(No Model.)

4 Sheets—Sheet 1.

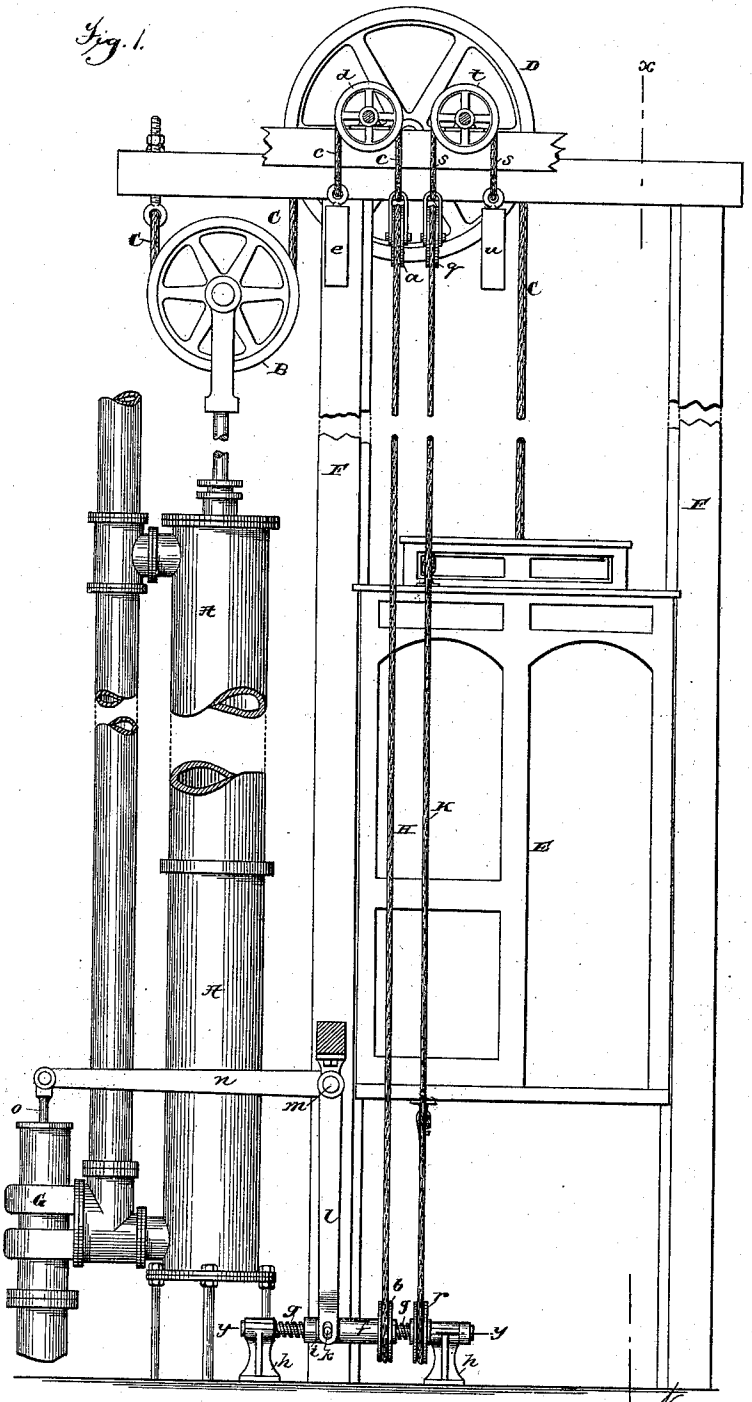
N. C. BASSETT.

ELEVATOR.

No. 535,343

Patented Mar. 12, 1895.

Fig. 1.



Attest:

Geo. H. Bolte

J. A. Hovey

Inventor:

Norman C. Bassett

by Munson & Philipp

Attys.

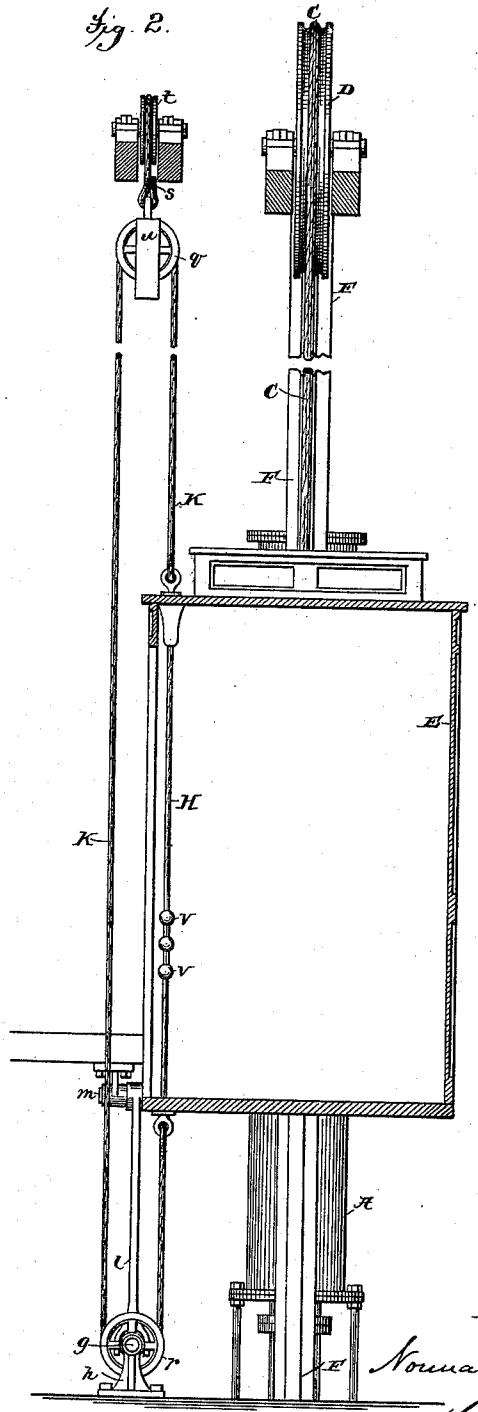
(No Model.) 4 Sheets—Sheet 2.

N. C. BASSETT.

ELEVATOR.

No. 535,343. Patented Mar. 12, 1895.

Fig. 2.



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(No Model.)

4 Sheets—Sheet 3.

N. C. BASSETT.

ELEVATOR.

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Fig. 5.

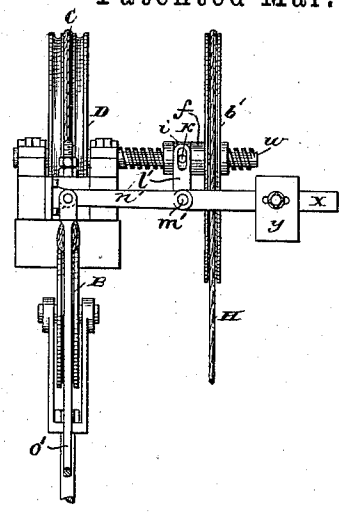


Fig. 3.

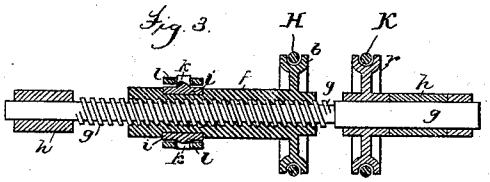


Fig. 6

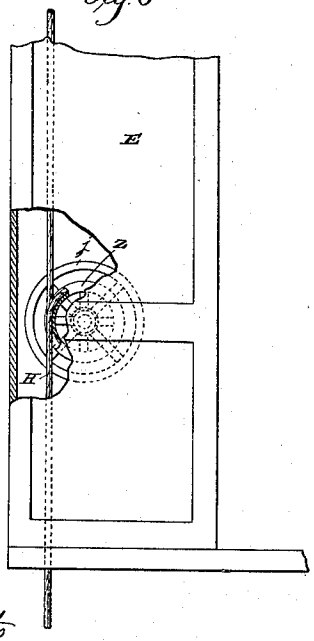
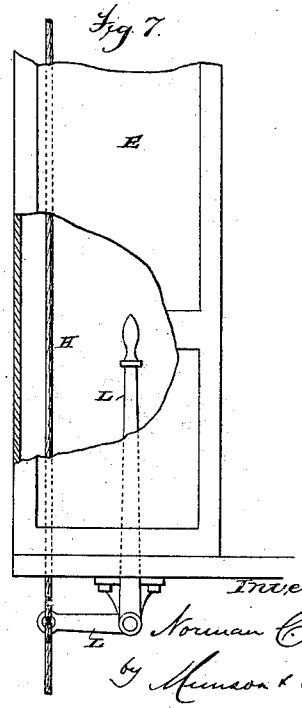


Fig. 7.



Witnesses:
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(No Model.)

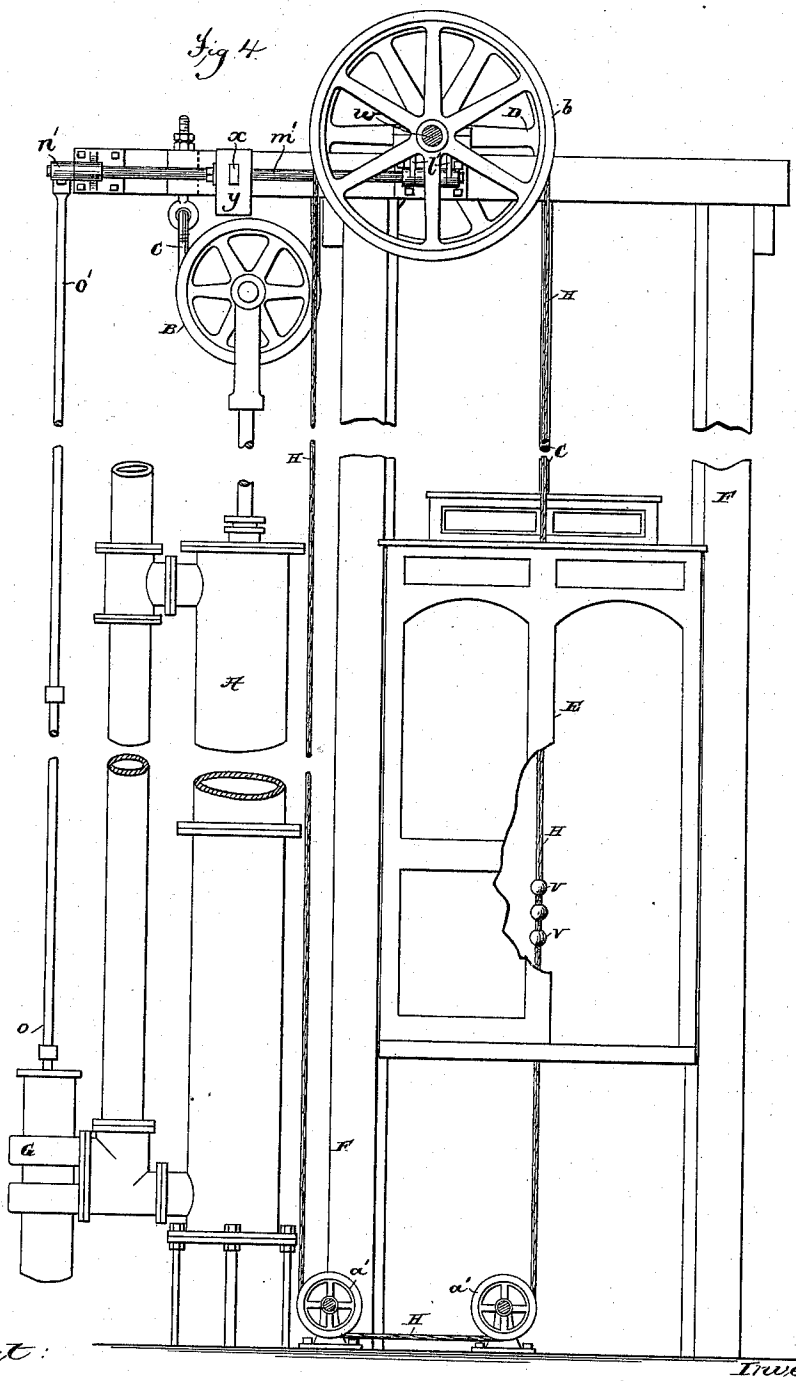
4 Sheets—Sheet 4.

N. C. BASSETT.

ELEVATOR.

No. 535,343. Patented Mar. 12, 1895.

Fig 4.



Attest:

Geo. H. Botts

J. A. Hovey

Inventor:

Norman C. Bassett

by Munson & Philipp

Attys:

UNITED STATES PATENT OFFICE.

NORMAN C. BASSETT, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL COMPANY, OF ILLINOIS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 535,343, dated March 12, 1895.

Application filed August 17, 1886. Serial No. 211,099. (No model.)

To all whom it may concern:

Be it known that I, NORMAN C. BASSETT, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Elevators, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an apparatus for operating the valve or other mechanism by which the movements of a hydraulic or other elevator are controlled.

In elevators as at present most commonly constructed the valve or other mechanism for controlling the movements of the car is operated by means of an endless rope which is suspended in the elevator shaft in such position as to pass through the car without being connected thereto and is arranged to be moved freely in either direction around pulleys located above and below the travel of the car. This rope is connected at the proper point in any suitable way with the valve or other mechanism by which the movements of the car are controlled in such manner that by moving the rope around its pulleys in the proper direction the car can be either raised or lowered or stopped in any position. The connections between the rope and the mechanism which controls the movement of the car are so arranged that to start the car from any position it is necessary to move the rope in the opposite direction from that in which it is desired to start the car, while to stop the car it is necessary to move the rope in the same direction in which the car is moving. With the rope thus arranged the operator in order to start the car either up or down from any position grasps the rope and moves it in the opposite direction from that which he wishes the car to move and as the car commences to move he releases the rope allowing the latter to remain stationary, the car meanwhile attaining a speed varying with different elevators from two hundred to six hundred feet per minute, and even higher. When the operator wishes to stop the car he must grasp the stationary rope while he, being in the car, is moving at a considerable speed. If he grasps the rope firmly so as to move it with him at the same speed at which the car is moving the valve or other mechanism will be operated so quickly that the car will be brought to rest with a sudden shock, very disagreeable to passengers and dangerous to the machinery of the elevator. In order to avoid this difficulty as much as possible it has been customary in practice to so arrange the connections between the operating rope and the mechanism which controls the movements of the car that the distance through which the rope must be moved to stop or start the car is much greater than the movement of the stopping and starting mechanism itself. The distance which the rope can be readily moved is, however, limited to three or four feet from the fact that as soon as the operator begins to move the rope to start the car in either direction the car begins to move in the opposite direction and he must therefore be able to move the rope the required distance at one pull on the rope for as soon as the car starts he is moving so fast relatively to the rope that if he then attempts to grasp the rope and move it but little, if any effect is produced. Now it has been found in practice that an elevator car moving at the rate of three hundred to three hundred and fifty feet per minute, which is about the average speed, can not be brought to rest without a disagreeable sensation to the passengers and danger to the elevator, in a less distance than ten feet. If the movement of the operating rope to fully operate the starting and stopping mechanism is made ten feet the operator can stop the car properly and safely by simply grasping and holding the rope tightly, allowing the motion of the car to operate the stopping mechanism, but if the rope is required to be moved this distance to stop the car it must, of course, move the same distance in the reverse direction to again set the car in motion at the same speed, and this extended movement of the rope would require several pulls which, as just explained, is not practicable.

It is the object of the present invention to overcome this difficulty and to provide means by which the operator can at all times move the rope either up or down to any desired extent which may be necessary to raise, stop or

lower the car entirely independent of and unembarassed by the movement of the car.

As a full understanding of the invention can be best imparted by a detailed description of the apparatus in which it is embodied all preliminary description will be omitted and a full description given, reference being had to the accompanying drawings, in which—

Figure 1 is a partial side elevation of an ordinary form of hydraulic elevator, showing the present invention applied thereto. Fig. 2 is a sectional elevation of the same taken on the line *x x* of Fig. 1. Fig. 3 is an enlarged horizontal section taken on the line *y y* of the same figure. Fig. 4 is a view similar to Fig. 1 illustrating a modified form of the invention. Fig. 5 is an elevation of the part of the mechanism shown in Fig. 4 looking from the left of said figure; and Figs. 6 and 7 illustrate means by which the rope for stopping and starting the elevator may be operated.

Referring now particularly to Figs. 1, 2 and 3 it is to be understood that A represents the lifting cylinder having the usual lifting piston; B, the traveling pulley attached to the piston rod of the cylinder; C, the lifting cable; D, the pulley around which the cable passes at the top of the elevator shaft; E, the car, and F the frame-work of the shaft of an ordinary hydraulic elevator. The lifting cylinder A is provided with the usual stopping and starting mechanism consisting of the valve G which controls the admission and discharge of the water to and from the lower end of the cylinder A. All of these parts are constructed and arranged in the usual manner and are so well understood in the art as to need no specific description.

The valve G is operated by means of the usual endless rope H which passes through the car E and around the pulleys *a b* located respectively above and below the travel of the car. The pulley *a* is suspended upon a short rope *c* which passes over a fixed pulley *d* and is provided at its opposite end with the weight *e*, the purpose of this being to maintain the rope H taut at all times and compensate for any variation in its length. The pulley *b* is fixed upon a sleeve *f* which is of considerable length and is arranged to be turned freely upon a shaft *g* which is journaled so as to turn freely in suitable brackets *h* which are located at the bottom of the shaft. The sleeve *f* is screw threaded upon its interior and engages with corresponding threads formed upon the shaft *g* in such a manner that when the sleeve is turned about the shaft a longitudinal movement is imparted to the sleeve, as clearly shown in Fig. 3. The sleeve *f* is provided with a circumferential recess in which is located a collar *i* which turns freely upon the sleeve and is provided with projecting lugs K which enter slots in the forked end of an arm *l* extending from a rock shaft *m* having a second arm *n* which is connected by a link *o* to the valve G. In addition to the usual rope H the car E is provided with a second rope K which is fastened to the car so as to travel therewith and passes around pulleys *q r* which are also located respectively above and below the travel of the car. The pulley *q* like the pulley *a* is suspended from a rope *e* which passes around a fixed pulley *t* and is provided at its opposite end with a weight *u* whereby the rope K is maintained taut the same as the rope H. The pulley *r* is fixed to the shaft *g*. The rope K may be secured to the car E in any convenient manner. It preferably will be so secured by having its ends fastened to eye bolts at the top and bottom of the car, as shown.

It is to be remarked that the shaft *g* while it is arranged to turn freely in the brackets *h*, is so arranged that it is incapable of longitudinal movement in the brackets.

The operation of the apparatus thus organized is as follows: Assuming the car E to be at rest, the operator, in order to start the car either up or down, will grasp the rope H and move it either up or down according to the direction in which the car is to be started. The movement of the rope H will cause the pulley *b* and the sleeve *f* to turn upon the shaft *g* and this, by reason of the screw threads upon the shaft and the sleeve, will cause the latter to move longitudinally along the former. This longitudinal movement of the sleeve will of course impart a vibrating movement to the arm *l* which, through the shaft *m*, will be communicated to the arm *n* and will either raise or lower the valve as the case may be and start the car in the direction desired. As the car moves the rope K, being fixed to the car and passing around the pulley *r*, will revolve the shaft *g* and thus impart a corresponding movement to the sleeve *f* and pulley *b* and as the pulleys *b r* are of the same size the movement of the rope H will be the same as that of the rope K, or in other words, the rope H will move with the car and may therefore be held continually by the operator. It will also be observed that as the pulleys *b r* are of the same size the movement of the rope H with the car will have no tendency to move the sleeve *f* along the shaft as this movement of the rope H will not impart any movement to the sleeve *f* around the shaft *g*. If the friction of the rope H should at any time be so great as to prevent the sleeve *f* from turning with the shaft *g* and thus cause the movement of the shaft to shift the sleeve longitudinally it can readily be overcome by the operator by simply grasping and holding the rope while the car is in motion. From this it will be seen that when the car is in motion the rope H moves with the car and is therefore at all times stationary with relation to the car so that no matter how fast or how slow the car is moving the rope can always be moved to any desired extent by the operator, the motion of the car affording him no embarrassment. When, therefore, it is desired to stop the car the operator, holding the rope in his hand, simply moves it up or down, thereby either turning the sleeve *f* in the contrary direction to the rotation of the shaft *g*

or in the same direction but at a greater rate of speed, and thus moves the sleeve longitudinally on the shaft so as to move the arms *l n* and through them operate the valve, and this movement of the rope the operator can continue until the rope has been moved the necessary distance and at the proper speed to bring the elevator to rest without shock or strain. During this operation it will be seen that the operator is entirely unembarrassed by the movement of the car, the rope H, as before stated, being stationary with respect to the car.

In order to facilitate the grasping of the rope by the operator it may be provided with suitable buttons *v* as shown in Fig. 2.

From what has been said it will be seen that the only function of the rope K is to control the rotation of the shaft *g* with relation to the sleeve *f;* that is to say, to cause the shaft to revolve in unison with the sleeve *f* so long as the rope H moves with the car or is stationary with relation to the car, and to prevent the shaft from taking any movement imparted to the sleeve by the movement of the rope H with relation to the car. This result can, however, be accomplished without the aid of the rope K and as in some cases it may be desirable to dispense with this extra rope, I have in Figs. 4 and 5 illustrated a form of my invention in which this rope is omitted. In this case the shaft *w* upon which the pulley D is mounted is provided with a threaded extension upon which the sleeve *f* carrying the collar *i* and pulley *b'* is mounted. The pulley *b'* is in this case of the same size as the pulley D. The rope H instead of passing around a single pulley corresponding to the pulley *a* passes around two pulleys *a'* located a distance apart at the bottom of the shaft. This however, is merely a matter of convenience. A single pulley may be used at the bottom of the shaft if preferred. As, however, the single pulley in this case would have to be of comparatively large size, it will usually be preferable to employ two small ones as shown. The pulleys *a'* are in this case shown as stationary but one or both of them may be readily made movable and provided with a spring or weight to keep the rope taut. The arms *l' n'* and the shaft *m'* are in this case of course located at the top instead of at the bottom of the shaft and the link *o'* is made of sufficient length to extend downward to the valve. In order to counterbalance the weight of this long link it will usually be found desirable to provide the shaft *m'* with an arm *x* extending in the opposite direction to the arm *n'* and provided with a suitable weight *y* for that purpose.

The operation of the apparatus when thus organized is exactly the same as already described except that the motion is imparted to the pulley *b'* and rope H by means of the cable C, pulley D and shaft *w* instead of by the rope K, pulley *r* and shaft *g*. Although the rope H may be operated by being grasped by the operator to be moved up or down it will usually be preferable to effect the necessary movement of the rope through the medium of mechanical devices carried by the car.

In Figs. 6 and 7 two forms of devices suitable for this purpose are illustrated. In Fig. 6 the rope H is shown as passing round a drum or pulley *z* mounted on the car, which drum is provided with a suitable hand wheel *j* by which it can be turned so as to move the rope up or down. In Fig. 7 the same result is accomplished by means of a hand lever L which is fulcrumed on the car and connected at one end to the rope. In this case it is of course not necessary that the rope H should pass through the car, and when the drum is used as shown in Fig. 6 the drum may be upon the outside of the car, the shaft of the drum passing through into the car.

It will be readily understood that the form of the devices for communicating the motion of the rope H to the stopping and starting mechanism may be varied widely without departing from the broad feature of the invention.

Although I have herein illustrated and described my invention as applied to a hydraulic elevator, it is to be understood that the invention is not limited in its application to this class of elevators.

The sleeve *f* may be provided with connections for operating the stopping and starting mechanism no matter of what form such mechanism may be.

The specific form of apparatus shown in Figs. 4 and 5 is not herein claimed as that subject matter is claimed in an application for Letters Patent filed September 4, 1886, Serial No. 212,669 (now Letters Patent No. 379,556, of March 8, 1888).

What I claim is—

1. The combination with an elevator car and its lifting and stopping and starting mechanisms, of a pulley driven so as to revolve in conformity to the movements of the car, a second pulley turning with said first pulley and free to be turned independently thereof, a threaded connection between said pulleys, a rope H, traveling with the car and passing around said second pulley and free to be moved to turn said pulley independently of the movement of the car, and connections through which the lateral movement of the pulley is imparted to the stopping and starting mechanism, substantially as described.

2. The combination with an elevator car and its lifting and stopping and starting mechanisms, of a threaded shaft driven so as to be revolved in conformity to the movements of the car, a threaded sleeve upon said shaft free to turn with the shaft and be turned independently thereof, the rope H passing around a pulley upon the sleeve and traveling with the car and free to be moved around said pulley independently of the movement of the car, and connections by which the longitudinal movement of said sleeve is imparted to the

stopping and starting mechanism, substantially as described.

3. The combination with an elevator car and its lifting and stopping and starting mechanisms, of the threaded shaft *g* and the rope K attached to the car and passing around a pulley upon said shaft, the threaded sleeve *f* arranged upon the shaft *g* and provided with the pulley *b*, the rope H passing around the pulley *b* and traveling with the car and free to be moved around said pulley independently of the movement of the car, and connections by which the longitudinal movement of the sleeve is imparted to the stopping and starting mechanism, substantially as described.

4. The combination with an elevator car, its lifting mechanism and stopping and starting valve, of a threaded shaft driven so as to be revolved in conformity to the movements of the car, a threaded sleeve upon said shaft free to turn with the shaft and be turned independently thereof, the rope H passing around a pulley upon the sleeve and traveling with the car and free to be moved around said pulley independently of the movement of the car, and connections by which the longitudinal movement of said sleeve is imparted to the stopping and starting valve, substantially as described.

5. The combination with an elevator car and its lifting and stopping and starting mechanisms, of a threaded shaft driven so as to be revolved in conformity to the movements of the car, a threaded sleeve upon said shaft free to turn with the shaft and be turned independently thereof, the rope H passing around a pulley upon the sleeve and traveling with the car and free to be moved independently of the movement of the car, an operating device carried by the car and connected to the rope for moving it around said pulley independently of the movement of the car, and connections by which the longitudinal movement of the sleeve is imparted to the stopping and starting mechanism, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

NORMAN C. BASSETT.

Witnesses:
E. R. CHAMBERLAIN,
JAS. J. GROOL.