertical section of the apparatus. Fig. 2, Sheet 1, is a transverse section of the same. Fig. 3, Sheet 2, is a vertical section taken in a plane at right angles to that of Fig. 1; and Fig. 4, Sheet 2, is a side elevation, partly in section, of the base of the apparatus.

Similar letters of reference in the accompanying drawings denote the same parts.

Our invention relates to that class of hydraulic hoisting apparatus used in buildings and elsewhere for handling freight, merchandise, &c., their simplicity and cheapness, as well as their size, specially fitting them, rather than the large and expensive steam-elevators, for this purpose; and the invention consists—

First, in adapting the water-piston to travel its full stroke within the cylinder to raise heavy loads to the highest points, and to travel but half such distance to raise light loads to the same point, thereby saving one-half the water when the apparatus is not working to its full capacity.

It also consists in the means for effecting this adaptation, at the will of the operator, from the platform or inside of the car.

It also consists in the means employed for centering the hoisting-chains to prevent the piston from binding in the cylinder when working at full or half stroke.

It also consists in the construction and operation of the safety apparatus, by which the car and its load are prevented from falling if one or both chains become broken.

It also consists in the construction and combination of various parts, as we will presently describe.

In the drawings, A is the upright water-cylinder, supported upon the base B, provided with the necessary water supply and discharge pipes, the former connected with water-mains, or a reservoir having the requisite head of water. D is a horizontal chain drum or shaft extending through the base B within the water-space, a little on one side the center, and having its bearings in the walls of the base. One or both ends of the shaft extend through such walls to receive one or more exterior drums, E, to which the hoisting-ropes are attached, and from which such ropes extend up over sheaves at the top of the building or other elevated point, and thence down to the carriage.

F is the piston, arranged within the cylinder above the base, and provided with a suitable packing, *g*, held in place near its upper edge by an annular ring, *h*, screwed or bolted to its upper surface. The piston is made hollow to receive the mechanism for centering the connecting-chains, which consists in a central cross-rod, I, and a grooved drum, J, articulated thereto by two pendent arms, K, hung upon the rod near each end. This mechanism is entirely located within the piston, so that the entire length of the piston-chains can be utilized for winding.

L L are the chains, connected at their lower ends to the extremities of the chain-drum, and, when they are wound up thereon to lower the piston and car, travel inward toward the center thereof, being guided by the spiral grooves *m m*.

The opposite ends of the chains are joined by a bar, O, and, passing up over the piston-drum J, hang therefrom a short distance, holding the bar O in a horizontal position when the piston is moved upward its full stroke. At some distance from the ends the chains are joined together by a bar, P, which, when the piston is on its full stroke, catch at the ends under the two hooks Q Q, fastened to one side of the pendent arms K of the centering mechanism, as shown in Fig. 1, and thus limit the stroke.

The stop-bar and hooks are employed when the piston is to move its full stroke, to raise heavy loads; but when light loads are to be lifted the piston is lowered until the bar O catches into a hook, R, mounted upon a cross-shaft, S, in the base of the apparatus, as

shown in Fig. 3. With the chains thus arranged, the piston travels but half its full stroke when the water is let on; but the chain-drum makes the same number of revolutions as in the full stroke. Only half the quantity of water is therefore required to raise the car.

With the piston at full stroke, the chain is wound and unwound upon the chain-drum, being locked at its upper end to the centering mechanism; but with the piston at half-stroke the chains run freely over the drum of the centering mechanism as they are wound and unwound upon the chain-drum.

As the line of draft is different in the two positions of the chains, the centering mechanism conforms to both, and thereby prevents the piston from tipping and binding in the cylinder.

The shaft of the hook R is moved by a lever, T, or other suitable device within reach of the operator in the car, so that when the piston is on full stroke the hook may be held or moved out of the path of the descending hook-bar O; and when it is desired to change the piston to half-stroke, it may be moved inward toward the chain-drum to catch over said bar, as will be readily understood.

To release the hook-bar and chains, the piston must be at the limit of its downstroke, when the bar will be below the hook and swung clear of it. The hook is then moved outward out of the line of the hook-bar, and when the piston again moves up the bar P will catch under the hooks Q of the centering mechanism, and the piston will then be changed to its full stroke.

The safety mechanism is constructed and operates as follows:

V is a cross-shaft, extending partly through the base of the apparatus in rear of and parallel with the chain-drum. It has its bearings in two blocks, W W, within the base, and in a block or enlargement, X, on the outside of the base, as shown in Fig. 2. Between the blocks W the shaft carries an upright arm, Y, which curves toward the chains, and to its upper end is swiveled a horizontal plate, Z.

The outer end of the shaft is provided with a toe, A′, which, in its turn, carries a short rearwardly-projecting arm, B′, connected to the block X by a spiral spring, C′, whose tension pulls the arm upward, thereby turning the shaft and holding the swiveled plate against the chains.

The movements of the spring-arm are limited by stops *d d′*, in the side of the block, as shown in Fig. 3.

E^1 is a vertical bar, pivoted at its lower end to the face of the block X, and when in a vertical position resting against the straight side of the toe A′. The upper end of the vertical bar is provided with a lateral pin, E^2, (shown clearly in Figs. 2 and 4,) which enters a horizontal slot behind a ball or roller, G′, placed in a recess communicating with said slot, and also communicating with the curved recess H′, between the front edge of the block and the hoisting-drum E.

If either or both chains break when the apparatus is at work, their pressure against the swiveled plate Z is removed, thereby allowing the spring C′ to turn the shaft V, the same action causing the toe A′ to move the vertical bar E′, and throw the ball or roller out of its recess down into the curved recess H′, where it binds between the hoisting-drum and edge of the block, stopping the rotation of the drum, and, therefore, arresting the descent of the carriage.

By swiveling the plate Z to its upright, it will readily turn to allow the spring to act if only one chain is broken. The face of the plate is also curved to permit the free movement of the chain upon it.

We claim as our invention—

1. In a hydraulic hoisting apparatus, a water-piston adapted, by means substantially as described, arranged within the cylinder, to travel at full stroke to raise heavy loads to the highest point, and to travel but half such distance to raise light loads to the same point, substantially as set forth.

2. The combination of a centering mechanism with the piston and chains, for the purpose of preventing the piston from tipping and binding in the cylinder whether the chains are changed for a full or half stroke of the piston, substantially as described.

3. A safety apparatus for the elevator, consisting of a ball or roller, adapted by the breaking of one or both chains to be automatically thrown down between the hoisting-drum and an abutment on the base of the cylinder, to stop the rotation of said drum and arrest the falling car, substantially as described.

4. The combination of the pivoted centering mechanism and the double chains with the piston and chain-drum, substantially as described, for the purpose specified.

5. The chains L, provided with cross-bar P, to engage with the hooks Q of the centering mechanism to permit the full stroke of the piston, substantially as described.

6. The chains L, provided with the end cross-bar O, to engage with the pivoted hook R, to permit the half-stroke of the piston, substantially as described.

7. The hook R, adapted, at the will of the operator, to engage the chains for a half-stroke of the piston, and to disengage them for a full stroke of the piston, substantially as described.

8. The centering mechanism, consisting of the cross-rod I in the piston, the arms K hung thereon and provided with catches, and the grooved drum J, journaled in the lower ends of the arms, substantially as described.

9. The combination of the horizontal spring guide-plate Z with the chains, substantially as described, for the purpose specified.

10. The spring guide-plate Z, swiveled upon

its supporting-arm Y, combined with the double chains, substantially as described, for the purpose specified.

11. The toe A′, combined with the shaft of the guide-plate and its spring-connection, and with the pivoted arm E′ and ball or roller G′, substantially as described, for the purpose specified.

12. The ball or roller G′, held in the recess of the block X, and adapted to be thrown down into the space H′ between such block and the hoisting-drum by the pivoted upright arm E′, the latter being operated by the plate Z and its connections, substantially as described.

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