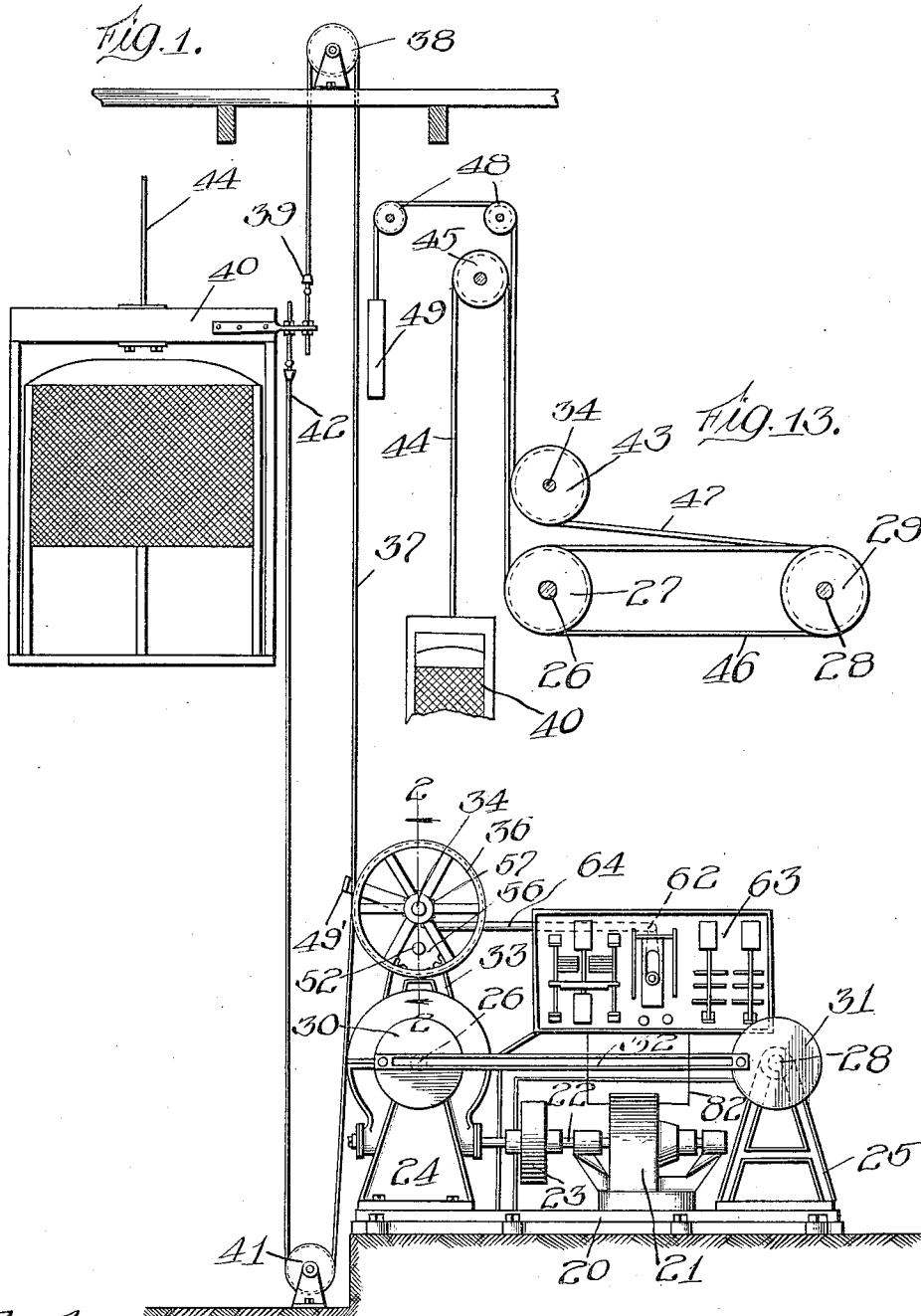


H. W. FORSLUND.
LIMIT SWITCH FOR ELEVATORS OR HOISTING MACHINERY.
APPLICATION FILED DEC. 14, 1906.

1,042,212.

Patented Oct. 22, 1912.

4 SHEETS—SHEET 1.



Witnesses:
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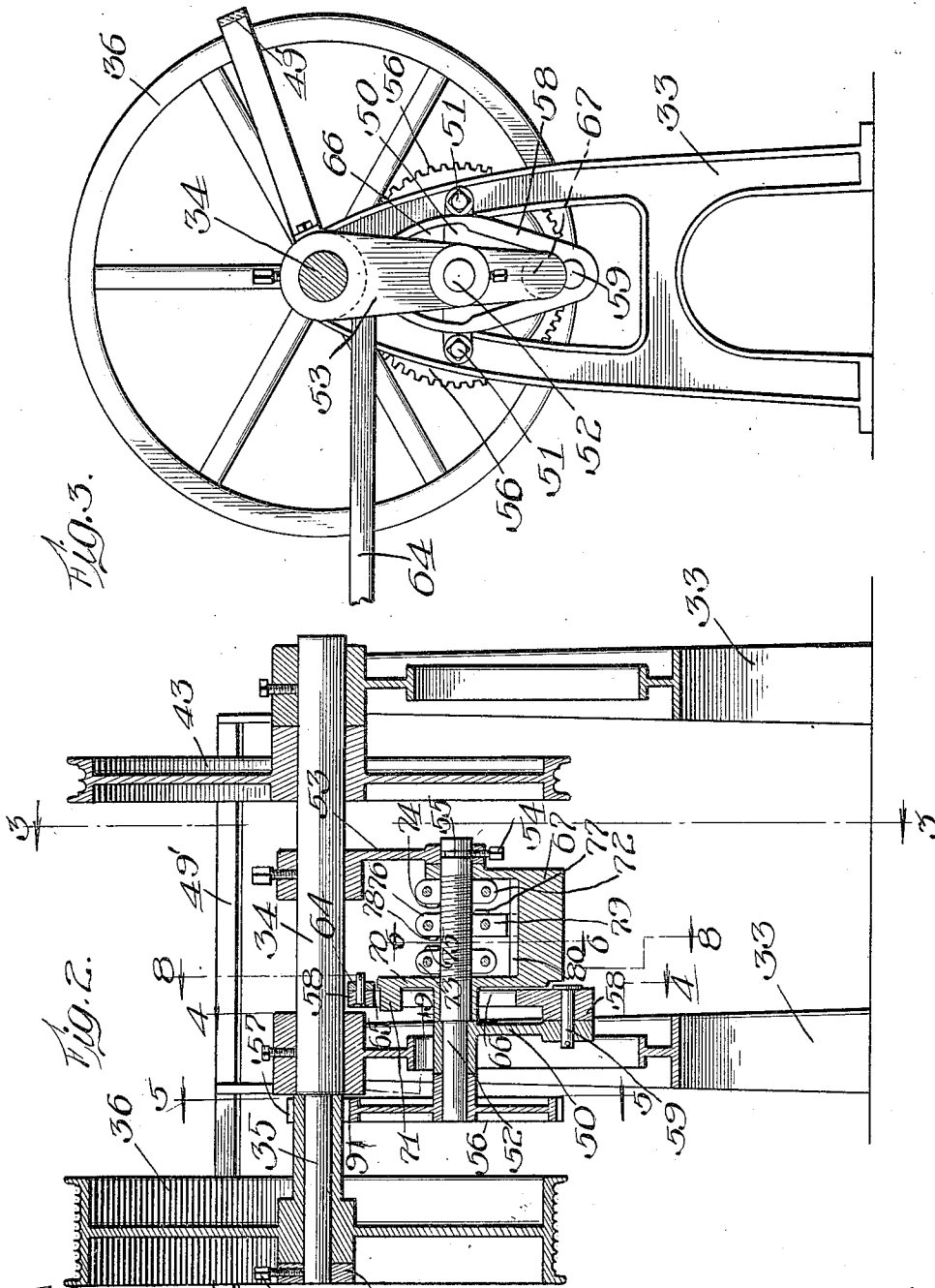
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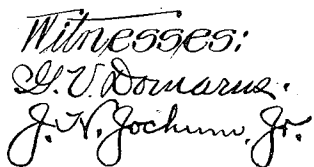


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4 SHEETS—SHEET 3.



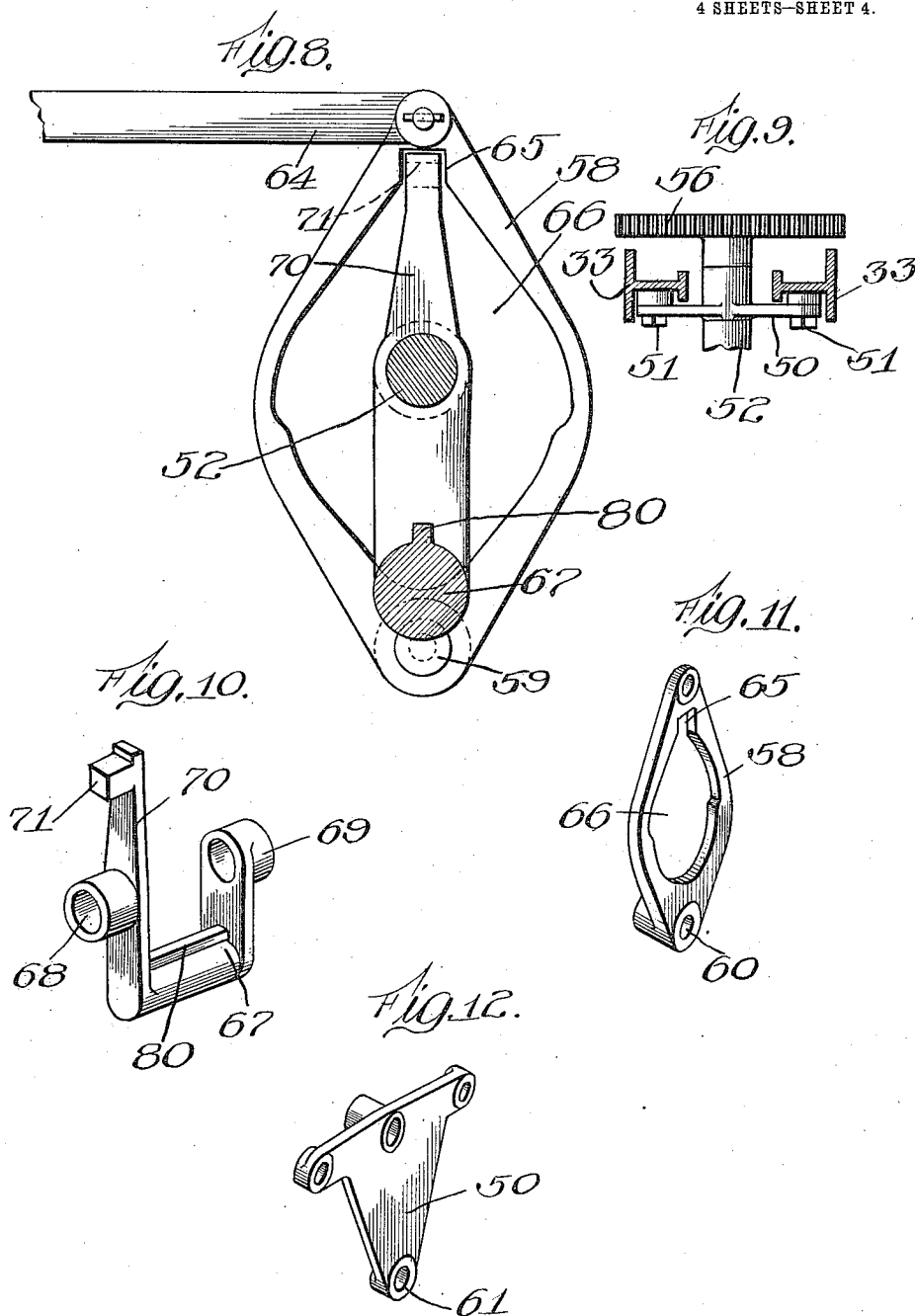
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

HUGO W. FORSLUND, OF CHICAGO, ILLINOIS, ASSIGNOR TO J. W. REEDY ELEVATOR MANUFACTURING CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LIMIT-SWITCH FOR ELEVATORS OR HOISTING MACHINERY.

1,042,212.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed December 14, 1906. Serial No. 347,781.

To all whom it may concern:

Be it known that I, HUGO W. FORSLUND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Limit-Switches for Elevators or Hoisting Machinery, of which the following is a full, clear, and exact specification.

This invention relates in general to electric elevators or hoisting machinery, but more particularly to the mechanism for limiting or controlling the movement of the cage or platform, and the primary object of the invention is to provide an improved stop or switch adapted to be operated when the elevator has reached the limit of its movement.

A further object is to provide an improved device of this character, which will be simple and cheap in construction and effective in operation.

To the attainment of these ends and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the various parts hereinafter more fully described and claimed, and shown in the accompanying drawings illustrating an exemplification of the invention, in which,

Figure 1 is an elevation of an elevator having the improvement constructed in accordance with this invention, applied thereto; Fig. 2 is a sectional view on line 2—2 of Fig. 1; Fig. 3 is a sectional view on line 3—3 of Fig. 2; Fig. 4 is a sectional view on line 4—4 of Fig. 2; Fig. 5 is a sectional view on line 5—5 of Fig. 2; Fig. 6 is a sectional view on line 6—6 of Fig. 2; Fig. 7 is a view of the cable and operating drum for the switch; Fig. 8 is a sectional view on line 8—8 of Fig. 2; Fig. 9 is a sectional view on line 9—9 of Fig. 2; Fig. 10 is a perspective view of the operating yoke; Fig. 11 is a perspective view of the link; Fig. 12 is a perspective view of the operating screw hanger and the link support; Fig. 13 is a diagrammatic view showing a portion of the cage and weights and the hoisting drum and cable.

Referring more particularly to the drawings and in which the same reference numerals designate similar parts throughout the several views, the numeral 20 designates

a base, 21 the motor, 22 the motor shaft, 23 a brake pulley on the shaft, and 24, 25 standards on the base.

Journaled between the standards 24, on a shaft 26, is a hoisting cable drum 27, and journaled between the standards 25 on a shaft 28 is a similar drum 29. Secured to the ends of the shafts 26, 28, adjacent the outside of the standards 24—25, are crank disks 30—31, and these disks are connected by pitman rods 32, to cause the cable drums 27—29 to revolve in unison.

Projecting above and supported by the standards 24, are supplemental standards or supports 33 suitably spaced from each other and supported by said supplemental standards is an axle 34, one end of which projects beyond its supporting standard and is preferably reduced, as at 35, and this axle 34 is preferably located above and parallel to the hoisting drum shaft 26. Loosely mounted upon the reduced portion 35, preferably on the outside of the standard is a cable-drum 36, which is held from displacement in any suitable manner, such as by means of a sleeve or collar 37 held in position by means of a screw or bolt 38.

Passing around the drum or pulley 36 is a cable 37 which completely fills the drum. This cable is wound from the outside of the drum toward the center thereof, and the runs thereof pass from the center of the drum in opposite directions and adjacent each other, as shown more clearly in Fig. 7, in order to keep the drum always filled with the cable; the cable being secured to the drum in any suitable manner, such as by means of suitable fastening devices 37^a adjacent the sides of the drum. One end of the cable passes upward over a suitable pulley 38, preferably located at the top of the elevator shaft and is secured by its extremity 39 to an elevator cage or frame 40. The other end passes over a pulley 41 preferably located adjacent the bottom of the well, and is secured by its extremity 42 to the cage or frame 40, preferably adjacent the extremity 39, so that as the cage or frame moves in one direction, the respective end of the cable will be paid off the drum 36, and the other end will be taken up or wound upon the drum, thereby rotating the drum as the cage or frame moves. Supported by the axle 34, preferably adjacent the other standard 33, is a pulley 43 which

rotates loosely thereon. One end of a suitable cable 44 is secured to and supports the cage or frame 40, and passes over a pulley 45 located at the top of the elevator shaft. The body 46 of the cable wraps around the two drums 27—27, and one of the upper runs 47 passes from the drum 29 below and in engagement with the pulley 43, thence upwardly preferably in proximity to and parallel with the end 44, thence over suitable pulleys 48, the free extremity being attached to a suitable counterbalancing weight 49; so that when either the cage or weight descends the other one will ascend.

If desired, a suitable guide or shield 49' may be provided and supported adjacent the peripheries of the drum 36 and pulley 43 to prevent accidental displacement of the cables.

A bracket or hanger 50 is secured to one of the supports 33, preferably adjacent the inner face thereof by means of bolts or screws 51 and journaled in said bracket or hanger is one end of a threaded shaft or screw 52, the other end thereof being journaled in a bracket or support 53 secured to and depending from the axle 34. This end of the shaft or screw is prevented from displacement by means of a suitable screw or bolt 54, the end of which enters a circumferential groove 55 adjacent the extremity of the screw or shaft. The extremity of the other end of the shaft projects beyond the bracket or hanger 50 and secured thereto is a gear-wheel 56, which meshes with a pinion wheel 57 on the hub of the drum 36.

A link 58 is pivotally supported by the bracket 50, by means of a suitable bolt or pin 59 passing through an aperture 60 in the link and a registering aperture 61 in the bracket or hanger 50. The free end of the link is connected to the operating lever 62 of a suitable controller 63 by means of a rod or bar 64 the ends of which are respectively pivotally connected to the link 58 and the controller lever 62. The link 58 is provided with a notch or recess 65 which is preferably located adjacent the free end of the link and communicates with the opening 66 in the body of the link.

A weighted yoke 67 is provided with bearings 68—69 which are adapted to receive the shaft or screw 52 which latter forms a pivotal support for the yoke, the yoke being located preferably between the link 58 and the bracket or hanger 53. One side of the yoke 67 is extended as at 70, for some distance above the bearing 68 and adjacent the free end thereof, is a laterally projecting portion or lug 71 which is adapted to project into the notch or recess 65 of the link 58. Mounted upon the threaded portion of the shaft or screw 52, within and preferably adjacent, the sides of the yoke are nuts 72—73 which are provided on their adja-

cent faces with lateral projections or lugs 74—75, respectively. These nuts 72—73 rotate with the shaft or screw 52, and 76 is a traveling nut or collar which is also mounted on the shaft or screw 52 between the nuts 72—73. The traveling nut or collar is provided with oppositely disposed lateral projections 77—78, arranged on the opposite faces thereof, which are adapted to respectively engage the projections 74—75 on the nuts 72—73, and the nut or collar 76 is prevented from rotation with the screw or shaft 52, by means of a projecting portion 79 engaging a guide or track 80 on the yoke 67.

The controller 63 is connected to the motor 21 by means of suitable connections 82. In operation the cage or frame 40 is raised and lowered by means of the cable 46 and drums 27—29, which latter are operated by the motor in any suitable manner. As the cage or frame ascends or descends, the cable 37 will rotate the drum 36, which in turn rotates the gear 56 through the medium of the pinion 57. The rotation of the gear 56 also rotates the screw or shaft 52 which feeds the traveling nut or collar 76, toward the respective nuts 72—73, which latter rotate with the screw or shaft 52. The nut or collar 76 will continue to travel toward the respective rotating nuts 72—73 until the cage or frame 40 has about reached the limit of its travel, at which time one of the projections 77—78 will engage the respective projections 74—75 and thereby lock the nut or collar 76 with one of these two nuts, so that a further rotation of the shaft or screw 52 will also rotate the traveling nut 76. The rotation of the traveling nut will move the weighted yoke 67 about its pivot, thereby rocking the extended portion 70, which will cause the laterally projecting portion 71 to engage the side of the notch or recess 65 in the link 58, which will rock the link about its pivot 59 to move the link or rod 64, and shift the controller operating lever or switch, and thereby stop the motor and the movement of the cage or frame 40. When the shaft or screw 52 is rotated in the opposite direction, the traveling nut or collar 76 will at once begin to move away from the interlocking nut and the yoke 67 will be brought to its normal position, in which position it will be retained by gravity. It will thus be seen that this stop will automatically operate to check or limit the movement of the elevator cage or frame, and thereby prevent the danger of the cage or frame striking the roof of the shaft or the bottom of the well.

The link 58 is moved by the yoke 67 and has a limited movement regulated by the controller lever while the arm 70 of the yoke is power driven. If it should so happen that the arm or extension 70 of the

yoke continues to move in the direction of the movement of the link after the latter has reached the limit of its movement, the engaging parts would become strained or broken. To overcome this difficulty the link 58 and the yoke 67 are mounted for movement upon different arcs. The link 58 moves through an arc described from the pivotal point of support 59 and the yoke 67 through the arc described from its pivotal support formed by the shaft 52 and the bearings 68—69. These parts are so arranged that the projections 71 will move the link 58 about its pivot until the link 58 has reached the limit of its movement. After the parts have reached this point, should the arm or extension 70 continue to rotate for any reason, in the same direction, the projection 71 will pass out of the notch or recess 65 in the link and will rotate around and within the opening 66 in the link, said opening being of a size to permit such rotation.

In order that the invention might be fully understood, the details of an embodiment thereof have been thus specifically described, but

What I claim as new is:—

1. In a device of the class described, the combination of a motor, a hoisting member, means operated by the motor for moving the member, a controlling element for the motor, a pivotally supported link connected with the controlling element and having a limited forward and backward movement, a countershaft, a weighted member pivotally supported on the countershaft, there being a projection on the weighted member extending into the link, spaced stops on the countershaft and rotatable therewith, and means on the counter-shaft operatively connected with the weighted member and movable by the countershaft for swinging the weighted member, said projection having engagement with the link to move the latter, and adapted to move in the same direction with the link and out of engagement therewith when the latter reaches the limit of its movement.

2. In a device of the class described, the combination of a motor, a hoisting member, means operated by the motor for moving the member, a controlling element for the motor, a pivotally supported link connected with the controlling element and having a limited forward and backward movement, a countershaft, a weighted member pivotally supported on the countershaft, there being a projection on the weighted member extending into the link, spaced stops on the countershaft and rotatable therewith, a traveling member supported directly on the countershaft and having a sliding engagement with the weighted member, and means whereby the countershaft will cause the traveling

member to be moved longitudinally on the countershaft into engagement with one of the stops for rotating the said weighted member, said projection having engagement with the link to move the latter and adapted to move in the same direction with the link and out of engagement therewith when the latter reaches the limit of its movement.

3. In a device of the class described, the combination of a motor, a hoisting member, means operated by the motor for moving the member, a controlling element for the motor, a pivotally supported link connected with the controlling element and having a limited forward and backward movement, a countershaft, a weighted member pivotally supported on the countershaft, there being a projection on the weighted member extending into the link, spaced stops on the countershaft and rotatable therewith, a traveling member supported upon the countershaft and having a sliding engagement with the weighted member, and means whereby the counter shaft will operate directly upon the traveling member to cause it to be moved longitudinally on the countershaft into engagement with one of the stops for rotating the said weighted member, said weighted member being mounted for movement in an arc differing from the arc of movement of the link whereby the said projection will engage and move the link and continue to move in the same direction and out of engagement with the link when the link has been shifted thereby and has reached the limit of its movement.

4. In a device of the class described, the combination of a motor, a hoisting member, means operated by the motor for moving the member, a controlling element for the motor, a pivotally supported link connected with the controlling element and having a limited forward and backward movement, a countershaft, a weighted member pivotally supported on the countershaft, there being a projection on the weighted member extending into the link, spaced stops on the countershaft and rotatable therewith, a traveling member supported directly on the countershaft and having a sliding engagement directly with the weighted member, and means whereby the counter shaft will operate directly upon the traveling member to move it longitudinally on the countershaft into engagement with one of the stops for rotating the said weighted member, said link being of an irregular diameter whereby the projection will move out of engagement with and independently of the link when the latter has reached the limit of its movement.

5. In a device of the class described, the combination of a motor, a hoisting member, means operated by the motor for moving the member, a controlling element for the

motor, a pivotally supported link connected with the controlling element and having a limited forward and backward movement, a countershaft, a substantially U shaped
5 weighted member pivotally supported on the counter shaft, there being a projection of one of the arms of the weighted member extending into the link, spaced stops on the counter shaft and rotatable therewith, a
10 traveling member supported directly on the counter shaft and having a sliding engagement with the weighted member and in a direction longitudinally of the counter shaft, and means whereby the counter shaft
15 will cause the traveling member to be moved longitudinally on the counter shaft into en-

gagement with one of the stops for rotating the said weighted member, said projection having engagement with the link to move the latter and adapted to be moved in the
20 same direction with the link and out of engagement therewith when the latter reaches the limit of its movement.

In testimony whereof I have signed my name to this specification, in the presence of
25 two subscribing witnesses, on this 12th day of December A. D. 1906.

HUGO W. FORSLUND.

Witnesses:

FRANCIS A. HOPKINS,
CHAS. H. SEEM.

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