

(No Model.)

3 Sheets—Sheet 1.

F. E. HERDMAN.
ELEVATOR.

No. 560,211.

Patented May 19, 1896.

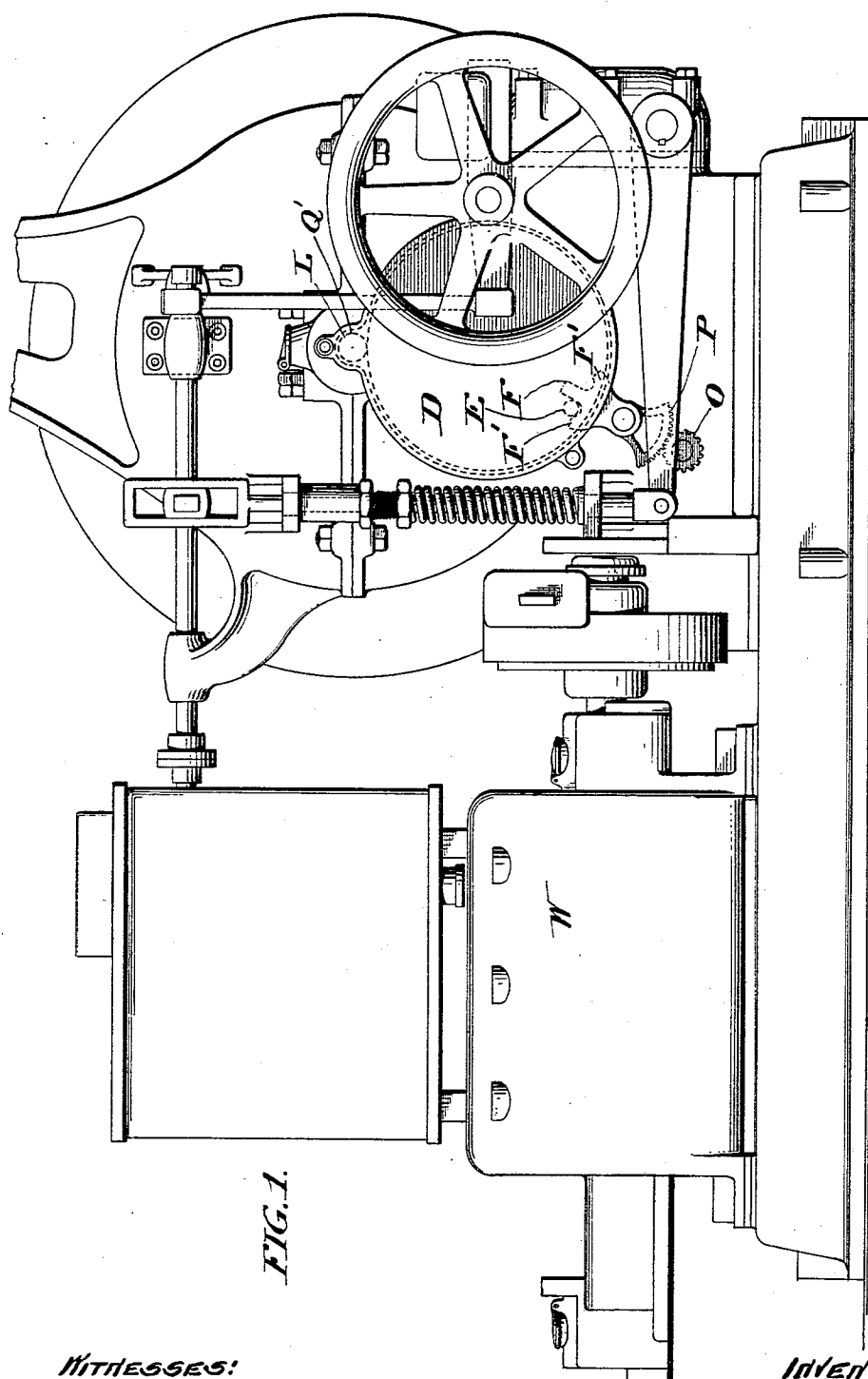


FIG. 1.

WITNESSES:

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Philip Bontely

INVENTOR:

Frank E. Herdman
by J. H. Anderson
att'y

(No Model.)

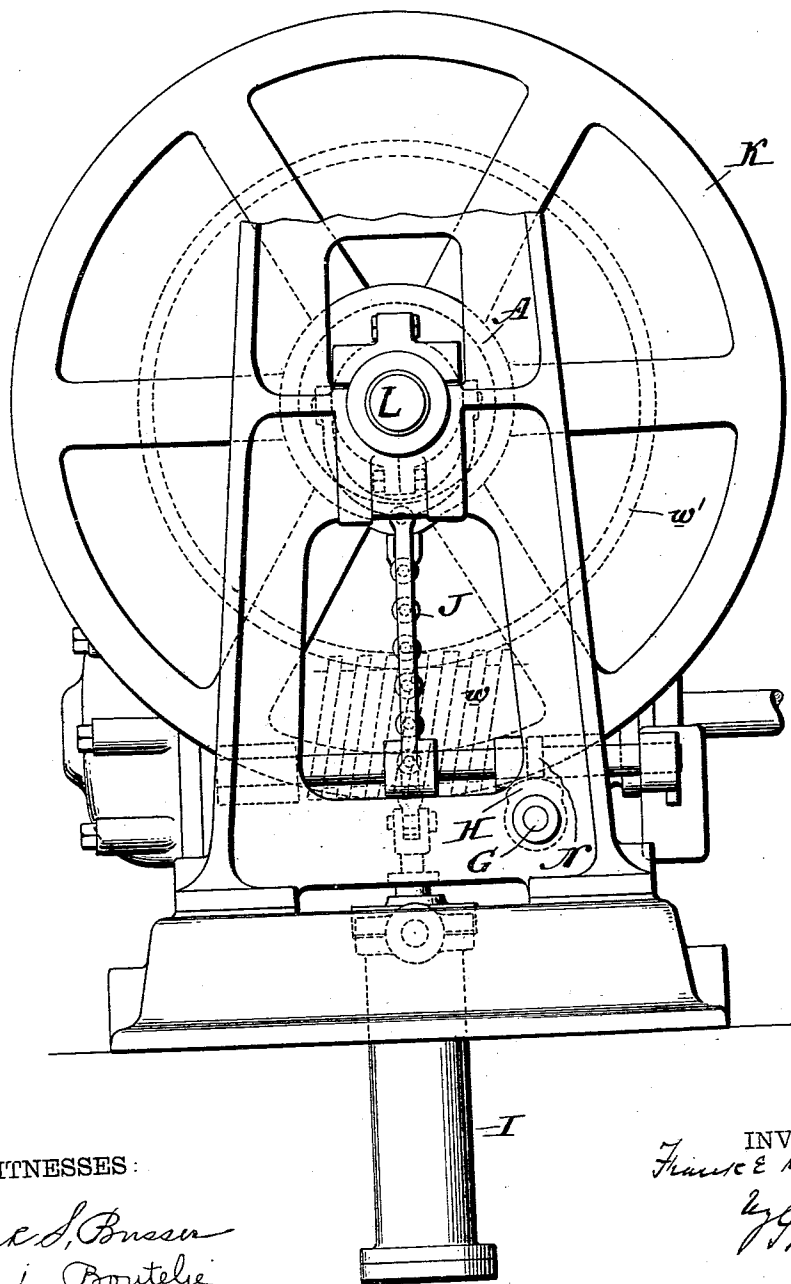
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FIG. 2.



WITNESSES:

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(No Model.)

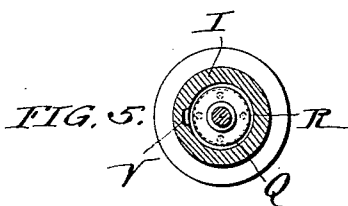
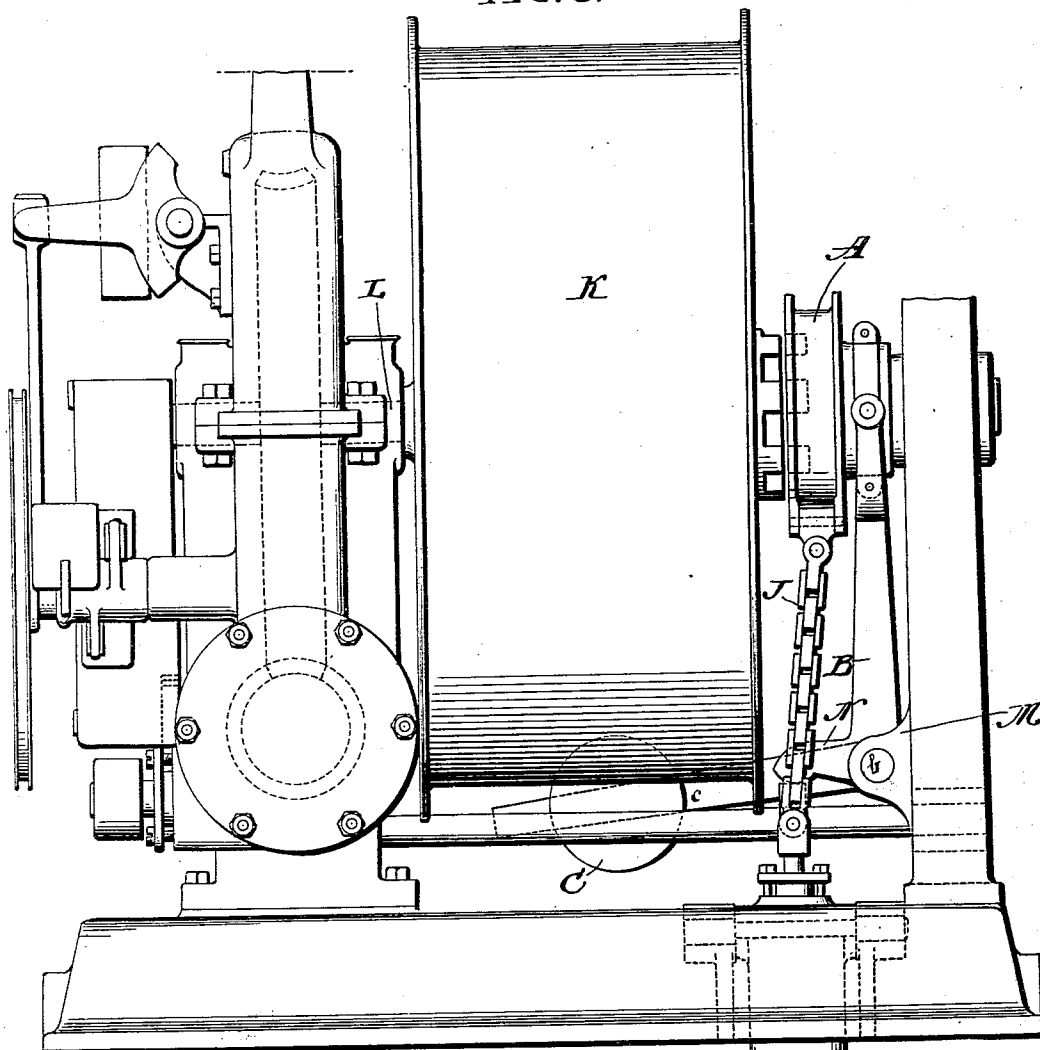
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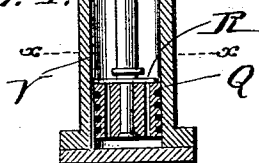
FIG. 3.



WITNESSES:

Frank S. Bresson
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FIG. 4.



INVENTOR
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UNITED STATES PATENT OFFICE.

FRANK E. HERDMAN, OF WINNETKA, ILLINOIS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 560,211, dated May 19, 1896.

Application filed December 18, 1894. Renewed December 10, 1895. Serial No. 571,715. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. HERDMAN, a citizen of the United States, residing at Winnetka, county of Cook, and State of Illinois, have invented a new and useful Improvement in Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to automatic stopping devices for elevators operated by a winding-drum.

The object of my invention is to provide mechanism operated (preferably) by a weight whereby, when the latter is automatically thrown into action, the said mechanism will be thrown into action simultaneously and constitute an effective stop and bring the car positively to rest at a definite point, not depending upon the load in the car or the speed at which the car is traveling.

The construction which I prefer to use to carry out my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of the mechanism embodying my invention shown in its relation to the winding-drum. Fig. 2 is a similar view looking toward the opposite side and showing other parts of the mechanism. Fig. 3 is an end view of same. Fig. 4 is a vertical section of retarding-cylinder, and Fig. 5 a horizontal section of same on line *x x*.

K is the winding-drum. I have illustrated it in connection with electrical operating mechanism, the same consisting of an electric motor W, suitably controlled, and having on its shaft a worm *w*, engaging a gear *w'* on the drum-shaft L.

I will not herein describe the mechanism for controlling the electric motor, as the same forms no part of my invention, any of the well-known means for stopping and starting the motor being capable of use in connection with my improvement; nor is it necessary that the invention be electrically operated, as my invention may be with equal advantage applied to an elevator operated by hydraulic or steam power. On the end of the drum-shaft is the clutch A, Fig. 3, having recesses adapted to engage corresponding teeth on the drum. The clutch is attached to the

bell-crank BN on the shaft *b*, having its bearings in bracket M, this shaft carrying also a horizontal arm *c*, carrying the weight C, which, when free to act, throws the clutch into the teeth of the drum. The weight is normally held from falling by means of a supporting-cam H on shaft G, Fig. 2, which cam rests under and directly sustains the horizontal arm N of the bell-crank BN. At the opposite end of this shaft G is a gear O, Fig. 1, and meshing with gear O is a segmental gear P, pivoted centrally to the frame of the machine and having at its opposite end the finger F and side fingers F'. The drum-shaft carries the gear Q, which meshes with the large gear or disk D, pivoted to the frame of the machine, the size of these gears being so proportioned that the gear D will revolve approximately once during the full travel of the elevator-car.

The gear D carries a pin E, so located that just before the elevator reaches its limit of movement in either direction the pin E will engage the finger F, moving the segmental gear on its axis, which in turn, through the medium of gear O, revolves shaft G. The revolution of shaft G continues until the raised portion of the cam H is moved from under the horizontal arm of the bell-crank BN, whereupon the weight C, no longer sustained by lever N, falls, pushing the clutch A into engagement with the jaws on the drum.

To the bed-plate, by means of trunnions, is attached the cylinder I, Figs. 3, 4, and 5, the piston-rod of which is attached by a chain J to the clutch A. The inner wall of the cylinder is provided with a V-shaped groove or grooves V, (only one groove being shown in the drawings,) running lengthwise, widest and deepest at the bottom and growing smaller until they vanish at or near the top. The piston Q has a release-valve R, which opens upwardly but not downwardly. The cylinder is filled with oil or other liquid.

The effect of engaging the clutch A with the drum will be to cause the clutch to revolve with the drum and wind about it the chain J and draw up the piston in the cylinder. The fluid contained in the cylinder will be forced by the upward movement of the piston from above the piston to below the piston, its only

passage being through the grooves V, and, owing to the constricted area of these passages, some little resistance will be opposed to the upward movement of the piston, which
 5 resistance becomes progressively greater as the piston moves over the narrower and shallower portions of the grooves, whereby the drum is caused to revolve with gradually-decreasing rapidity. When the piston reaches
 10 the upper part of the cylinder, whereat the grooves vanish, further passage of the fluid is impossible, and consequently the piston can move no farther and the revolution of the drum ceases. The car has now reached its
 15 limit of movement.

When the operating mechanism is thrown to reverse the direction of revolution of the drum, the clutch will revolve with the drum and slacken the chain, permitting the piston
 20 to descend by its own weight, there being no resistance to the downward movement of the piston, owing to the opening of the release-valve. In the meantime the pin E engages one of the side fingers F' and remains so engaged until the segmental gear has returned
 25 to its normal position, when the pin E slides off and moves away from finger F'. The shaft G meanwhile revolves until the cam H raises the arm N of the bell-crank, lifting the weight
 30 and drawing the clutch out of engagement with the shaft. When the elevator-car nears the end of its travel in the opposite direction, the gear D will have made about one revolution, and the pin E (or a second pin E if the
 35 gear does not make a full revolution) will engage the other side of the finger F, releasing the weight, applying the clutch, and operating the retarding device, as above described.

Having now fully described my invention, what I claim, and desire to protect by Letters
 40 Patent, is—

1. The combination with the winding-drum of an elevator, of a clutch adapted to engage
 45 said drum but normally held out of engagement therewith, a retarding device connected with said clutch and operated by it when the

latter is engaged with the drum, and means to engage said clutch with the drum before the end of the travel of the car in either direction.

2. The combination with the winding-drum of an elevator, of a clutch adapted to engage said drum but normally held out of engagement therewith, a retarding device connected with said clutch and operated by it when the
 55 latter is engaged with the drum, a weight controlling the clutch, a movable support normally upholding said weight, devices for operating the movable support, normally inactive, but adapted to be operated by the drum
 60 at a predetermined point in the drum's revolution.

3. The combination with the winding-drum of an elevator, of a clutch adapted to engage the drum, but normally held out of engagement therewith, a retarding device connected with the clutch and operated by it when the
 65 latter is engaged with the drum, clutch-operating mechanism, devices for operating the clutch-operating mechanism, normally inactive, but adapted to be operated by the drum
 70 at predetermined points in the drum's revolution.

4. The combination with the winding-drum of an elevator, of a clutch adapted to engage
 75 said drum, a retarding device connected with the clutch, a weighted lever controlling the clutch, a shaft, a cam thereon, a lever adapted to engage said cam and connected with said
 80 weighted lever, a gear on said cam-shaft, a gear adapted to engage said last-mentioned gear, and carrying a finger, a disk carrying a pin in alinement with said finger, and operative connection between the disk and the
 85 winding-drum.

In testimony of which invention I have hereunto set my hand.

FRANK E. HERDMAN.

Witnesses:

C. D. HOYT,
 J. J. O'MEARA.