(No Model.) 2 Sheets—Sheet 1.

F. B. PERKINS.

ELEVATOR.

No. 349,175. Patented Sept. 14, 1886.

Fig: 1.

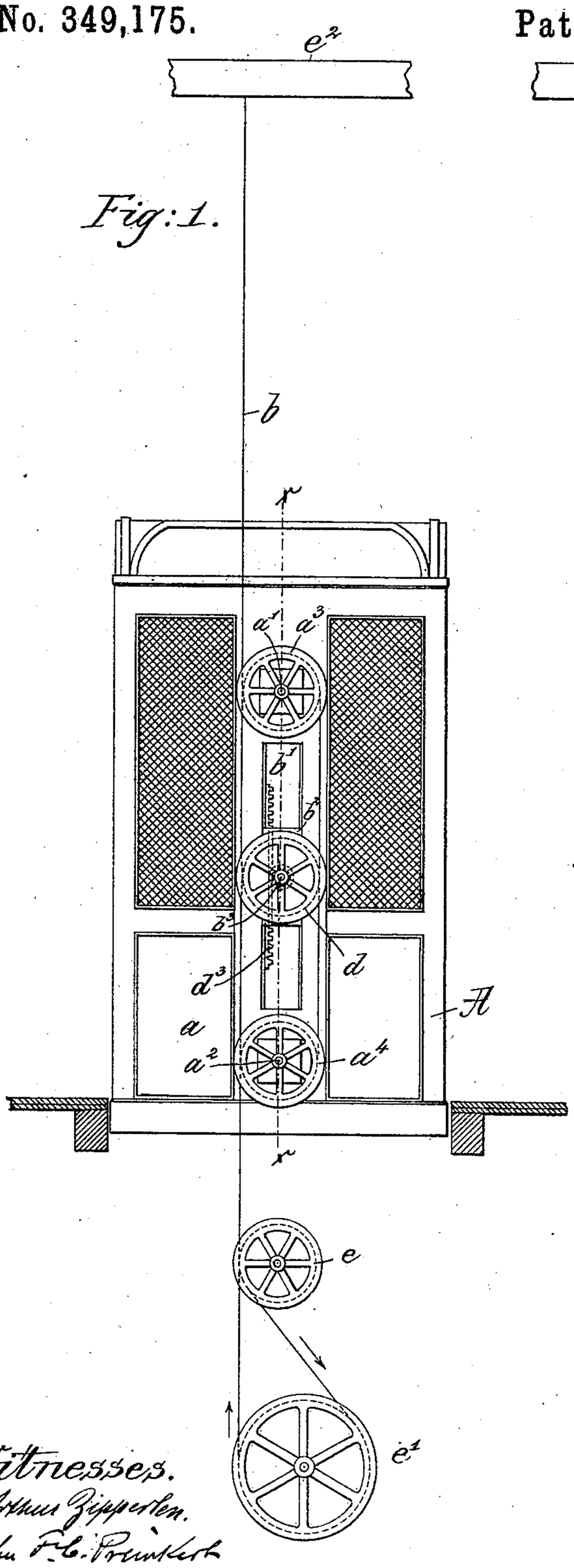
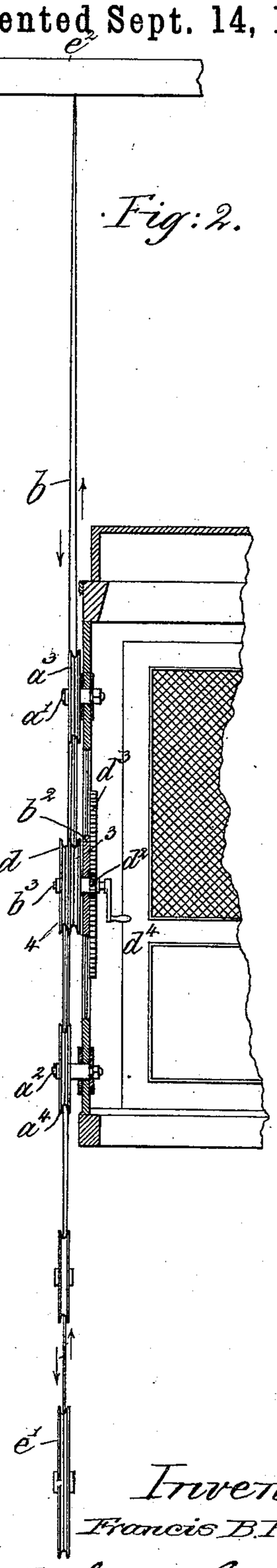


Fig: 2.



Witnesses.
Arthur Zipperlen.
John F. C. Prinkert

Inventor:
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(No Model.) 2 Sheets—Sheet 2.

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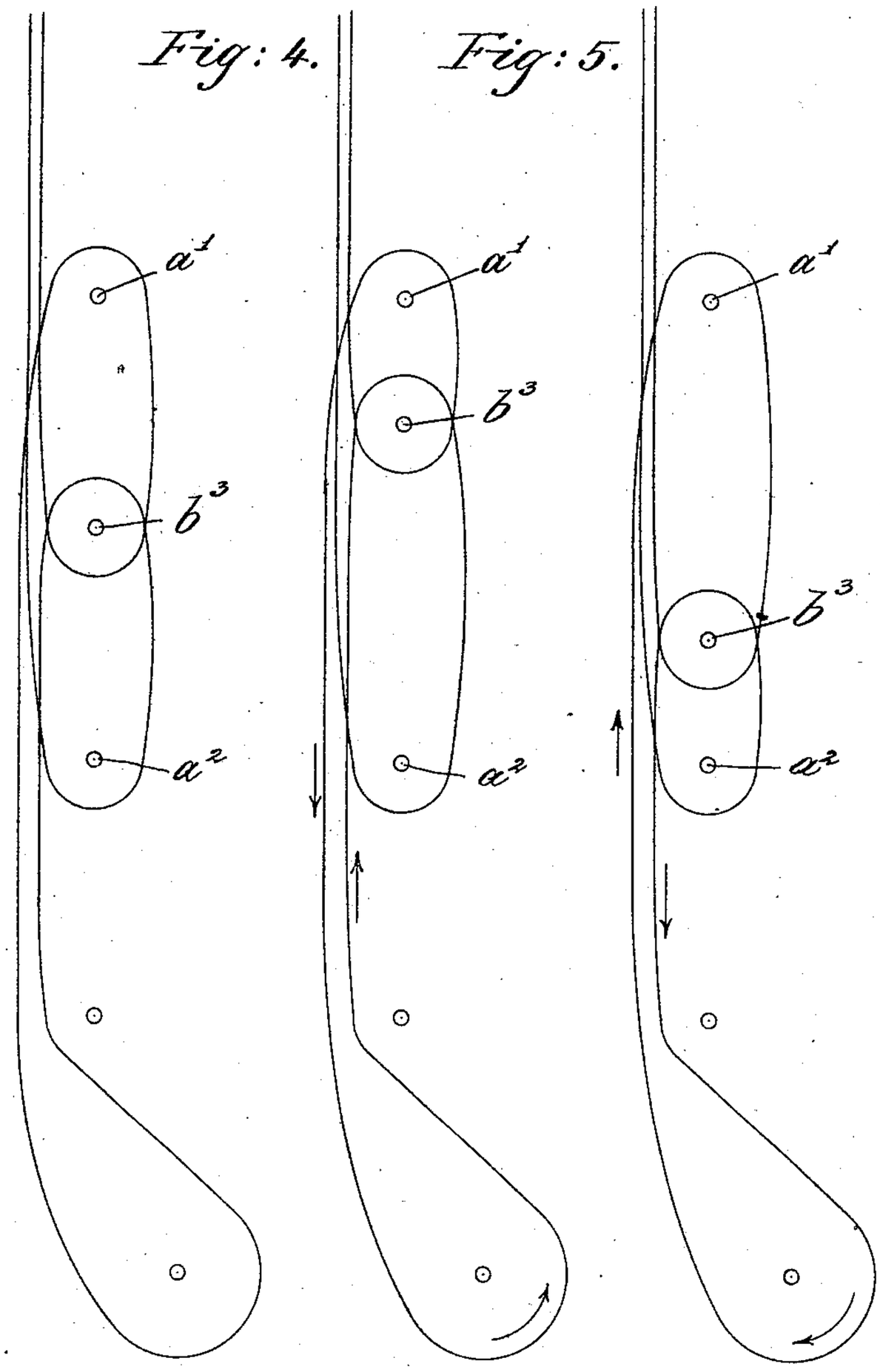
Fig: 3. *Fig: 4.* *Fig: 5.*



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UNITED STATES PATENT OFFICE.

FRANCIS B. PERKINS, OF BOSTON, MASSACHUSETTS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 349,175, dated September 14, 1886.

Application filed April 12, 1886. Serial No. 198,536. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS B. PERKINS, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Elevators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to simplify the apparatus for changing the position of the operating-rope employed in connection with elevators to govern the direction of movement of the car, the said rope being in operative connection, in any usual manner, with the device or devices which control the application of the power which is effective to move the car.

Prior to my invention the car of an elevator has been provided with a rope passing through it, which rope has been grasped by the hand of the operator, and so, also, the operating-rope has been located outside the car and passed over or around a sheave fast to a shaft having its bearings on the car and being extended within the car, where the said shaft has been provided with a hand-wheel. In this latter class of elevators the shaft having the hand-wheel is rotated continuously while the car is traveling, and to start the car in one or the other direction the attendant of the car has to grasp the hand-wheel and turn the said shaft in one or the other direction, thus causing the operating-rope to be drawn bodily in one or the other direction, and, the power having been applied and the car started, the sheave on the said shaft, and about which the operating-rope is passed, is rotated by the operating-rope; but the latter is not moved longitudinally at such time.

In accordance with my invention, which is intended as an improvement on that class of elevators wherein the operating-rope is to remain outside the car, I have provided said car at its outer side with two sheaves arranged on stationary studs, and with a double sheave mounted on a stud of a movable carriage, said double sheave and carriage being located between the two single sheaves first mentioned. The carriage referred to, as herein shown, has a hand-shaft provided with a gear, which meshes into a rack attached to the car, so that the carriage with the double sheave may be readily moved toward or from either of the two sheaves mounted upon the stationary studs. The operating-rope, both ends of which are connected, as herein shown, to a beam or rafter above the car, is passed around the sheave upon the stationary studs, and also around the double sheave mounted on a stud of the carriage, in such manner as to form loops extending from each sheave on a stationary stud about the double sheave on the carriage, so that the movement of the carriage and its double sheave in one direction will lengthen one loop and shorten the other, and the varying of the lengths of these loops effects a positive drawing of a portion of the operating-rope in one or the other direction, so that the said rope, through a sheave on a shaft operated by the rope, effects the application of the power at the proper time and in such manner as to control the ascent or descent of the car. When the double sheave is in a position midway between the two sheaves on the stationary studs, the power to move the car will be cut off or silenced. The attendant, to start the car in one or the other direction or to stop it, has only to turn the crank and move the carriage carrying the double sheave, and during the movement of the car after the application of the power the pinion operated by the crank and the carriage remain at rest; but all the sheaves about which the operating-rope is extended rotate freely on their studs as the car rises or falls, they being rotated by friction upon the operating-rope, which is stationary, the sheaves running, as it were, on said rope.

Figure 1 is a side elevation of a passenger-car provided with my improved apparatus for starting the car; Fig. 2, a section of Fig. 1 on line *x x*, the sheaves being shown in elevation. Fig. 3 is a diagram showing the relative position of the sheaves when the car is stationary. Fig. 4 shows the relative position of the sheaves with the car traveling in one direction, and Fig. 5 shows the position of the sheaves with the car traveling in a direction opposite to that indicated in Fig. 4.

One side, *a*, of the car A, which may be of any usual shape or construction, is herein shown as cut away at its center, as at *b'*, to receive a carriage, b^2, which is adapted to be

moved up and down in said cut-away portion, the extent of upward and downward movement of said carriage determining the opening of the usual valve and the rate or speed at which the car shall travel. The carriage b^2 forms a bearing for a shaft, b^3, having at one end a double-faced sheave, d, and at its other end a pinion, d^2, said pinion meshing with a rack-bar, d^3. (Herein shown as fastened to the inside of the car.) The pinion d^2 is moved up and down in engagement with the rack-bar d^3 by means of a crank or handle, d^1, on the shaft b^3. The side a of the car, as herein shown, also supports studs a' a^2, on which are mounted single sheaves a^3 a^4, the sheave a^3 being above and the sheave a^4 below the cut-away portion b'. The rope b, by which the usual valve is moved to set the car in motion, is passed over and around said sheaves in a manner, as will be hereinafter described, to form loops extending from the sheaves on each of the studs a' a^2 about the double sheave d on the shaft b^3, such loops being clearly shown in Figs. 3, 4, and 5. The rope b also passes under an auxiliary sheave, e, and around the sheave e', both supported below the car, the sheave e' being connected with the valve controlling the power by which the elevator is moved. The rope b, which has both its ends fastened to the rafter c^2 or other suitable support at the top of the building, is herein shown as first passed down under the sheave a^4, up and over one half, as 3, of the double-faced sheave d, down and partially under the auxiliary sheave e, thence under the sheave e' in the direction indicated by arrows, Fig. 1, up and over the sheave a^3, and thence down and under the second half, 4, of the double-faced sheave d to the rafter c^2, where it is firmly fastened. When the elevator-car is at rest, the sheave d will occupy a substantially central position with relation to the sheaves a^3 a^4 on the studs a' a^2, as shown in Fig. 3; but when it is desired that the car should be set in motion the crank d^1 will be turned so as to cause the pinion d^2 to travel toward one or the other end of the rack-bar d^3, thereby changing the position of the sheave d with relation to the sheaves a^3 a^4 on the studs a' a^2. When the sheave d is moved toward the sheave a^3 on the stud a', the loop of rope between the sheaves d and a^3 will be shortened, while the loop between the sheaves d and a^4 will be lengthened, that portion of the rope which is moved being drawn in the direction indicated by the arrows, Fig. 4. When it is desired that the elevator should travel in a direction opposite to that in which it is moved, when the sheave d occupies the position shown in Fig. 4, the crank d^4 will be turned to cause the pinion d^2 and sheave d to travel toward the sheave a^4 on the stud a^2. In this latter movement of the sheave d the part of the rope which travels will be moved in the direction of arrows in Fig. 5. When it is desired to stop the motion of the car, the crank will be turned so that the pinion d^2 and sheave d will, as herein shown, occupy a central position with relation to the said rack-bar and sheaves a^3 a^4, said position being indicated by a suitable mark, or in any well-known manner, on the inside of the car. During the motion of the car the shaft b^3 and crank and pinion on said shaft will remain stationary until positively moved by hand, thereby obviating unequal motion due to a too sudden starting or stopping of the car. The supply of motive power is completely controlled and regulated by means of the crank, any change of position of said crank being transmitted to the valve-sheave e', controlling the said supply of motive power. As herein shown, the valve is moved to open the valves to admit power, and thereby raise the car by turning the crank (shown in Fig. 2) toward the right, said movement of the crank causing the movable sheave d to approach the sheave a^3, said sheaves occupying substantially the position shown in Fig. 4. When it is desired to lower the car, the crank will be turned to the left, the relative positions of the sheaves being the reverse of that in Fig. 4, and as shown in Fig. 5.

I claim—

1. In an elevator, the car, sheaves a^3 a^4, mounted on stationary studs on the outside of said car, a double sheave intermediate of said sheaves, a carriage to support said double sheave and movable between the studs a^3 a^4, and means, substantially as described, to move said carriage, combined with a rope effectively connected to the power-controlling valve, substantially as described, and passed about said sheaves to form loops between the double sheave and the sheaves a^3 a^4, whereby change of position of the double sheave with relation to the sheaves a^3 a^4 changes the length of the said loops, as and for the purpose set forth.

2. The car, sheaves a^3 a^4, mounted on stationary studs on the outside of said car, the carriage b^2, the shaft supported by said carriage and provided with a double sheave, a pinion and crank on said shaft, and rack-bar to be engaged by said pinion, combined with a rope effectively connected to the power-controlling valve, substantially as described, and passed about said sheaves to form loops between the double sheave and the sheaves a^3 a^4, whereby movement of the crank to change the position of the pinion on the rack-bar causes the length of the loops between the sheaves to be changed, 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.

FRANCIS B. PERKINS.

Witnesses:
F. CUTTER,
I. H. CHURCHILL.