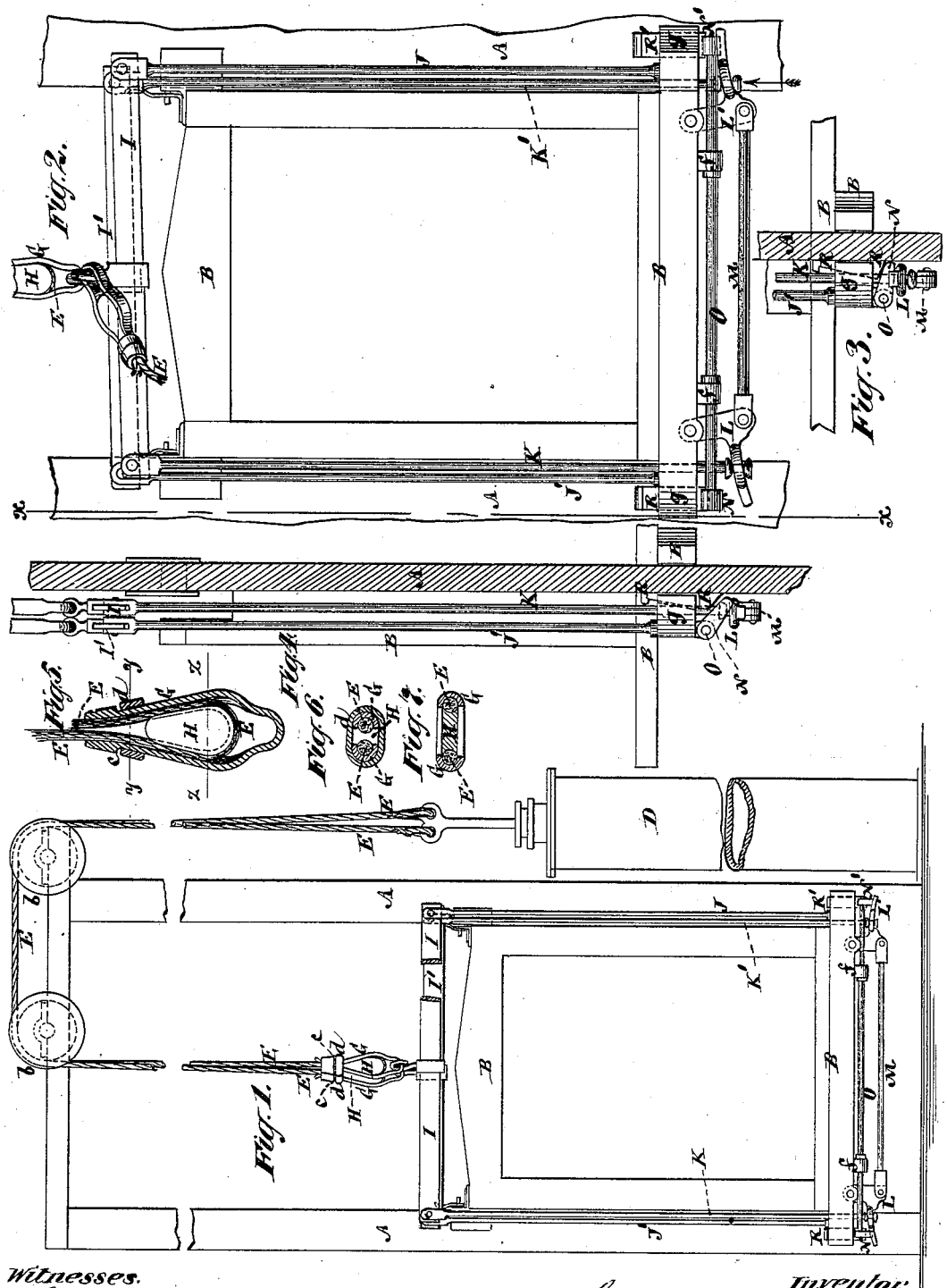
C. W. BALDWIN.

Elevator.

No. 216,013. Patented June 3, 1879.



Witnesses.

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IMPROVEMENT IN ELEVATORS.

Specification forming part of Letters Patent No. **216,013**, dated June 3, 1879; application filed November 1, 1878.

To all whom it may concern:

Be it known that I, CYRUS W. BALDWIN, of the city and State of New York, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to passenger and other elevators or hoisting apparatus, in which a raising and lowering car or platform is used.

The invention consists in a clevis or shackle of novel construction, in combination with a wedge and locking device for attaching the hoisting-rope to the car or platform, whereby great security is obtained and every facility afforded for attaching and detaching the hoisting-rope.

The invention also consists in certain novel combinations of devices applied to the car or platform and to a stop mechanism connected therewith, whereby, when duplicate hoisting-ropes are used, perfect safety is insured, and the car is arrested in its descent should either rope break or become unduly slack, without, however, resisting the ascent of the car by the rope which remains intact.

In the accompanying drawings, Figure 1 represents a side elevation of a hoisting apparatus having the invention applied, and showing the stop mechanism in position when duplicate hoisting-ropes applied to the apparatus are whole or in working condition and subject to like tension. Fig. 2 is a similar view of the same, in part only, upon a larger scale, mainly in illustration of the changed position of the stop mechanism when one of the hoisting-ropes is broken, or when, from any other cause, the strain is thrown wholly upon the one rope. Fig. 3 is a vertical section in a plane at right angles to Fig. 2 on the line *x x*, mainly in illustration of the stop mechanism when thrown into action; and Fig. 4, a like sectional view on the same line *x x*, but showing the stop mechanism when not in action. Fig. 5 is a longitudinal section of a loop-like clevis or shackle, used to connect each hoisting-rope with the car or platform, or with mechanism applied thereto for controlling the action of the stop mechanism; Fig. 6, a transverse section of said clevis or shackle on the line *y y*, and Fig. 7 a further transverse section thereof on the line *z z*.

A A are opposite side uprights of an elevator or hoisting apparatus, in which a car or platform, B, is arranged to move up and down between said uprights.

Any suitable hoisting-power may be used for raising and lowering the car, a hydraulic apparatus, D, here being represented as employed for the purpose, and duplicate hoisting-ropes E E preferably being used to guard against accident in case of breakage or the imperfect operation of a single rope. These ropes E E, which pass over guides or pulleys *b b*, are independently connected with the car or platform of the apparatus by separate clevises or shackles, G G. Each of these shackles is of a strap or loop-like construction, and grooved or concave on its inner faces. Its upper ends, which are made to open, and which form a mouth for the entry of the rope, incline when closed toward each other, and are kept closed by a locking band or ring, *d*, applied to or slipped over the mouth end of the shackle, and beneath a shoulder, *c*, thereon.

Within each clevis or shackle G is a flat loose wedge, H, arranged with its point uppermost, and of concave construction externally on its edge, to receive the hoisting-rope E around it, and between its grooved edge and the groove or concave on the inner faces of the shackle G.

By lowering the wedge H into or within the wider portion of its shackle G, the upper or mouth portion of the latter may then be closed to admit of the withdrawal over the shoulder *c* of the locking-band *d*, when the shackle may be opened to withdraw or insert the end of the hoisting-rope from or into the shackle.

When inserting the rope within the open shackle, its entering end is passed down within the concave surface of one arm of the shackle, around and within the concave edge of the wedge H, and up within the concave surface of the other arm of the shackle, after which the locking-band *d* is slipped down over the shouldered portion *c* of the mouth end of the

shackle, and when tension is put upon the rope or the weight of the car B and its load brought to bear upon the lower end of the shackle G the wedge H, by the effect of such pull or strain, is drawn upward within the narrowed upper portion of the shackle, and the rope E thereby tightly clamped between the shackle and the wedge, which tightness of hold increases in proportion with increase of the load.

This combination of a loop-like shackle, contained wedge, and locking band or ring forms a very efficient means for connecting the hoisting-rope with the car or platform, and is especially advantageous when duplicate hoisting-ropes are used, inasmuch as the flat form of the shackles and their wedges allows of duplicate shackles having contained wedges being arranged side by side in close proximity with each other, thus providing for the duplicate hoisting-ropes working over the same pulleys and close to one another, in central relation with the car or platform.

The shackles G are connected at their lower ends indirectly with the car B by duplicate upper cross bars or levers, I I′, arranged side by side over the car, whereby the hoisting-ropes E E are virtually attached to said cross bars or levers I I′ intermediately of the length of the latter.

The cross-bar I has attached to it at its one end a rod, J, which runs down one side of the car B, and is fastened below to the bottom of the car, thus making of the rod J what may be termed a "fast rod;" and the opposite end of said cross-bar I has attached to it a rod, K, which runs down the opposite side of the car, and is free to work up and down through the bottom of the latter, thus forming what may be termed a "loose rod." The cross bar or lever I′ has also a like fast rod, J′, and loose rod K′, combined with its opposite ends, but oppositely arranged in relation with the sides of the car to the rods J K—that is to say, arranged so that the fast rod J′ is on the same side of the car as the loose rod K of the lever I, and the loose rod K′ is on the same side of the car as the fast rod J of said lever.

The fast rods J J′ constitute the fulcrums or supports on which the cross bars or levers I I′ work.

The lower ends of the loose rods K K′ are connected, respectively, with bell-cranks L L′, pivoted to the bottom of the car, and coupled by a connecting-rod, M. These bell-cranks L L′ are arranged to project beneath fingers N N′ upon a cross-shaft or finger-bar, O, which is free to turn in bearings *f f* on the under side of the platform; and arranged immediately above the fingers N N′ are inclined friction blocks or wedges R R′, fitted to work up and down within guides *g g*, and to bear or bind when raised against the fixed posts or uprights A A. These friction blocks or wedges, in connection with the devices by which they are operated, constitute a lower stop mechanism.

The operation of such stop mechanism and of the hoisting devices connected therewith is as follows: So long as the tension or pull is upon both hoisting-ropes E E alike, the two cross bars or levers I I′ pull equally by their respective loose side rods, K K′, on the bell-cranks L L′, and as the latter are connected by the rod M, then said cranks are kept from coming in contact with or bearing upward on the fingers N N′ of the shaft or finger-bar O, and so that said fingers (as illustrated for one of them in Fig. 4) is free from contact with or upward pressure against the friction blocks or wedges R R′. In this way or by these means the stop-motion is restrained from action. Should either of the duplicate hoisting-ropes E E, however, break or become unduly slack, then, the remaining hoisting-rope having the whole tension or strain thrown upon it, the cross bar or lever I or I′ of said last-named rope is raised, and the loose rod K or K′ of said lever caused to work upward the crank L or L′, controlled by it, and in so doing to lift the finger N or N′ immediately over it, and, by the rocking of the cross-shaft O, to cause both of said fingers to work upward the friction blocks or wedges R R′, and, by their binding action against the posts A A, to stop the car in its descent.

Figs. 2 and 3 illustrate the stop mechanism when thus thrown into action.

Said safety-stop mechanism, it will be observed, while it prevents the car from running down in case of a rope breaking, admits of it being drawn upward by the rope which remains intact, thus obviating the difficulty of the car sticking fast between two stories of a building.

In cases where more than two ropes are used—as, for instance, four, six, or any multiple of two—the duplicate cross bars or levers I I′ and their appurtenances may be correspondingly increased in number, one pair of such cross bars or levers being used for every pair of ropes. This increase in the number of cross bars or levers is not, however, absolutely necessary, as two or more ropes may be connected with each one of the said cross bars or levers.

I claim—

1. The loop-like clevis or shackle, in combination with the wedge within said shackle, for clamping the attaching end of the hoisting-rope to the shackle, and with a locking band or device applied to the mouth end of the shackle, substantially as specified.

2. The combination, with the car or platform of a hoisting apparatus, and with a stop mechanism applied thereto, of duplicate cross bars or levers, to which duplicate hoisting-ropes are attached, and which are directly connected with the car or platform, one on one side and the other on the opposite side

thereof, and each of which is connected with the stop-mechanism on the opposite side of the car or platform to that on which it is directly connected, substantially as and for the purpose herein specified.

3. The combination, with the car or platform, of the upper cross bars or levers, I I′, to which duplicate hoisting-ropes are attached, the fast and loose side rods, J K J′ K′, on opposite sides of the platform, the bell-cranks L L′, the connecting-rod M between said bell-cranks, the finger-bar O, having fingers N N′, and the friction blocks or wedges R R′, essentially as described.

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