

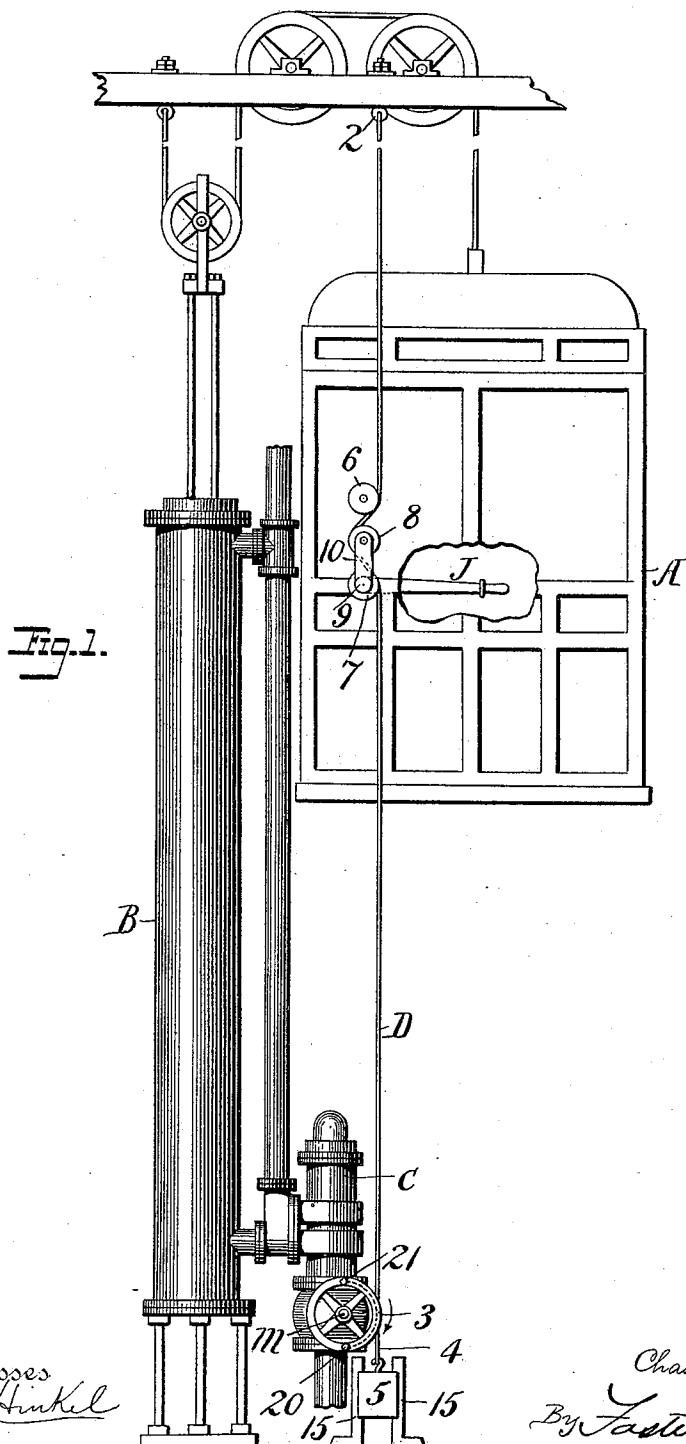
(No Model.)

3 Sheets—Sheet 1.

C. E. FOSTER.
CONTROLLING DEVICE FOR ELEVATORS.

No. 464,278.

Patented Dec. 1, 1891.



Witnesses
Frederick Hinkel
H. S. M. Arthur

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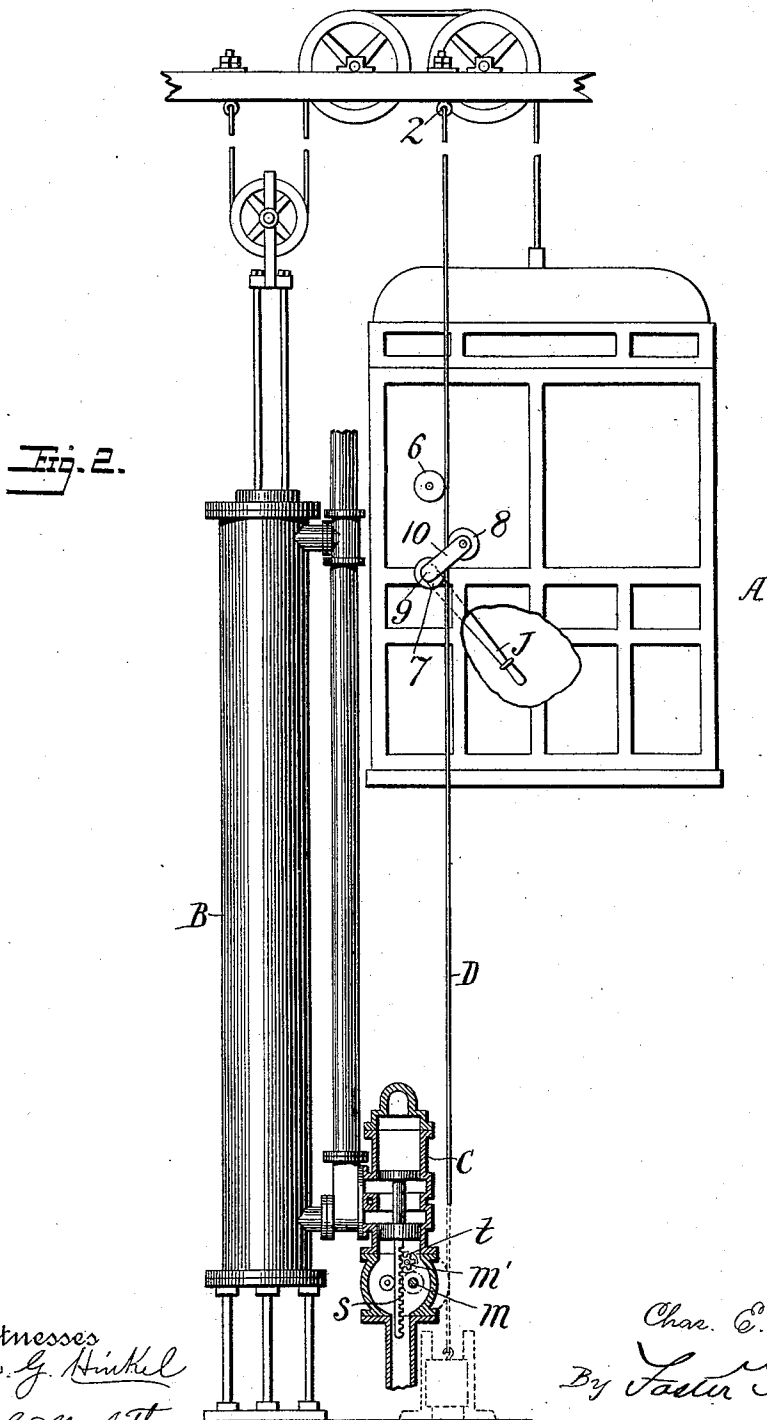
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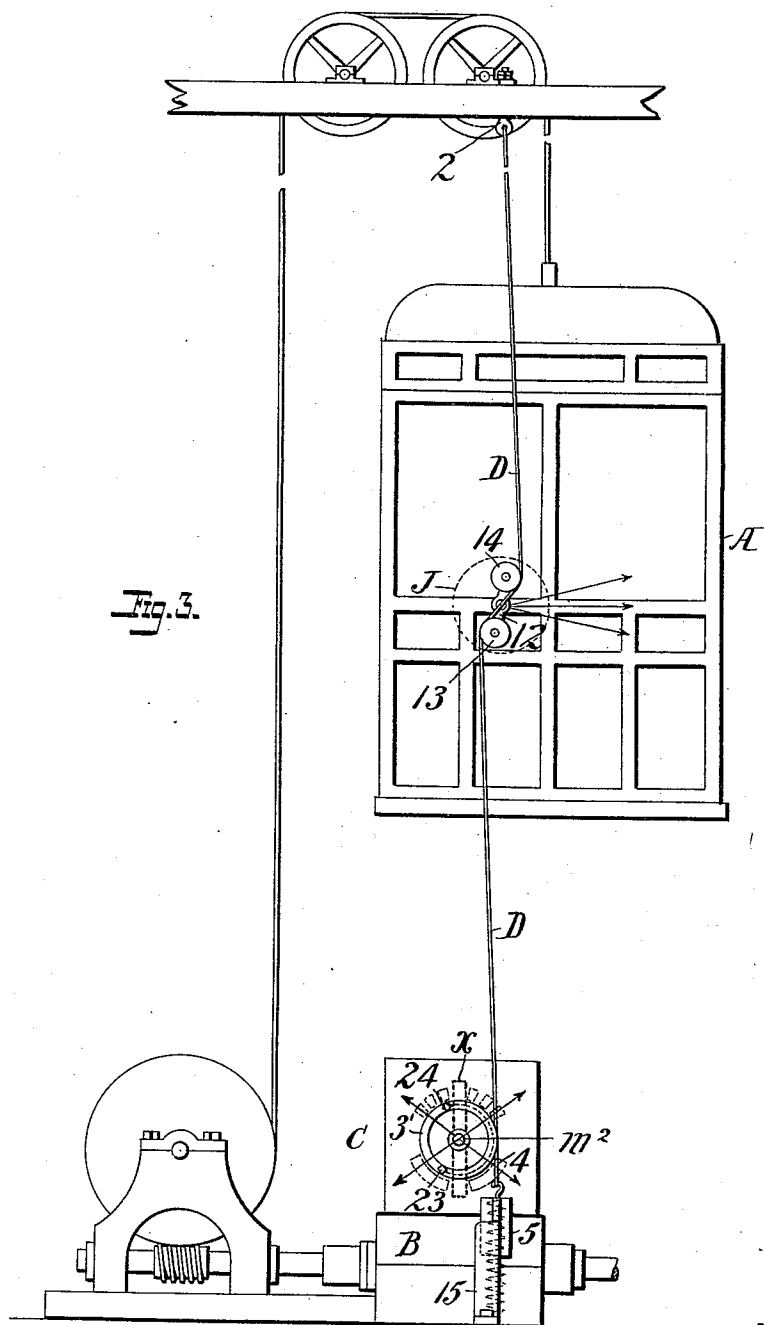
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UNITED STATES PATENT OFFICE.

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CONTROLLING DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 464,278, dated December 1, 1891.

Application filed August 10, 1891. Serial No. 402,288. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. FOSTER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Controlling Devices for Elevators, of which the following is a specification.

In elevating apparatus as now constructed the stopping and starting device, the movements of which determine the movements or position of the cage, is frequently operated from the cage through the medium of one or more cables traveling around supporting-pulleys and connected with the cage or appurtenances thereof, or through the medium of two suspended cables hanging adjacent to the cage and operated upon by appliances carried by the cage. While these means of operating the stopping and starting device are effective in securing the proper movements and adjustments of such device, they are objectionable from the length of cables required and from the greater or less complexity, weight, and expanse of the connecting parts, and to avoid these objections and to secure advantages which cannot be obtained with ordinary constructions I provide means for operating the stopping and starting device, so as to regulate all the movements of the latter and of the cage through the medium of a single cable suspended from or connected with a fixed attachment or support, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a side view of sufficient of an elevating apparatus to illustrate my improvement. Fig. 2 is a view of the parts shown in Fig. 1, the valve in section. Fig. 3 is a side view illustrating a modification.

The cage A is constructed for passengers or freight in any suitable manner and is operated from the engine B, which may be a hydraulic engine, as shown in Fig. 1, or an electromotor, as indicated in Fig. 3, and said engine is provided with a stopping and starting device so constructed as by its adjustment to regulate all the movements of the engine required to stop the cage when moving in either direction or to start it in either direction from its normal position of rest or to vary its speed, according to the will of the operator in the

cage. This stopping and starting device may be a valve in the case of a steam or hydraulic motor, or it may be a switch in the case of an electromotor. Thus in the construction shown in Fig. 1 the controlling device C is a valve device of any well-known or suitable construction—as, for instance, that shown in Letters Patent No. 306,097, granted to Otis and Smith October 7, 1884, in which the turning of a shaft *m* is the means of setting in position a pilot-valve that regulates the position of a piston connected to move the main valve of the apparatus, or an ordinary hydraulic valve may be used, as shown in Figs. 1 and 2.

In the construction shown in Fig. 3 the stopping and starting device C has a switch connected with a shaft *m'* and serving to break the circuit when in its normal or mid position and to cut out resistances when swung to either side, the completion of the circuit in one direction or the other imparting movement in one direction or the other to the armature of the machine, as set forth in Letters Patent granted to Otis and Smith January 13, 1891, No. 444,640.

As the special details of construction of the stopping and starting device are not material, provided it has the functions hereinbefore set forth, and as such devices are well known, it is not necessary to more particularly describe the same.

With the cage and with the stopping and starting device I combine a connecting means embodying a single cable D, connected at one end to a stationary support—as, for instance, to an eyebolt 2, from which the cable is suspended within the well so as to hang in a position in proximity to one side of the cage, and the other end of said cable connected with the stopping and starting device in such manner that the cable is always partly contracted when the stopping and starting device is in its mid or normal position, and by pulling upon or relaxing the cable at any point beyond its point of attachment to the eyebolt, according to the position of the cage, proper movements will be imparted to the stopping and starting device. Thus in the construction shown in Figs. 1 and 2 the cable is secured to the periphery of a pulley 3 upon the shaft *m* of the stopping and starting device by winding it, as

usual, around the periphery of said pulley and fastening it at any point by a jam-screw or other fastening device 20, and a weight 5 is hung to a short cable also connected by a jam-screw or other fastening device 21 to the periphery of the said pulley, so as to tend to turn the pulley in the direction of the arrow, whereby any draft upon the cable will turn the pulley in the reverse direction, and the weight will serve as a means of restoring the parts to position after it is relaxed. The shaft *m* is geared with a shaft *m'* by gears, (shown in dotted lines,) and a pinion *t* on the shaft *m'* gears with a rack *s* on the valve-stem, and, referring to Fig. 3, the wheel 3' upon the shaft *m'* of the switch *x* (shown in dotted lines) has secured to its periphery by jam-screws 23 24 cables D and 4, and from the latter hangs a weight 5, as in Fig. 1. In each construction when the pulley is turned to its extreme position in one direction the stopping and starting device will be so set that the engine and the cage will move in one direction, and when the said device is set to its extreme position in the opposite direction a reverse movement will be imparted to the engine and the cage, and when the device is brought to a normal or mid position the engine and the cage will be arrested. It therefore follows that in operating the cable D it must be contracted to one extent to bring the stopping and starting device to its mid-position to stop the cage, to a greater extent to bring the device to its extreme position in one direction to start the cage one way, and wholly relaxed to allow the said device to assume its extreme position in the opposite direction to start the cage in another way, and that by imparting these movements to the cable and varying their extent all of the adjustments of the said device necessary to regulate the direction and speed of all the movements of the cage may be effected through the medium of the single cable as the result of the force applied to draw upon or contract it in one direction and the power of the weight acting in the opposite direction.

Different appliances may be employed for drawing upon or contracting the cable beyond its fixed end. In Figs. 1 and 2 said appliances consist of three pulleys 6 7 8, the pulleys 6 and 7 turning upon fixed studs at the

side of the cage and the pulley 8 being movable and arranged upon the opposite side of the cable, so that by carrying the pulley 8 to the position shown in Figs. 1 and 2 the cable may be wholly relaxed to start the cage in one direction, and, as shown, by carrying the pulley 8 toward and between the pulleys 6 7 the cable may be drawn upon or contracted to a greater or less extent to slow or stop the cage, and then to a further extent to start the cage in the opposite direction. The movable pulley is operated by any suitable operating device J within the cage. For instance, said device may be in the form of a lever, as shown in Figs. 1 and 2, connected with a short shaft 9, extending through the cage, serving as a stud for the pulley 7, and to which is connected an arm 10, carrying the pulley 8. In the construction shown in Fig. 3 the operating device J is a wheel within the cage secured to a shaft extending into the cage and supporting a lever 12, carrying two pulleys 13 and 14, round and between which the cable extends, as shown.

In order that the weight 5 may act effectively to avoid sudden or abrupt movements and jerks, it is preferably guided by means of guides 15, entering vertical grooves in the sides of the weight. Instead of a weight, a spring may be used, as shown in dotted lines, Fig. 2.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim—

The combination of an elevator-engine provided with a stopping and starting device normally occupying a mid-position when the cage is at rest, means, as a weight, for moving said device in one direction, a single suspended operating-cable connected with said device, and a cable-operating device arranged upon the cage to occupy a mid-position with the cable partly contracted when the cage is at rest, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. FOSTER.

Witnesses:

F. L. FREEMAN,
G. P. KRAMER.