

(No Model.)

F. B. GRAVES.
SLACK CABLE STOP.

No. 385,754.

Patented July 10, 1888.

Fig. 1.

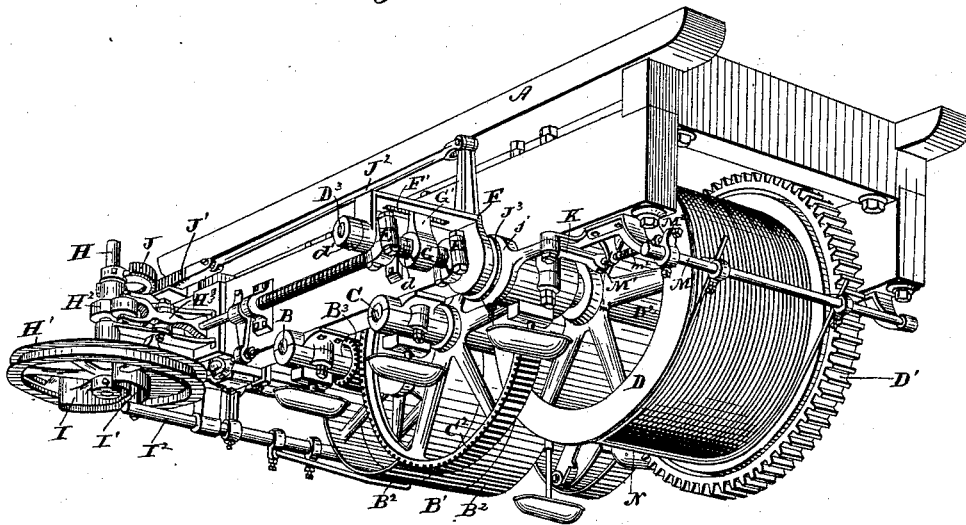
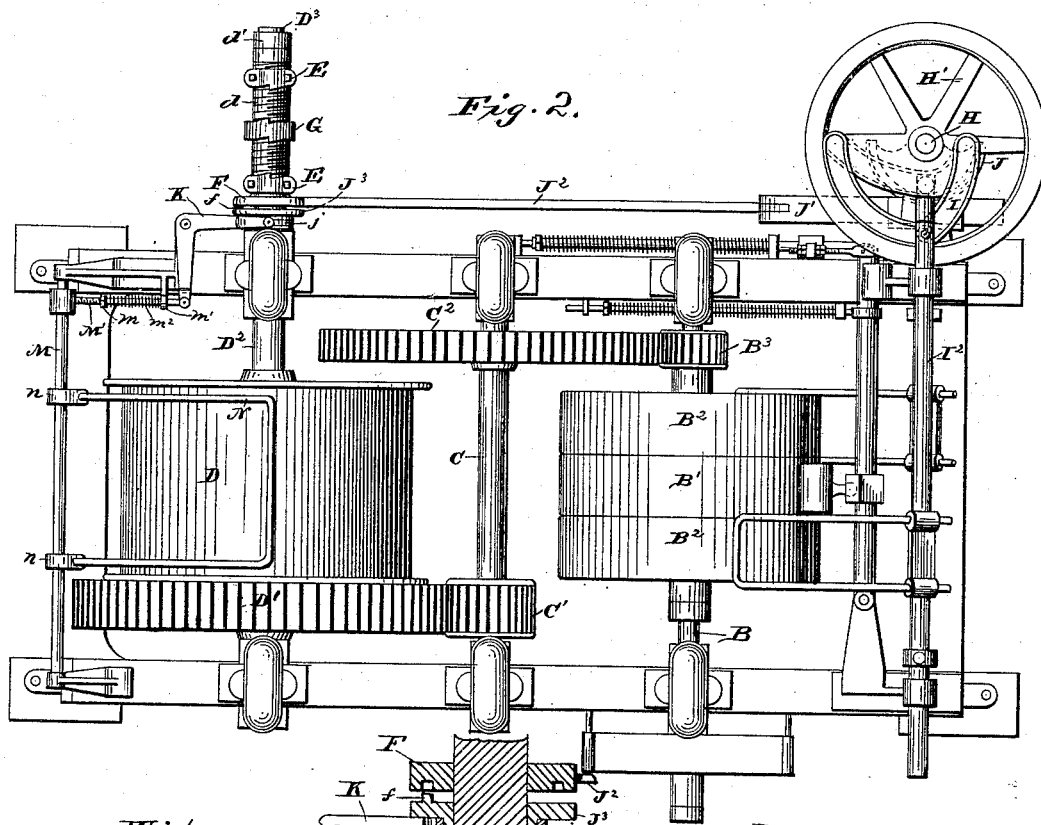


Fig. 2.



Witnesses.
Chas. R. Burr.
A. J. Stewart.

Inventor.
Fred. B. Graves.
By Church & Church
his Attorney.

UNITED STATES PATENT OFFICE.

FRED B. GRAVES, OF ROCHESTER, NEW YORK, ASSIGNOR TO L. S. GRAVES & SON, OF SAME PLACE.

SLACK-CABLE STOP.

SPECIFICATION forming part of Letters Patent No. 385,754, dated July 10, 1888.

Application filed March 26, 1888. Serial No. 269,587. (No model.)

To all whom it may concern:

Be it known that I, FRED B. GRAVES, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Slack-Cable Stops for Elevators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

My present invention relates to improvements in slack-cable stops for elevators, particularly to that class adapted to be applied to the ceilings of rooms, and to hang suspended therefrom, and it has for its object to improve and cheapen their construction and simplify their operation; and it consists in certain novel combinations of parts hereinafter described, and pointed out particularly in the claims at the end of this specification.

In the drawings, Figure 1 is a perspective view of a hoisting-machine with my invention applied thereto; Fig. 2, a bottom plan view of the machine, showing more clearly the details of my improvement. Fig. 3 is an enlarged sectional view of the clutch of the automatic stop mechanism.

Similar letters of reference in the several figures indicate the same parts.

It is well known that frequently serious accidents result from the arrest of elevators while descending while the suspending-cable is continually unwinding, leaving the car suspended at the mercy of the obstruction, and devices known as "slack-cable stops" have been provided for the purpose of preventing these by arresting the motion of the cable-containing drum, and my present invention is designed to provide an improved device for this purpose.

The construction of the hoisting-machine to which the invention is shown herein applied forms no part of the invention, except in so far as specified in the claims, and I do not deem it necessary to enter into a minute description of all the operative parts thereof.

A in the drawings represents the main frame or base, adapted to be secured to the ceiling of a room, and provided with suitable bearings and journals for the operating-shafts. Near

one end said frame and supported in bearings is a shaft, B, on which run the fast and loose pulleys B' B², adapted to be driven by suitable belts from the prime mover in the ordinary manner.

C represents an intermediate counter-shaft, having pinions C' C², gearing with pinion B³ on shaft B and gear D', formed on the winding-drum D, as shown. The shaft D², on which the drum D is mounted, is provided on one end with an extended portion, D³, threaded at d, and upon this threaded portion are secured two two-part nuts or stops, E E, capable of being adjusted, but normally held clamped a certain distance apart, regulated by the height of the building and length of cable employed.

On the outer end of the drum-shaft is secured a collar, d', and between this and the outer of the stationary nuts is hung one end of a vibratory frame, F, the other end being hung upon the shaft between the inner stationary nut and the bearing of the main frame, and on the threaded portion between the stops E E is arranged a movable threaded nut, G, having an extension, G', entering a slot, F', in the vibratory frame, the latter being of such length as to permit the free movement of the nut while traveling until it strikes one or the other of the stops E.

At the end of the frame opposite the drum is provided a short shaft, H, on which is mounted the hand-rope wheel H', to which is connected the hand-rope, which runs in proximity to the car, and is manipulated by the operator to control the operation of the machine. On one side this wheel is located the cam I, operating through projection I' upon rod I², to which the belt-shifters are connected. To the shaft H' is connected a cam, H², adapted to move the end of a lever, H³, carrying a brake arranged to be applied to the fast pulley or its shaft when operated in one direction. The extreme of the shaft is provided with a sector J, engaging a rack, J', arranged to slide in suitable guides, and connected by a rod, J, with the extension of the vibrating frame F, as shown.

From the above it will be seen that the operator normally controls the movements of the elevator by the hand-rope, operating the belt-shifter and pulley-brake; but as the nut G

caused to travel in one or other direction, according to the direction of movement of shaft, when the extreme of the movement of the car is reached, said nut will strike one of the stops 5 and be prevented from further rotation. This will cause the rotation of the nut, and through its extension the vibration of frame F, causing the latter to operate the connecting-rod, rack, sector, and shaft H, turning the latter so as to 10 cause its cam to shift the belt to or from the loose pulley and stop the unwinding or winding of the cable, as the case may be.

On the side of the inner extension of frame F are provided teeth or projections *f*, forming 15 one section of a clutch adapted to engage corresponding teeth on a clutch-section, *J*², connected to the shaft *D'*, so as to rotate therewith, by a spline-and-groove connection, and capable of a reciprocating motion thereon, so as to 20 be engaged and disengaged when desired. A groove is formed in section *J*², in which is located a collar, *j*, connected to one arm of a bell-crank lever, *K*, pivoted on the frame, the other arm being connected with shaft *M* by 25 means of a link, *M'*, secured to an adjustable projecting arm, *M*², attached to the shaft. The link is provided with a thread for a portion of its length, on which is an adjustable nut, *m*, 30 and between this nut and a perforated projection, *m'*, in the main frame, through which the link passes, is a spring, *m*², operating to move the link in a direction to throw the clutch out of engagement.

Projecting slightly downward from the shaft, 35 and extending under the winding-drum and in close proximity to its surface, is a U-shaped frame, *N*, rigidly attached to said shaft by means of the collars *n n* shown, or other suitable fastening device. The relation which this 40 frame bears to the bell-crank and shaft is such that a movement of the former away from the drum will cause the engagement of the clutch-section, while a reverse movement caused by the spring *m*² will unclutch them. 5 From the above the operation of this device will be apparent.

Under normal conditions the frame *N* is close to the drum supported upon spring *m*² and the clutch uncoupled; but if it should happen that while the drum is unwinding and the car descending the latter should be caught, allowing the cable to hang in a loop from the drum, or if the coils of cable should from any cause be wound upon each other, and thus project from the drum's surface, they would, upon striking the frame *N*, depress it against spring *m*², and through the link and bell-crank move the rotating clutch-section *J*² into engagement with the side of the vibrating frame F, causing the vibration of the latter, and through the connecting-rod, rack, sector, and shaft H causing the shifting of the belt, application of the brake, and a stoppage of the machine.

Upon the removal of the coil of the cable from the frame the spring *m*² returns it to normal position, unclutching the sectors *J*

and F, and permitting the normal control of the machine by the manipulation of wheel H'. The device above described is simple, easily applied, and I have found it admirably adapted 75 for the purpose.

Of course numerous modifications will occur to those skilled in the art, and I do not desire to be limited more than is specified in the 75 claims.

Having thus described my invention, what I claim as new is—

1. In a hoisting-machine, the combination of the starting and stopping mechanism, the 80 winding-drum, the shaft for the same, having the portion extending beyond the bearing, the vibrating frame hung loosely thereon, having the clutch-teeth on one side and connected to the starting and stopping mechanism, the 85 movable clutch-section mounted upon the drum-shaft, the bell-crank lever connected with said clutch-section, the shaft arranged parallel with the drum, the frame mounted on said shaft and held close to the drum, and 90 the connecting-link between the frame-shaft and bell-crank, substantially as described.

2. The combination of the starting and stopping mechanism, the winding-drum, the shaft 95 for the same, having the threaded portion and extending beyond the bearing, the vibrating frame having a longitudinal slot and clutch-teeth hung loosely on said shaft, the stops secured on the shaft, the movable nut mounted on the threaded portion, arranged to travel 100 between the stops and having a projection entering the slot in the vibrating frame, connections between the frame and the starting and stopping mechanism, a movable clutch-section on the drum-shaft, the bell-crank connected thereto, the shaft extending parallel 105 with the drum, the frame mounted thereon, extending close to the periphery of the drum, and a connecting-rod between the bell-crank and the shaft, whereby a movement imparted 110 to the end of the frame will throw the clutch into engagement, substantially as described.

3. The combination of the starting and stopping mechanism, the winding-drum, the shaft 115 for the same, having the portion extending beyond the bearing, the vibrating frame hung loosely thereon, having the clutch-teeth on one side and connected to the starting and stopping mechanism, the movable clutch-section mounted on the drum-shaft, the bell-crank 120 lever connecting with said clutch-section, the shaft arranged parallel with the drum, having the short arm, the rod connected to said arm and to the bell-crank, having the nut thereon, the projection from the frame and 125 the spring interposed between the projection and nut, and the frame attached to said last-mentioned shaft and projecting in close proximity to the drum-surface, substantially as described.

FRED B. GRAVES.

Witnesses:

Z. L. DAVIS,
LORENZO S. GRAVES.