No. 830,944. PATENTED SEPT. 11, 1906.

J. J. WESTBROOK.

SLACK CABLE STOP FOR ELEVATORS.

APPLICATION FILED MAY 4, 1906.

3 SHEETS—SHEET 1.

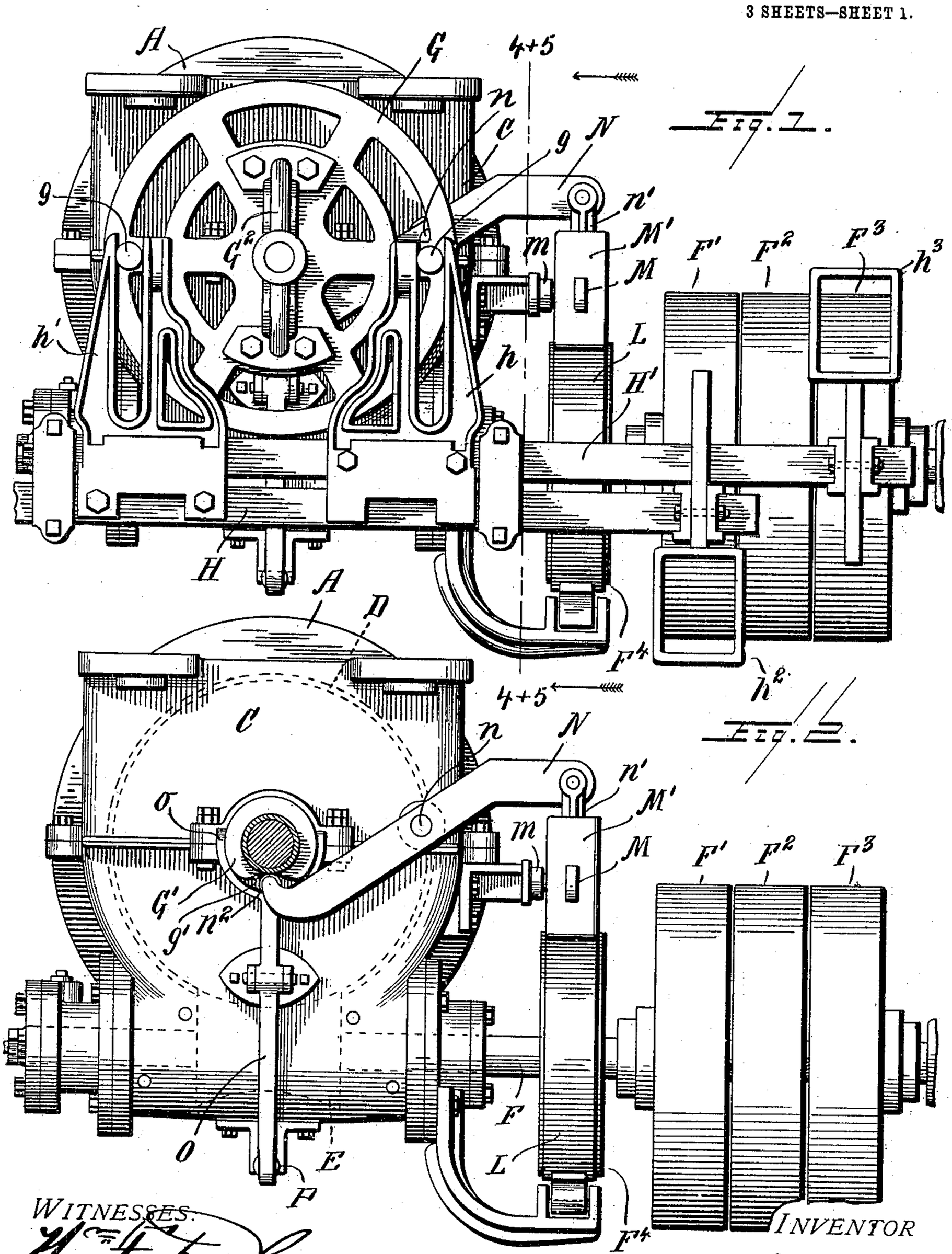

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Fig. 4.

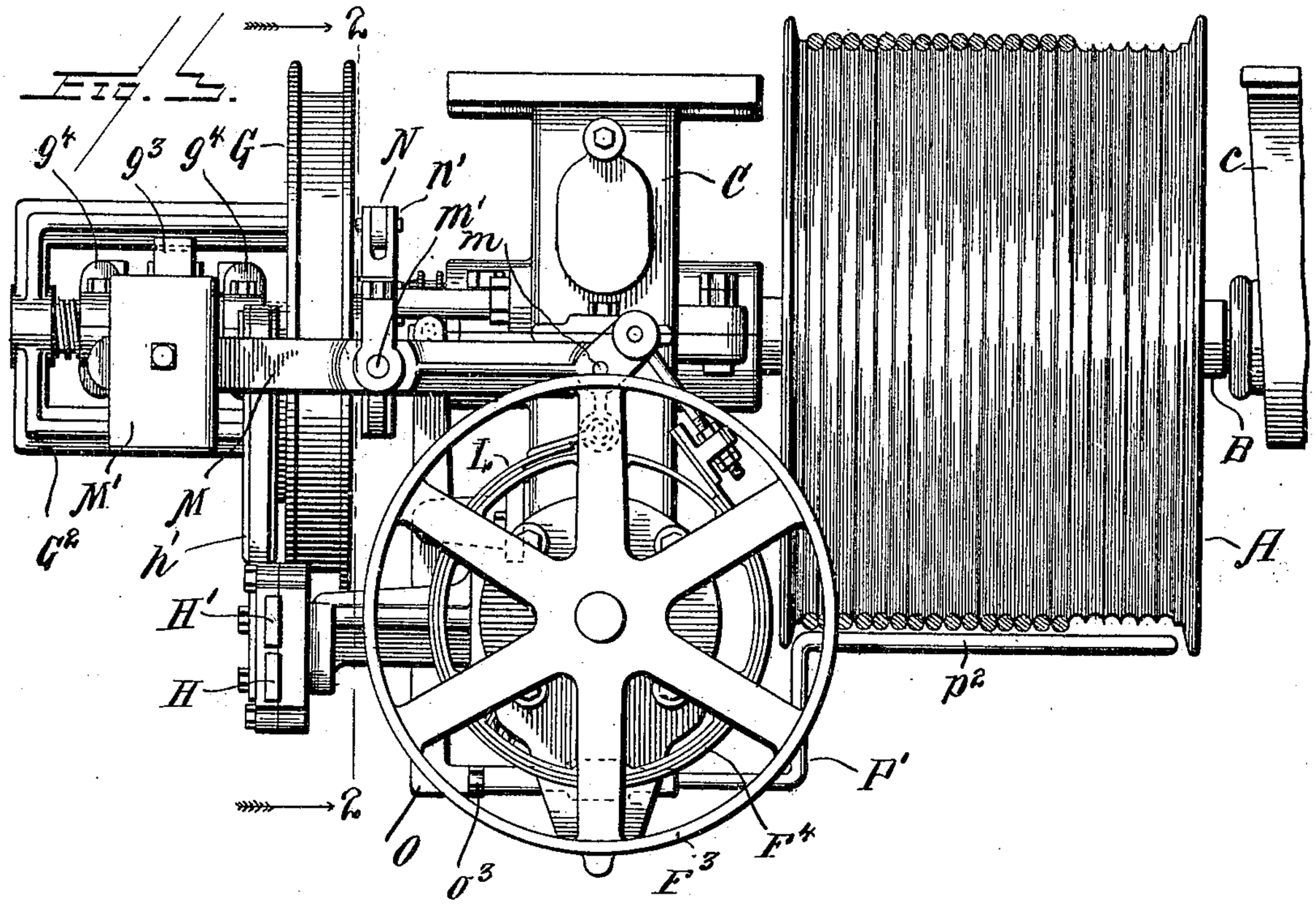
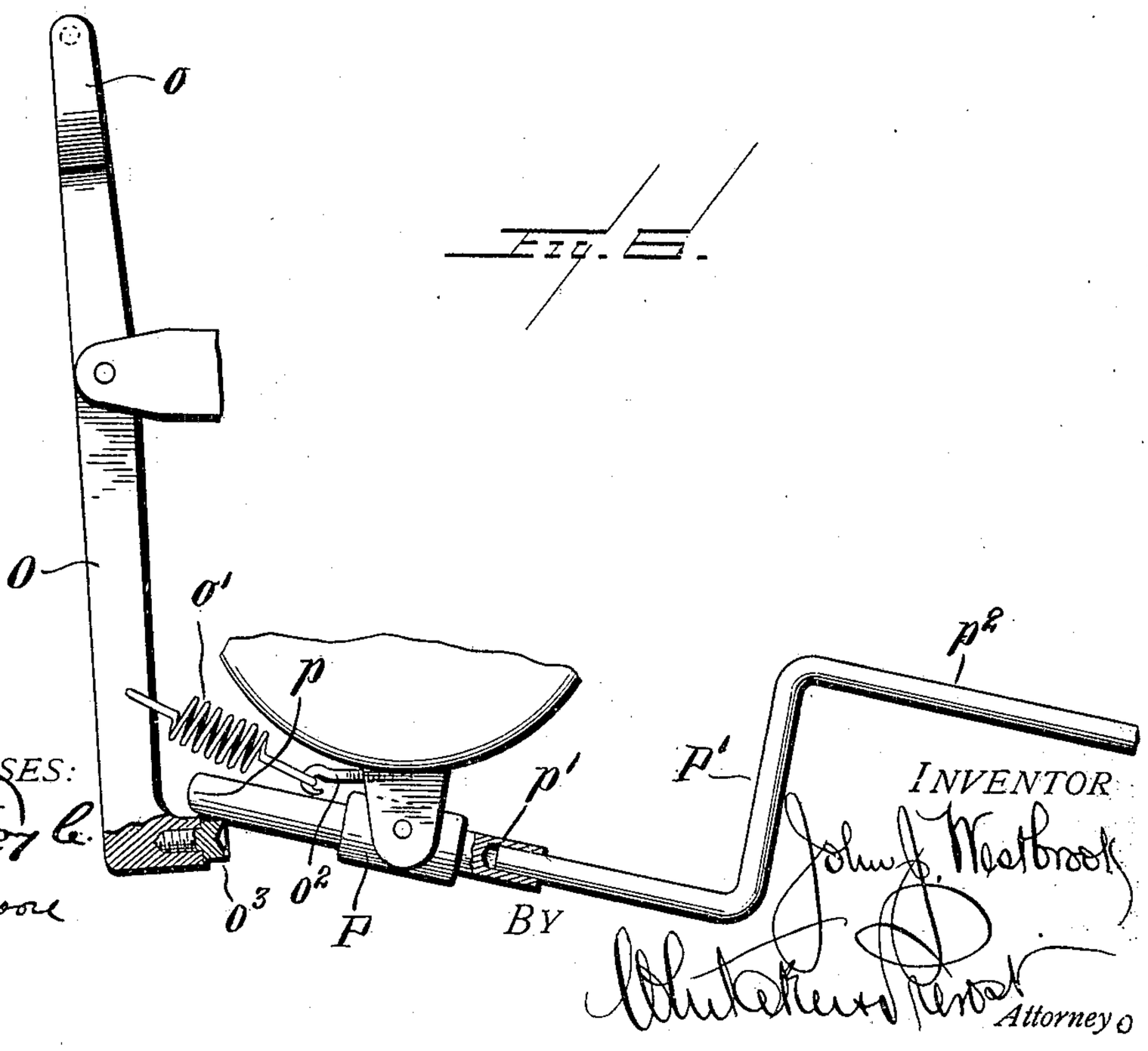


Fig. 5.



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3 SHEETS—SHEET 3.

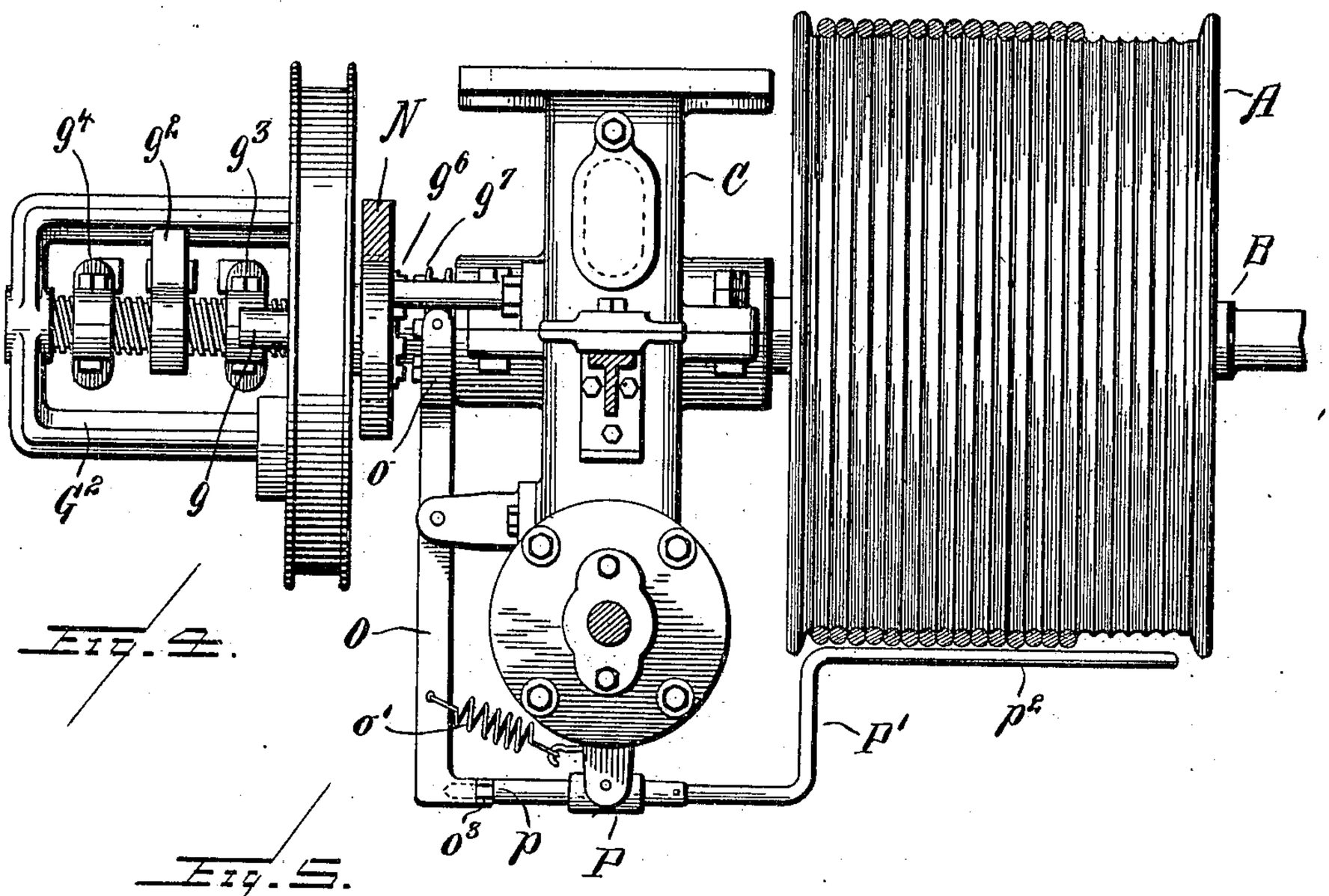
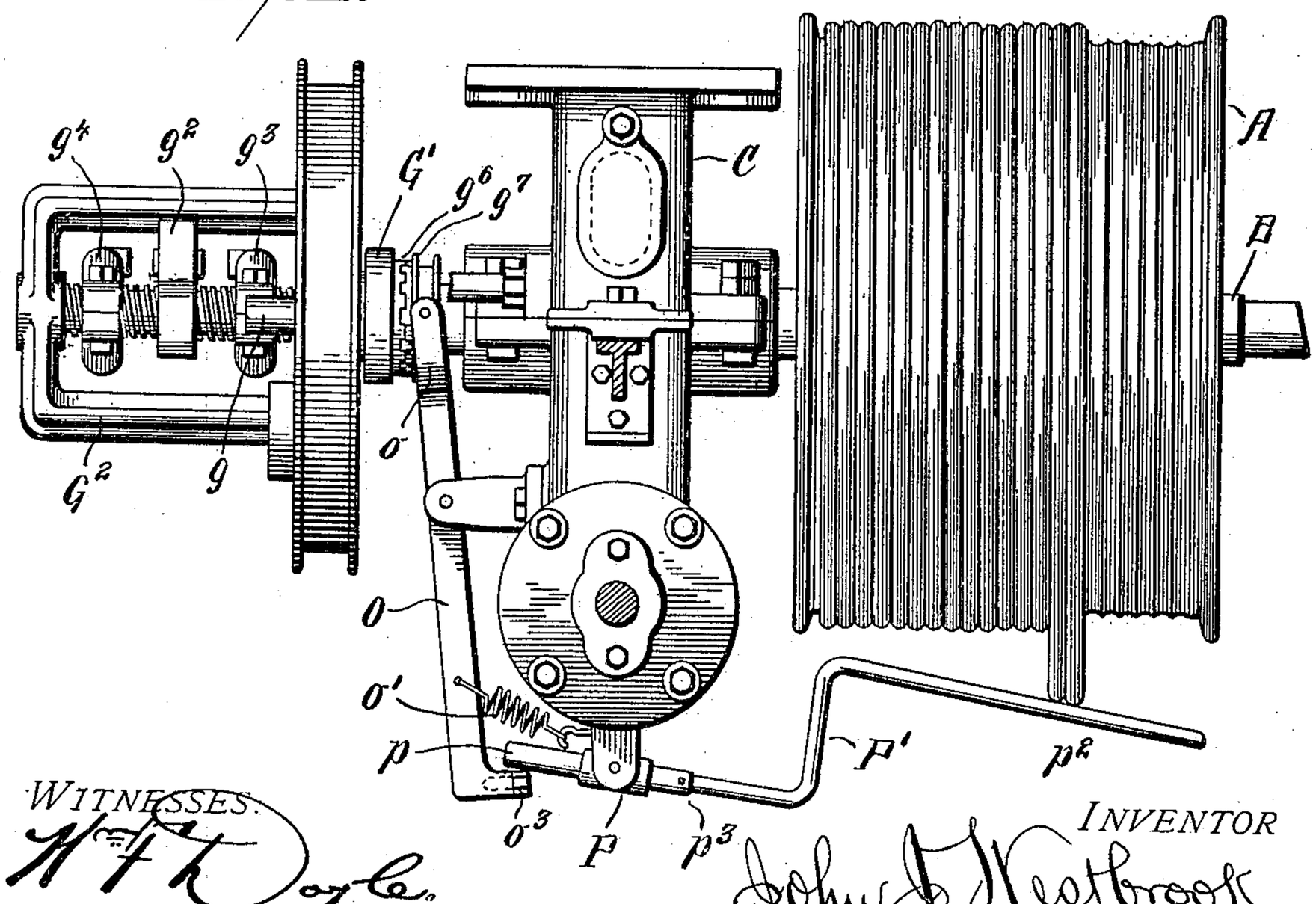


Fig. 4.

Fig. 5.



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SLACK-CABLE STOP FOR ELEVATORS.

No. 830,944. Specification of Letters Patent. Patented Sept. 11, 1906.

Application filed May 4, 1906. Serial No. 315,197.

To all whom it may concern:

Be it known that I, JOHN J. WESTBROOK, a citizen of the United States, residing at Danville, in the county of Pittsylvania and State of Virginia, 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 invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consist in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 represents a side elevation of a winding mechanism for elevators embodying my invention. Fig. 2 is a sectional view taken transversely of the drum-shaft in rear of the flier-wheel, as indicated by line 2 2 in Fig. 3. Fig. 3 is a front elevation of the mechanism. Fig. 4 is a sectional view on line 4 4 of Fig. 1. Fig. 5 is a sectional view on line 5 5 of Fig. 2. Fig. 6 is an enlarged detail of the slack-cable-operated lever, the clutch-operating lever, and the operating-spring for the latter.

The object of my invention is to provide a simple and efficient mechanism for stopping the elevator-operating mechanism in case the car or the counterweight in its descent encounters an obstacle which arrests it. The result of the stoppage of the car is that the supporting cable or cables will continue to unwind if the operating mechanism be not thrown out of operation, and should the weight of the car overcome the obstruction and fall the shock would in most cases break the cable and cause the car to plunge to the bottom of the shaft.

By my invention I provide a construction by means of which the operating mechanism will be stopped almost instantly in case the downward movement of the car is arrested or in case for any other reason the suspending-cable becomes slack, and the mechanism is so constructed that it can be readily adapted to drums of different diameters or width of face and applied to different types of elevators having a winding-drum without altering the main elements of the mechanism, as will hereinafter more fully appear.

In the drawings I have shown a belt-driven winding mechanism for elevators with which my improved slack-cable device is preferably employed; but it may also be used with other forms of winding mechanism, such as electrically-operated elevators, &c.

In the apparatus shown, A represents the winding-drum mounted on the drum-shaft B, which is supported in bearings in the casing C and in an exterior bearing *c*, said bearing and casing being preferably supported from suitable overhead beams or girders in any desired manner. Within the casing C is a worm-wheel D, (indicated in dotted lines in Fig. 2,) mounted on shaft B and engaging a worm E, (also indicated in Fig. 2 in dotted lines,) mounted on the driving-shaft F, which is mounted in suitable bearings provided in the casting and is provided with three pulleys F′ F² F³. The central pulley F² is fast on the shaft, and the two other pulleys are loose and are adapted to be driven in opposite directions by belts which may be shifted onto the fast pulley to drive the apparatus in either direction.

The belt-shipping apparatus comprises a "flier-wheel" G, mounted loosely on the drum-shaft B and provided on its outer face with oppositely-disposed studs (or friction-rolls) *g*, engaging slots in brackets *h h′*, secured, respectively, to sliding shipper-bars H H′. The bar H carries a belt-shipper h^2 for pulley F′, and the bar H′ carries a belt-shipper h^3 for pulley F³. It will thus be seen that the movement of the flier-wheel in either direction will operate one of the belt-shippers and start the mechanism in one direction, and the movement of the flier-wheel back to the position shown in Fig. 1, which I will term "median position," will throw whichever belt was upon the fast pulley back upon its loose pulley and stop the apparatus. The operation of the flier-wheel also throws into and out of operation a brake mechanism to secure a prompt stopping of the mechanism and prevent it from continuing its operation by inertia. The driving-shaft F is provided with a brake-wheel F⁴, around which is a brake-band L, operatively connected to the brake-lever M, which is pivoted near one end at *m* to the casing and is provided at its opposite or outer end with a weight M′, tending to apply the brake.

N is a brake-controlling lever pivoted near its center at *n* to the casing C and having its upper end connected by a link *n′* to the brake-lever M at *m′* and its lower end pro-

vided with a friction-roll n^2, which engages a cam G′, forming part of or connected operatively with the flier-wheel G. This cam has a recess g', which engages the roll n^2 when the flier-wheel is in its median position, thus allowing the weight M′ on brake-lever M to apply the brake. When the flier-wheel is turned in either direction, the roller n' rides up a cam-grade, thus lifting the brake-lever M and releasing the brake.

The flier-wheel is provided with a yoke G^2 for guiding a traveling block g^2 on a threaded portion of the drum-shaft, and upon said threaded portion are clamped the usual automatic stops g^3 g^4 for throwing the flier-wheel when the elevator-car reaches the top or bottom of the shaft.

The flier-wheel or some part connected therewith (in this instance the cam G′) is provided with a clutch member, (indicated at g^6,) and a movable clutch member g^7 is arranged adjacent thereto and is preferably mounted on a spline or feather on the shaft B.

O represents a pivoted clutch-operating lever provided at its upper end with a yoke o, engaging the movable clutch member g^7 and provided adjacent to its lower end with a spring o', which tends to throw the movable clutch member into engagement with the clutch member carried by the flier-wheel. This spring is connected to an adjustable screw-hook o^2 or other device by means of which its tension may be adjusted.

Adjacent to the lower end of the clutch-lever O, I provide a trip-lever P, pivoted to a stationary part of the apparatus (in this instance the casing C) and so constructed that the lever O can be moved so as to separate the clutch members g^6 g^7 and locked in that position by the trip-lever P. To provide for a practically instantaneous disengagement of the parts O and P, I prefer to provide one with a concave socket to engage a convex portion of the other, so that when they have been moved slightly out of engagement the pressure of the spring o' will cause them to separate quickly. In this instance I have shown the lever O provided with an angular projection at its lower end, which carries an adjustable screw o^3, the head of which is recessed or concave, and the end p of the trip-lever P is convex or rounded to engage this recess in the screw o^3.

The lever P is preferably formed of cast-iron and is provided at the end opposite that which engages the clutch-lever with a recess p' to receive a trip-arm P′, which I form, preferably, of wrought-iron and which is made to conform to the particular winding-drum with which it is to be used. The trip-arm P′ has a portion p^2, which extends across the lower portion of the face of the drum between the flanges and lies as closely as possible to the cable-coils thereon as is possible without touching them, as shown in Figs. 3 and 4. The trip-arm P′ is secured to the trip-lever P by inserting it in the recess p' of the latter and securing it by a set-screw p^3.

It will be noted that by making the trip-lever P and trip-arm P′ separately the trip-lever and the clutch-lever O can be made of one size and pattern for all sizes of machines, and the trip-arm can be bent to the proper form to suit the particular drum with which it is to be used and then secured to the trip-lever.

By reference to Fig. 5 it will be seen that should the cable become slack for any reason, as by the arresting of the car in its downward movement, the weight of any slack coil will depress the trip-arm P′ and instantly disengage the trip-lever P and clutch-operating lever O, when the spring o' will cause the clutch-lever to throw in the clutch member g^7 and operate the flier-wheel in the direction in which the drum-shaft is moving at the time, thus returning the flier-wheel to median position, and thereby, as previously described, throwing off the driving-belt to its loose pulley and allowing the brake to be applied, thus almost instantaneously stopping the mechanism and preventing the unwinding of the cable. After the slack-cable stop mechanism has been operated it is necessary to pull out the lower end of clutch-lever, reverse the travel of the winding mechanism until the slack is taken out of the cable, when the trip-the lever P may be placed in engagement with clutch-lever and will hold it out of operation until the cable again becomes slack. Should the counterweight of the elevator meet any obstruction in its descent or should the trip-arm P′ through any cause or by accident become disengaged from the clutch-operating lever O, the clutch-lever will be thrown over by spring o' and operate the belt-shippers, as previously described, or, in other words, this slack-cable-stop mechanism will stop the mechanism when the car is moving either up or down should the trip-arm P′ be tripped.

While I have shown my invention applied to one form of double belt-elevator-winding mechanism, it may also be used in connection with other forms than that shown, and it can also be used with single belt-winding mechanism and with direct-connected engine-winding mechanisms by simply varying the connections from the flier-wheel which serve to shut off or disconnect the power. This invention is also applicable to electric elevators, in which case the flier-wheel instead of being operatively connected to belt-shipping mechanism, as herein shown, is connected with an electric controller for the motor which actuates the winding-drum.

What I claim, and desire to secure by Letters Patent, is—

1. In a slack-cable stop for elevator mechanism, the combination with the flier-wheel, a clutch mechanism therefor provided with a

movable member, a clutch-operating lever connected with said movable clutch member, a spring for moving said movable member into operative position and a trip-lever having a part engaging said clutch-lever and a part in position to be engaged by a slack portion of the cable, substantially as described.

2. In a slack-cable stop for elevator mechanism, the combination with the flier-wheel, a clutch mechanism therefor provided with a movable member, a clutch-operating lever connected with said movable clutch member, a spring for moving said movable member into operative position and a trip-lever having a part engaging said clutch-lever, and a part in position to be engaged by a slack portion of the cable, the engaging portions of said trip-lever and clutch-lever being the one convex and the other concave, to form a socket to receive said convex part, substantially as described.

3. In a slack-cable stop for elevator mechanisms, the combination with the flier-wheel, a clutch mechanism therefor provided with a movable member, a clutch-operating lever connected with said movable clutch member, a spring for moving said movable member into operative position and a trip-lever having a part engaging said clutch-lever, and a separate trip-arm having a portion arranged in position to be engaged by a slack portion of the cable, and rigidly secured to said trip-lever, substantially as described.

4. In a slack-cable stop for elevator mechanisms, the combination with the flier-wheel, a clutch mechanism therefor provided with a movable member, a clutch-operating lever connected with said movable clutch member, a spring for moving said movable member into operative position and a trip-lever having a part engaging said clutch-lever and having a recess in its opposite end, a separate trip-arm having a portion constructed to lie within the flanges of the winding-drum of the elevator mechanism, and having its opposite end secured in the recess in said trip-lever, substantially as described.

5. In a slack-cable stop for elevator mechanism, the combination with the flier-wheel, a clutch mechanism therefor provided with a movable member, a clutch-operating lever connected with said movable clutch member, a spring for moving said movable member into operative position and a trip-lever having a part engaging said clutch-lever and a part in position to be engaged by a slack portion of the cable, one of the engaging portions of said trip-lever and clutch-lever being adjustable with respect to the part to which it is secured, substantially as described.

6. In a slack-cable stop for elevator mechanism, the combination with the flier-wheel, a clutch mechanism therefor, a clutch-operating lever, a spring connected therewith for throwing the clutch mechanism into operative position, said lever being provided with an adjustable screw having a concave seat, a pivoted trip-lever having a convex portion for engaging said concave seat to hold the clutch-lever and clutch out of operative position, said lever being provided with a recess at its other end, and a trip-arm having a part engaging said recess and a part bent to extend across the face of the winding-drum of the elevator mechanism and between the flanges thereof, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN J. WESTBROOK.

Witnesses:
W. J. WESTBROOK,
STANLEY W. SCOTT.