(No Model.)

2 Sheets—Sheet 1.

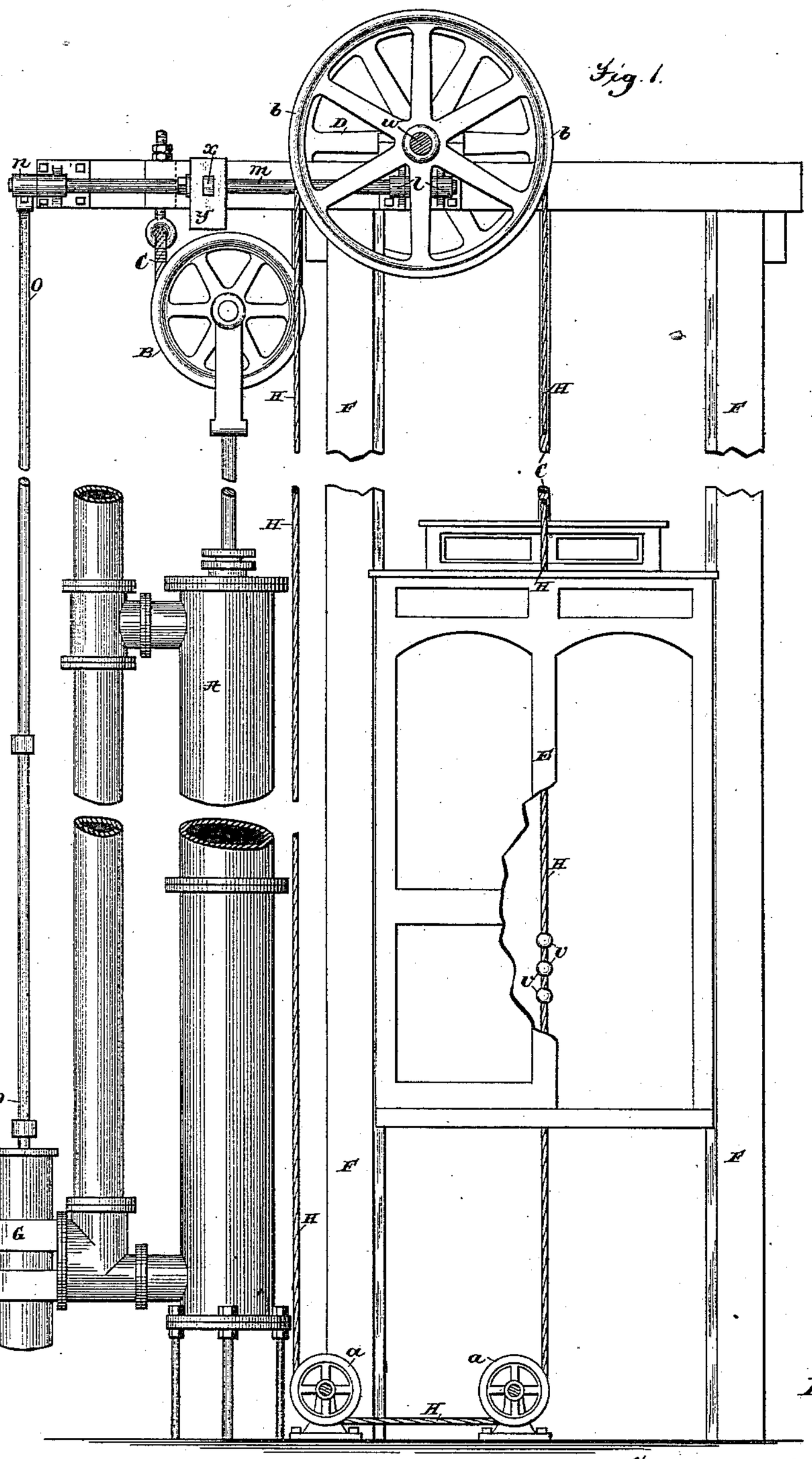
N. C. BASSETT.

ELEVATOR.

No. 379,556

Patented Mar. 20, 1888.

Fig. 1.



Inventor:

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Attys.

(No Model.) 2 Sheets—Sheet 2.

N. C. BASSETT.

ELEVATOR.

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Fig. 2.

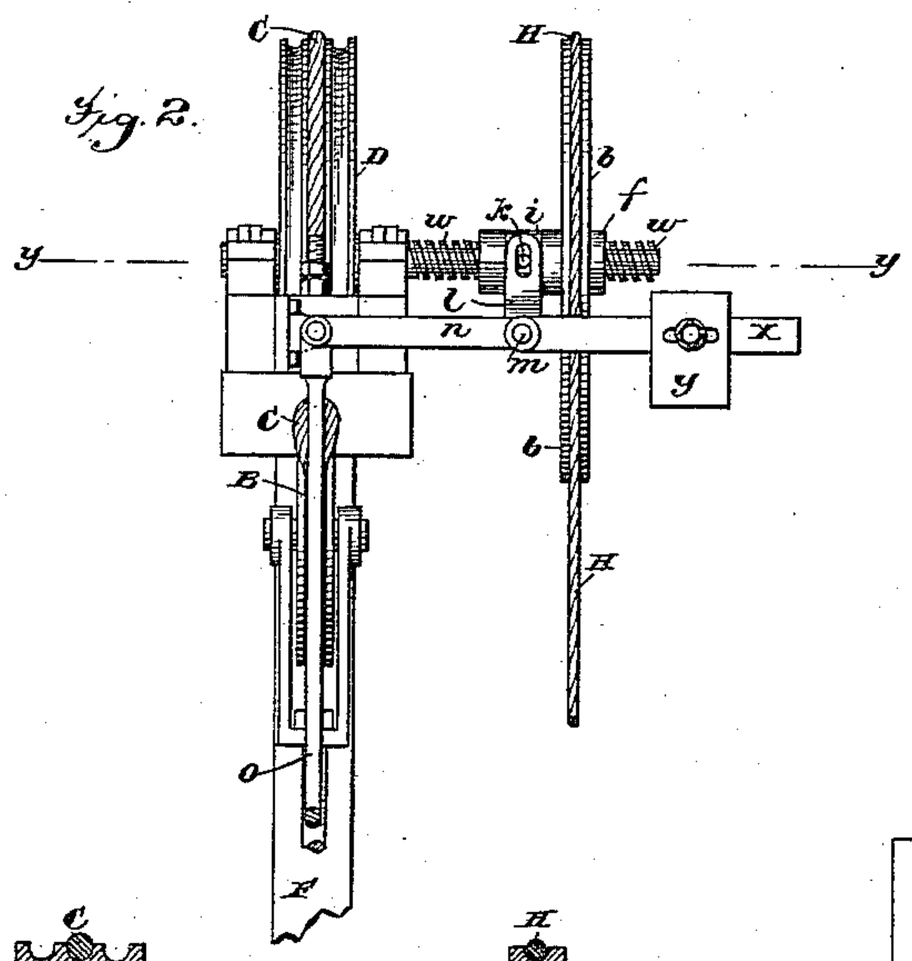


Fig. 3.

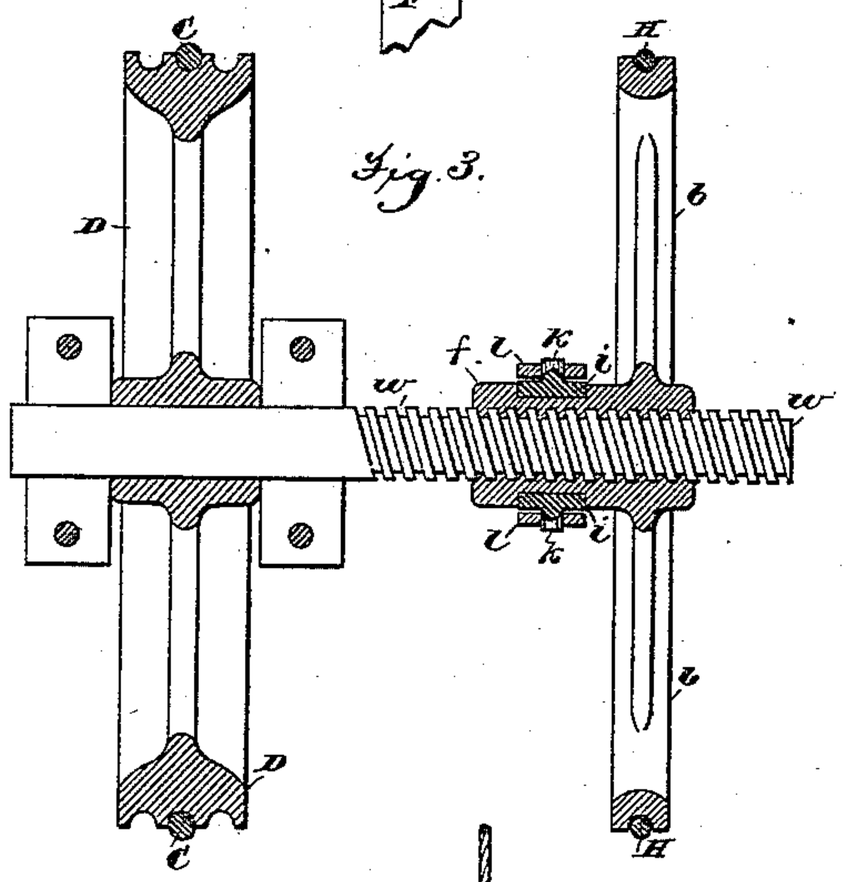


Fig. 4.

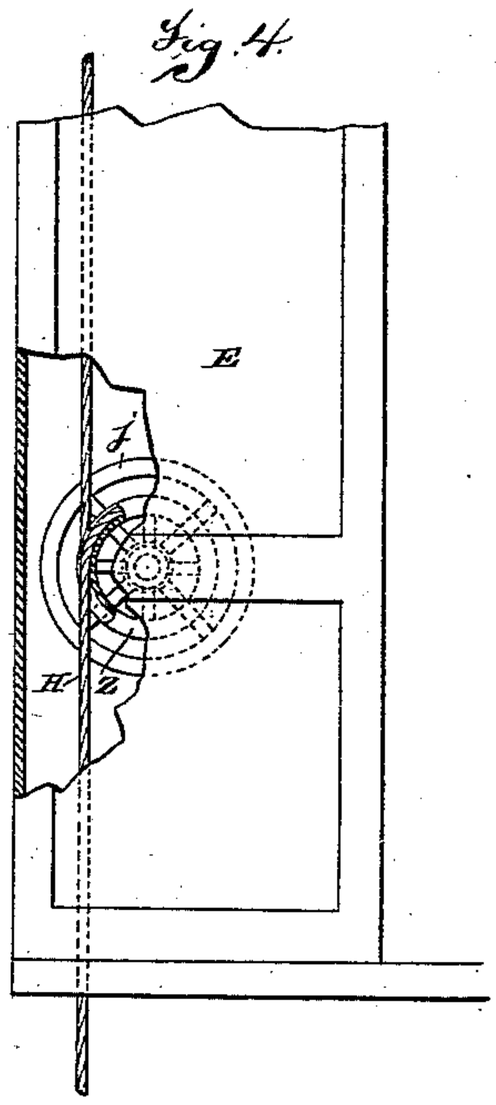
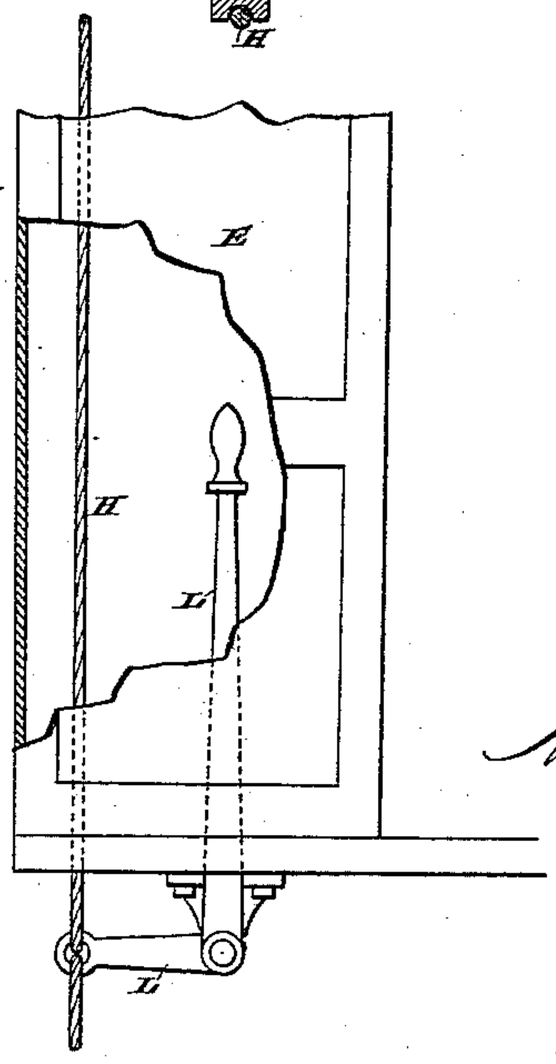


Fig 5.



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UNITED STATES PATENT OFFICE.

NORMAN C. BASSETT, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE HYDRAULIC ELEVATOR COMPANY, OF ILLINOIS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 379,556, dated March 20, 1888.

Application filed September 4, 1886. Serial No. 212,669. (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 movements 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, cannot 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 stopping and starting 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.

In an application filed August 17, 1886, Serial No. 211,099, I have shown and described apparatus in which the difficulty which has just been stated as existing in the constructions heretofore in use is obviated by arranging the operating-rope so that it travels with the car while the latter is in motion without operating the stopping and starting mechanism, and providing the rope with connections by which,

when it is moved independent of the car, the stopping and starting mechanism is operated. By this means the operator can move the rope to any desired extent that may be necessary to raise, stop, or lower the car entirely independent of and unembarrassed by the movement of the car.

The present invention relates to a specific form of mechanism for accomplishing the same general purpose, and, as a full understanding of the invention can best be imparted by a detailed description of the apparatus in which it is embodied, all further preliminary description will be omitted and a full description given, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, certain parts being broken away, of an ordinary form of hydraulic elevator, showing the present invention applied thereto. Fig. 2 is an elevation of a part of the mechanism shown in Fig. 1, looking from the left of said figure. Fig. 3 is an enlarged horizontal section taken on the line *y y* of Fig. 2. Figs. 4 and 5 illustrate means by which the operating-rope can be moved independent of the car for the purpose of operating the stopping and starting mechanism.

Referring now particularly to Figs. 1, 2, and 3, it is to be understood that A represents the lifting-cylinder; 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 valve mechanism, 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 and around pulleys *a b*, located, respectively, below and above the travel of the car. The pulleys *a* are mounted in suitable brackets located at the bottom of the elevator-shaft and are arranged to turn freely therein. The pulley *b* is mounted upon the shaft *w* of the pulley D, over which the lifting-cable passes, and is provided with an elongated hub, forming in effect a sleeve, *f*, which is arranged to turn freely on the shaft *w*. The sleeve *f* is screw-threaded upon its interior, and engages with corresponding threads formed upon the shaft *w* in such manner that when the pulley *b* 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 arranged the collar *i*, which turns freely upon the sleeve, and is provided with projecting lugs *k*, which enter slots in the ends of arms *l*, extending from a rock-shaft, *m*.

The shaft *m* is provided with an arm, *n*, which is connected by a link or rod, *o*, to the valve G. In order to counterbalance the weight of the rod *o*, which, as will be seen, is of considerable length, the shaft *m* may be provided with an arm, *x*, carrying a suitable counterbalancing-weight, *y*, as shown. It will be observed that the shaft *w* is so arranged that, while it is fixed to and turns freely with the pulley D as the latter is revolved by the movement of the cable C, it is incapable of any longitudinal movement.

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 *w*, 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 arms *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, to start the car in the desired direction. As the car moves, the cable C, being fixed to the car and passing around the pulley D, will revolve the shaft *w*, and thus impart a corresponding movement to the sleeve *f* and pulley *b*, and as the pulleys *b* and D are of the same size the movement of the rope will be the same as that of the cable C; 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* D 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 *w*, as this movement of the rope will not impart any movement to the sleeve and pulley around the shaft. If the friction of the rope H should at any time be so great as to prevent the sleeve *f* and pulley *b* from turning with the shaft *w*, 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 extent by the operator, the motion of the car causing him no embarrassment. When, therefore, it is desired to stop the car, the operator, holding the rope in hand, simply moves it up or down, thereby turning the pulley *b* and its sleeve *f* in a contrary direction to the rotation of the shaft *w*, 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 m*, and through them operate the valve, and this movement of the rope the

operator can continue until it has been moved the necessary distance and at the proper speed to bring the elevator to rest without shock or strain.

In order to facilitate the grasping of the rope by the operator, it may be provided with suitable buttons, *v*, as shown in Fig. 1.

From what has been said it will be seen that the cable C, in addition to its usual function, controls the rotation of the shaft *w* with relation to the pulley *b* and its sleeve *f*—that is to say, it causes the shaft to revolve in unison with the pulley so long as the rope H moves with the car and prevents the shaft from taking any movement imparted to the pulley by the movement of the rope H with relation to the car.

It is to be remarked that instead of employing two small pulleys, *a*, at the bottom of the shaft, a single pulley may be used; but as such single pulley would ordinarily have to be of comparatively large size it will usually be preferable to employ the two small ones, as shown. It is also to be remarked that the pulley or pulleys *a*, instead of being stationary, as shown, may be mounted in movable bearings and controlled either by a weight or spring suitably arranged to take up any slack in the rope H.

Although the rope H may be operated by being grasped by the operator, as has been stated, 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. 4 and 5 two forms of devices suitable for this purpose are illustrated. In Fig. 4 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. 5 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. 4, 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 devices for communicating the motion of the rope H to the stopping and starting mechanism may be varied widely without departing from the essential feature of the invention, which is the rope H arranged to travel with the car without operating the stopping and starting mechanism, and to be moved independent of or with relation to the car to operate said mechanism.

It is to be remarked that in practice the parts of the operating mechanism will usually be so arranged that any friction caused between the different parts of the operating mechanism by the movement of the car will tend to move the pulley *b* and its sleeve *f* in the direction to close the valve G or operate the stopping and starting mechanism to stop the elevator whether the car is ascending or descending. By this means the element of friction caused by the movement of the car is made to assist the operator in working the valve or other mechanism to stop the car, but does not act against him in working the valve or other mechanism to start the car, because at that time the parts are at rest.

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.

What I claim is—

1. The combination, with an elevator-car and its hoisting and stopping and starting mechanisms, of the threaded shaft *w*, driven by the lifting-cable, the pulley *b*, having the threaded hub or sleeve *f* and mounted to turn freely upon said threaded shaft, the operating-rope H, passing around the pulley *b* and traveling with the car and free to be moved around the pulley independent of the movement of the car, and connections for transmitting motion from the pulley *b* when it is turned about the shaft *w* to the stopping and starting mechanism, substantially as described.

2. The combination, with an elevator-car and its hoisting and stopping and starting mechanisms, of the pulley *b*, having the threaded hub or sleeve *f* and mounted to turn freely upon a threaded portion of the shaft *w*, carrying the pulley over which the lifting-cable passes at the top of the elevator-shaft, the operating-rope H, passing around the pulley *b* and traveling with the car and free to be moved independent of the car, operating devices carried by the car and connected to said rope, by which it can be moved, so as to turn the pulley *b* about the shaft *w*, and connections for transmitting motion from the pulley *b* when it is turned about the shaft *w* to the stopping and starting mechanism, substantially as described.

3. The combination, with an elevator-car, its hoisting mechanism, and stopping and starting valve, of the pulley *b*, having the threaded hub or sleeve *f* and mounted to turn freely upon a threaded portion of the shaft *w*, carrying the pulley over which the lifting-cable passes, the operating-rope H, passing around the pulley *b*, the link *o*, connected to the valve, and the rock-shaft *m*, having arms connected to the link and to the sleeve *f*, 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,

H. WESTERMAN.