(No Model.) 2 Sheets—Sheet 1.

E. W. HOUSER.

BELT SHIFTER FOR ELEVATORS.

No. 401,951. Patented Apr. 23, 1889.

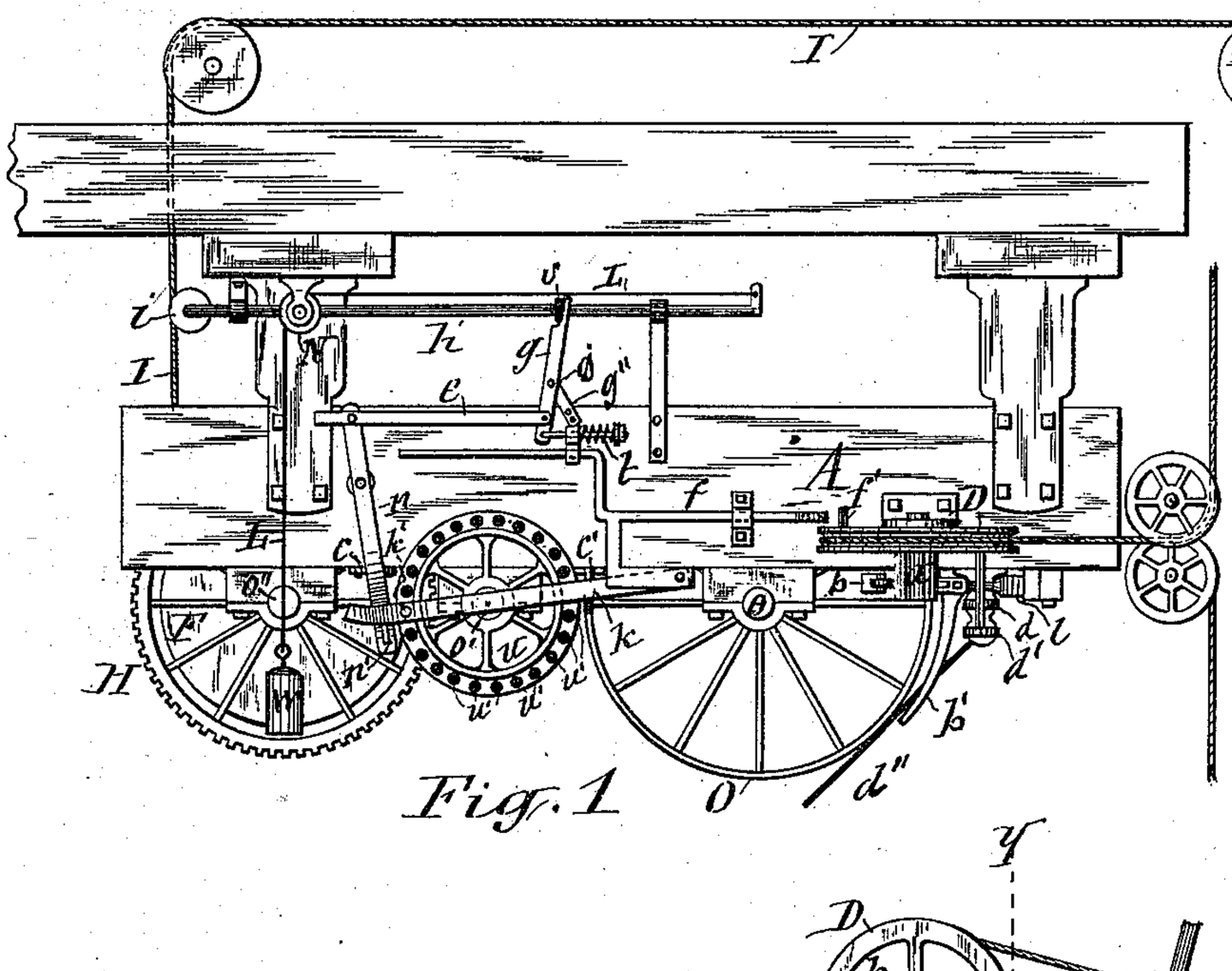

Fig. 1

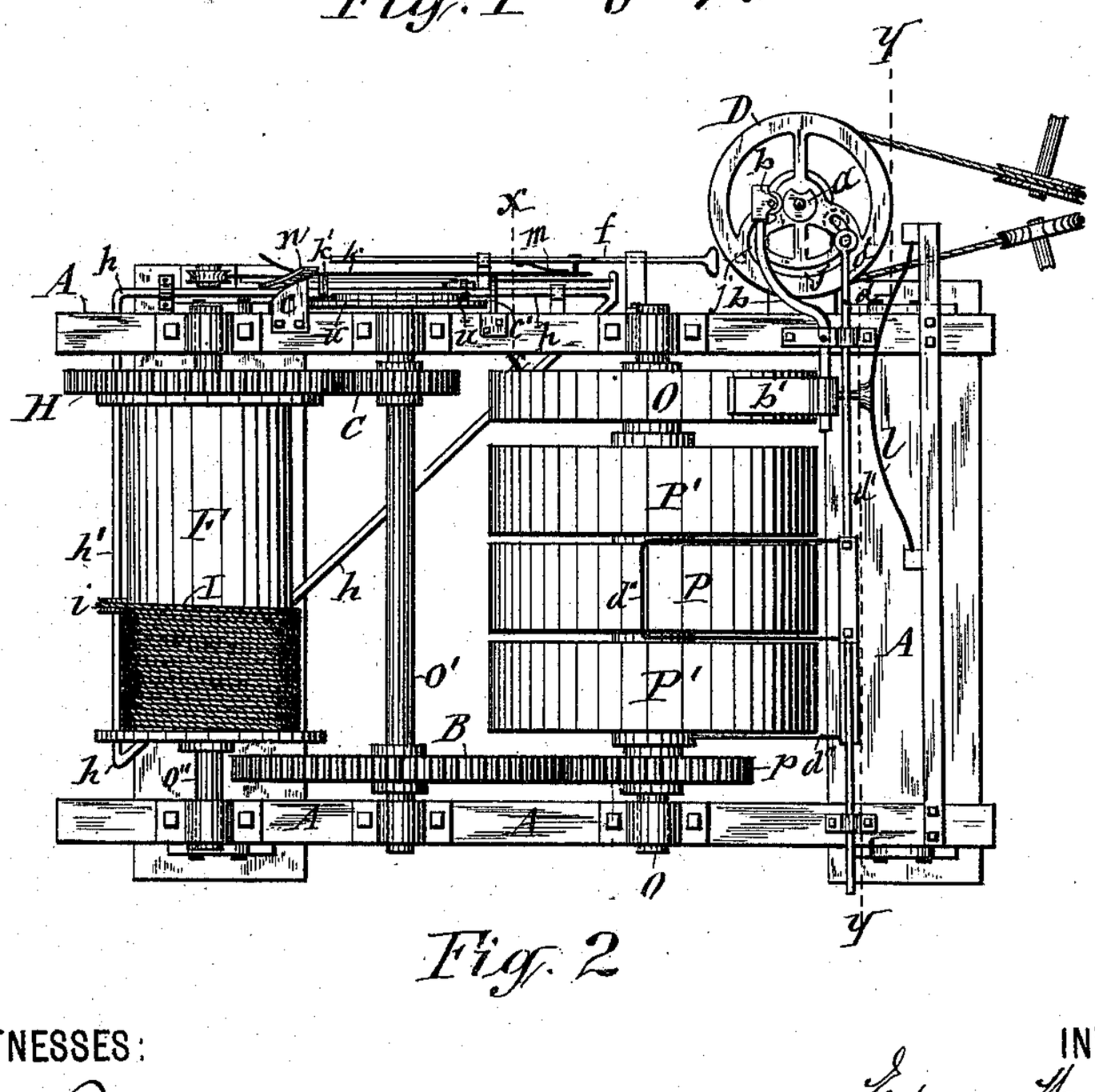

Fig. 2

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H. M. Seamans.

INVENTOR

Edgar W. Houser

BY

Duell, Laasi & Duell

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

E. W. HOUSER.

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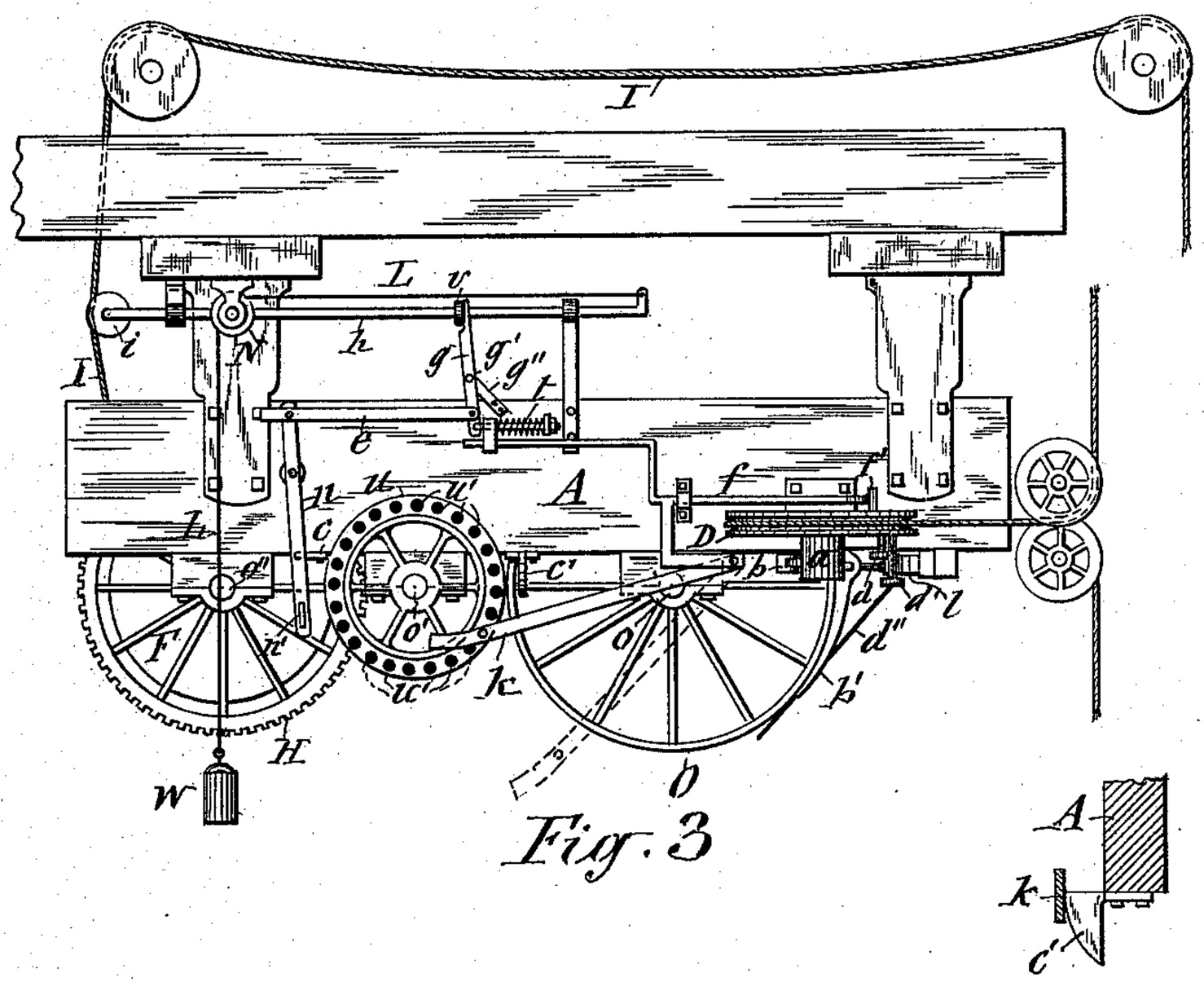

Fig. 3

Fig. 4

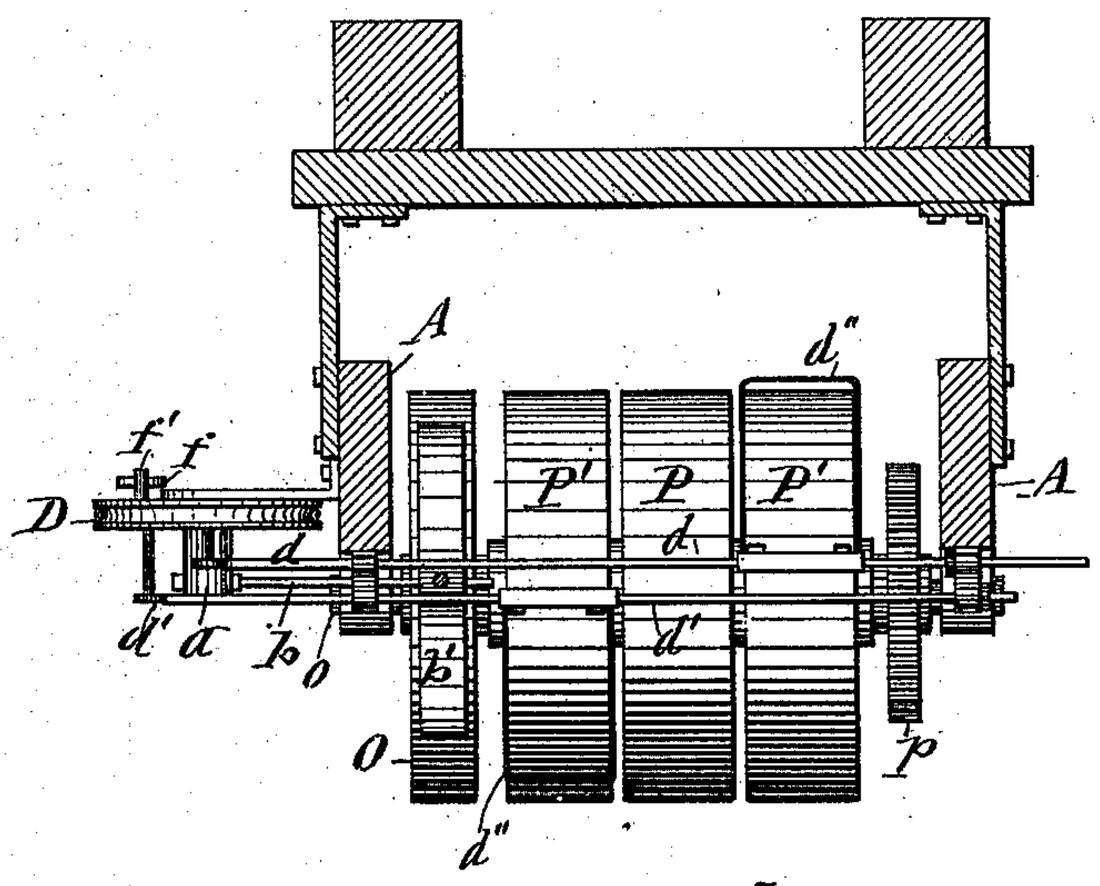

Fig. 5

WITNESSES:

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UNITED STATES PATENT OFFICE.

EDGAR W. HOUSER, OF SYRACUSE, NEW YORK.

BELT-SHIFTER FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 401,951, dated April 23, 1889.

Application filed January 30, 1889. Serial No. 298,086. (No model.)

To all whom it may concern:

Be it known that I, EDGAR W. HOUSER, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Belt-Shifters for Elevators, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in improved devices for automatically shipping the driving-belts from the driving-pulleys onto the two loose pulleys and simultaneously setting the brake to stop the motion of the hoisting mechanism in case the elevator car or platform becomes accidentally arrested in its descent, thereby preventing undue slack and entanglement of the cable and obviating the danger of its being caught between the gears and cut thereby.

In the annexed drawings, Figure 1 is a side elevation of the hoisting mechanism of an elevator embodying my invention, and showing the same in its normal condition. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation showing the operation of the automatic belt-shifter and brake. Fig. 4 is an enlarged transverse section on line *x x*, Fig. 2; and Fig. 5 is a vertical transverse section on line *y y*, Fig. 2.

Similar letters of reference indicate corresponding parts.

A represents the frame on which the hoisting mechanism is mounted. Said mechanism may be of any well-known form, and I do not limit myself specifically in this respect. The mechanism here selected for an illustration of my invention consists, mainly, of the driving-shaft *o*, on which are mounted the tight pulley P, loose pulleys P′ P′ at opposite sides of said tight pulley, the brake-pulley O, and pinion *p*. A counter-shaft, *o′*, which is parallel with the shaft *o*, has affixed to one of its ends the gear-wheel B, meshing with the pinion *p*, and to the opposite end of said counter-shaft is secured a pinion, C, and parallel with the counter-shaft is the shaft *o″*, to which is attached the drum F, having secured to one of its ends a gear-wheel, H, which meshes with the pinion C of the counter-shaft.

I denotes the hoisting-cable, which is secured at one end to the drum F and wound upon the same.

d and *d′* are two rods which are parallel with the shaft *o*, and are mounted movably longitudinally in boxes secured to the frame A. To these rods are attached yokes *d″*, through which the driving-belts run. Said rods are arranged one over the other, and in order to show both rods the upper rod is shown broken away at a point near the shipping-wheel D in Fig. 2 of the drawings. They are moved to carry the belts onto the desired pulleys, P or P′, by means of the belt-shipper or shipping-wheel D, which is pivoted to a suitable support on the frame A, and is formed with a cam-slot, *j*, into which project pins, connected, respectively, to the rods *d d′*. The cam-slot is of such a contour that by turning the shipping-wheel D into a certain position the rods *d d′* are moved to carry either belt onto the tight pulley P and the other belt onto one of the loose pulleys P′, and by turning the shipping-wheel from the aforesaid position both belts are shifted onto the two loose pulleys.

b represents the brake-lever, which is pivoted to the frame A between the brake-pulley O and shipping-wheel D, and has secured to it the brake-shoe *b′*, facing the said brake-pulley.

In connection with the aforesaid shipping-wheel D, I employ a safety-shipper and automatic brake, which consists of the following mechanisms: To the hub of the shipping-wheel D is rigidly attached a cam, *a*, across which the free end of the brake-lever *b* lies, and is held in contact therewith by means of a spring, *l*, which is suitably supported on the frame A and presses the brake-shoe *b′* toward the brake-pulley O. The cam *a* has its greater portion of cylindrical shape, and is provided with a recess in its periphery, and stands in such a position in relation to the cam-groove *j* of the shipper D that when the latter is turned to throw either belt onto the tight pulley the cylindrical portion of the cam *a* crowds the brake-lever in opposition to the spring *l* and holds the brake-shoe *b′* out of contact with the brake-pulley O, and when the shipper D is turned to throw both belts onto the two loose pulleys the bearing of the lever *b* comes in the recessed portion of the cam *a* and nearer to the axis of the latter, and thus allows the brake-lever to be crowded toward the brake-

pulley and press the brake-shoe b' against the same by the force of the spring l. To the end of one of the shafts of the hoisting mechanism, preferably to the counter-shaft o', (which revolves faster than the drum F,) is firmly secured a wheel, u, which is provided with a series of suitable catches, u' u', arranged in a circle concentric with the axis of said wheel. Said catches are represented in Fig. 1 of the drawings of the form of sockets in the side of the wheel.

To the shipping-wheel D is rigidly attached a lug, f', and in suitable boxes secured to the frame A slides a rod, f, in range with the aforesaid lug. To the said rod is hinged a push-bar, k, which is extended across the side of the wheel u, provided with the sockets or catches u' u', and from the said push-bar projects a pin, k', which is adapted to enter one of the said catches at a time. A spring, m, between the rod f and push-bar k, and connected to one of said parts, serves to press the latter toward the wheel u, so as to cause the pin k' thereof to engage one of the catches u'. The push-bar is supported in its position across the wheel u by means of a lever, n, pivoted to the frame A, and provided at its lower end with a shoulder or suitable catch, n', upon which the push-bar rests when in the aforesaid position. The opposite end of said lever is connected by a rod, e, to the lower end of another lever, g, which is pivoted at g' to a suitable support, g'', on the frame A.

h h represent a frame which is arranged on the frame A, movably at right angles to the line of travel of the cable I, and is formed with a shaft, h', parallel with the axis of the drum F, and on this shaft is mounted rotatably and movably longitudinally a grooved roller, i, which is caused to bear with its periphery on the aforesaid cable, either by means of a suitable spring exerting its force toward the cable, or by means of a weight, W, attached to one end of a rope or chain, L, which passes over a pulley, N, on the frame A or other suitable stationary support, and has its opposite end attached to the frame h, as illustrated in the annexed drawings, said spring or weight forcing the frame h toward the cable I, passing from the drum F.

A spring, t, of any suitable form, and connected to the lever g in any suitable manner, causes the upper end of said lever to be maintained in contact with the back of a collar, v, secured to the frame h.

The roller i, bearing on the taut cable, arrests the aforesaid movement and holds the frame h back, so as to cause it, by the bearing of the collar v on the lever g, to hold the latter in position to sustain the lever n, so as to allow it to support the free end of the push-bar k by means of catch n', and when said push-bar is thus supported the rod f is withdrawn from the lug f' on the shipping-wheel D. The lower end of the lever n slides over the back of the free end of the push-bar and over a cam, c, which is secured to the frame A, and guides said end of the lever toward the push-bar k to allow the catch n' to engage the same, and at the same time hold the push-bar out of engagement with the catches or sockets u' of the wheel u.

The mechanisms are held in their aforesaid positions so long as the cable I is taut. If, however, the elevator car or platform happens to become accidentally stopped in its descent, or in case the attendant of the elevator neglects to turn the shipper D so as to throw both belts onto the loose pulleys P' P' after the car or platform has reached the bottom of the elevator shaft or tower, the cable I becomes slack and releases the roller i from its pressure, and as soon as this takes place the weight W draws the frame h forward and releases the lever g from the pressure of the collar v, and said lever is then turned on its pivot by the force of its spring t, and by this movement the lever n is swung away from the push-bar k. The latter is then allowed to be forced by the spring m toward the side of the wheel u to allow the pin k' to engage one of the catches or sockets u'. The wheel u being in motion, causes the push-bar k to be forced toward the shipping-wheel D, and carrying with it the rod f causes the end of the latter to strike the lug f', and thereby turns the shipping-wheel D, so as to shift the two belts onto the two loose pulleys, and simultaneously turn the cam a into such a position as to release the brake-lever b sufficiently to allow the spring l to apply the brake to the brake-pulley O, and thus the motion of the hoisting mechanism is arrested in time to prevent entanglement of the slack cable. After the shipping-wheel has been turned, as aforesaid, the push-bar k is automatically released from the wheel u by means of the cam c', which projects from the side of the frame A and crowds the push-bar away from the wheel u, as best seen in Fig. 4 of the drawings. The released end of the push-bar then drops by gravity, as indicated by dotted lines in Fig. 3 of the drawings.

It is obvious that a spring may be employed in lieu of the weight W; hence I do not limit myself in this respect.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the hoisting mechanism, belt-shipping wheel, and brake, a spring adapted to force the brake into its operative position, a lever adapted to force the brake out of its operative position, and a cam turning with the belt-shipping wheel and actuating the brake-lever in opposition to the aforesaid spring, substantially as described and shown.

2. The combination, with the hoisting mechanism, belt-shipper, brake, and hoisting-cable, of a spring adapted to force the brake into operative position, a cam operating in unison with the belt-shipper and adapted to hold the brake out of operative position, a wheel mov-

ing in unison with the hoisting mechanism and provided with a series of catches, a push-bar adapted to engage said catches, and a rod arranged to transmit motion from the aforesaid wheel to the belt-shipper, substantially as set forth.

3. In combination with the hoisting mechanism, hoisting-cable I, and belt-shipping wheel D, the frame *h*, arranged movably at right angles to the travel of the cable and formed with the shaft *h'* parallel with the axis of the cable-drum, the roller *i*, pivoted to and adapted to slide longitudinally on the shaft *h'*, a weight or spring forcing the frame *h* toward the cable, the wheel *u*, moving in unison with the hoisting mechanism and provided with a series of catches, levers actuated by the frame *h* and adapted to throw the push-bar out of engagement with the wheel *u*, and a rod transmitting motion from the push-bar to the belt-shipping wheel, as set forth.

4. In combination with the hoisting mechanism, hoisting-cable, belt-shipping wheel D, and brake, a spring adapted to force the brake into its operative position, the cam *a*, rigidly attached to said wheel, the brake-lever *b*, pivoted to the stationary frame and having one end engaging said cam and its opposite end connected with the brake, the wheel *u*, moving with the hoisting mechanism and provided with a series of catches, a push-bar adapted to engage said catches, a spring pressing the push-bar into engagement with the catches, cams arranged to throw the push-bar out of said engagement at the ends of the strokes, the frame *h*, arranged movably at a right angle to the travel of the cable and formed with the shaft *h'*, parallel with the axis of the cable-drum, the roller *i*, pivoted to the shaft *h'* and adapted to slide longitudinally thereon, a weight or spring forcing the frame *h* toward the cable, the collar *v*, attached to the frame *h*, the lever *g*, held in engagement with said collar, the lever *n*, actuated by the lever *g* and provided with the catch *n'*, adapted to support the free end of the push-bar *k*, and the rod *f*, transmitting motion from the push-bar to the shipping-wheel D, substantially as described and shown.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 24th day of January, 1889.

EDGAR W. HOUSER. [L. S.]

Witnesses:
J. J. LAASS,
C. H. DUELL.