

No. 657,380.

Patented Sept. 4, 1900.

C. W. & W. D. BALDWIN.

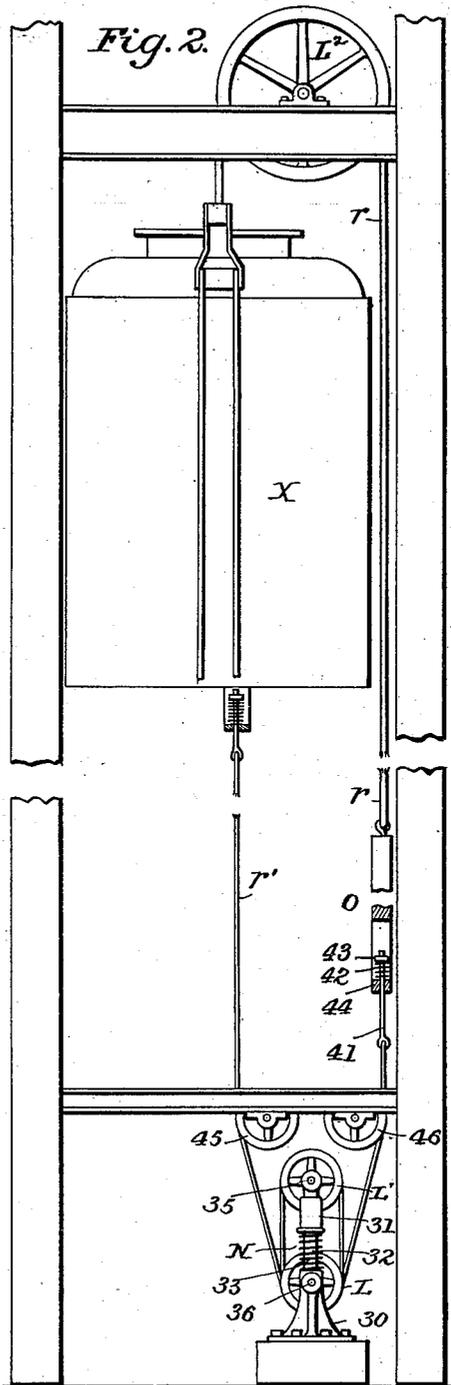
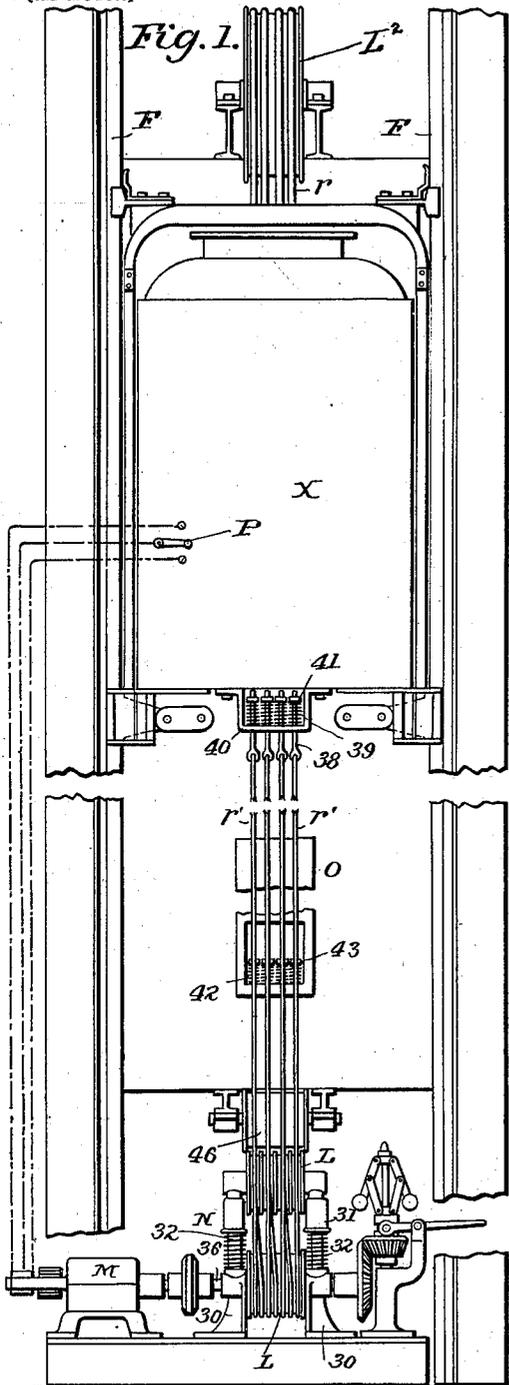
M. E. BALDWIN, Executrix of C. W. BALDWIN, Dec'd.

ELEVATOR.

(Application filed Feb. 4, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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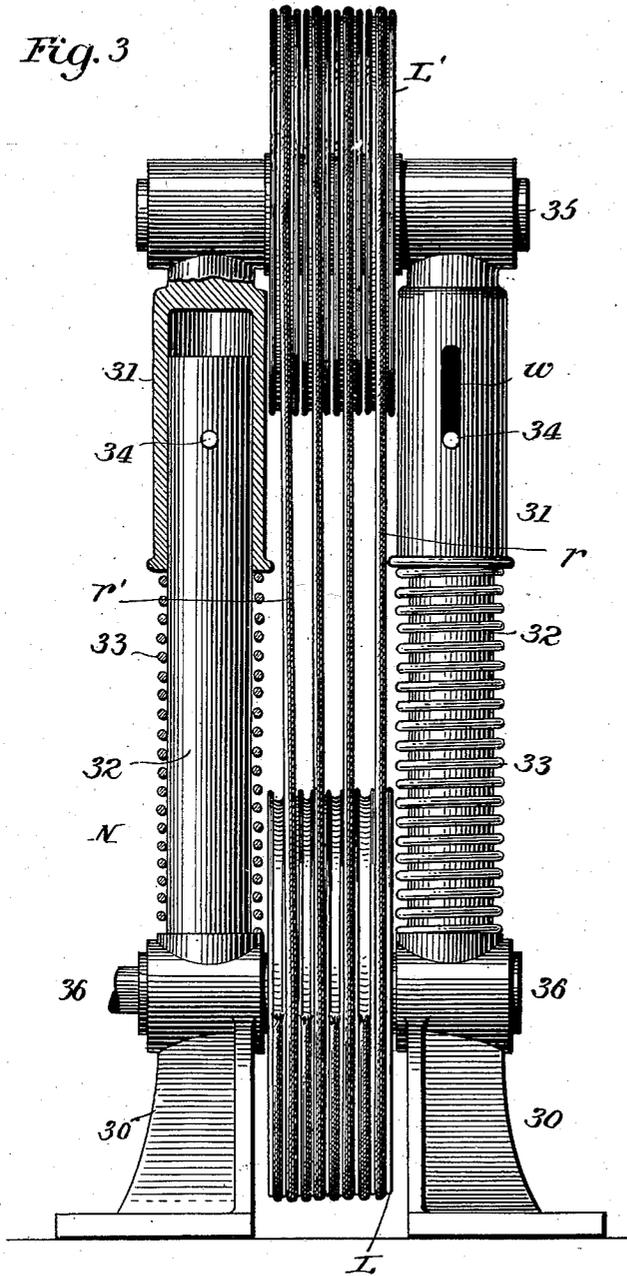
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2 Sheets—Sheet 2.

Fig. 3



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UNITED STATES PATENT OFFICE.

CYRUS W. BALDWIN AND WILLIAM DELAVAN BALDWIN, OF YONKERS, NEW YORK, MARY E. BALDWIN EXECUTRIX OF SAID CYRUS W. BALDWIN, DECEASED, ASSIGNORS TO THE OTIS ELEVATOR COMPANY, OF EAST ORANGE, NEW JERSEY.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 657,380, dated September 4, 1900.

Application filed February 4, 1898. Serial No. 669,073. (No model.)

To all whom it may concern:

Be it known that we, CYRUS W. BALDWIN and WILLIAM DELAVAN BALDWIN, citizens of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

This invention relates to that class of elevators in which the cage is suspended by flexible connections; and our invention consists of novel means fully set forth and claimed hereinafter, whereby the cage may be propelled positively in either direction and in certain improved details of construction, as fully illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of sufficient of an elevator to illustrate the improvement. Fig. 2 is a side elevation in part section. Fig. 3 is an enlarged sectional view of part of the apparatus.

The cage X travels between guides F F within the well, as usual, and one or more suspension-cables r pass over the upper guide-sheave L^2 and downward to a counterweight O, which in the present instance preferably exceeds the weight of the cage to a greater or less extent. At the opposite end of the well are arranged the driving-sheaves, of which there may be one or more, a series L of such sheaves being shown mounted upon a shaft 36, connected to be driven by a suitable motor M and constituting practically a grooved drum, the shaft 36 having its bearings in the stationary portion 30 of a frame N, the upper portion 31 of the said frame being movable and having sockets to receive rods 32, projecting from the lower part 30 of the frame, with springs 33 interposed between the two portions of the frame. The upper portion 31 of the frame carries a transverse shaft or axle 35, on which turn freely a series of counter-sheaves L' , and a cable r' passes from the bottom of the cage around the lower part of the sheaves or drum L in one of the grooves of the same upward and around one of the counter-sheaves L' and down and around or in one of the grooves of

the sheave L, and thence upward to the lower part of the counterweight O. By this means an extended frictional bearing for each cable is secured, preventing any possible slippage when the driving sheaves or drums are either in motion or stationary.

In order to prevent contact of the driving-cables r' with the upper sheave, two separated guiding-drums 45 46, mounted upon suitable bearings within the well, or two series of sheaves arranged side by side, serve to separate the different portions of the cables r' , as best shown in Fig. 2.

In order to provide for expansion and contraction of the cables and maintain the same taut at all times, we connect each cable to an eyebolt 38, which passes through a bracket 40 upon the lower part of the cage and is provided with a nut 41, bearing upon a spring 39, the nut serving to impart the desired degree of tautness to each cable in the first instance and the spring yielding under the contraction of the cables and expanding to maintain them taut when the cables are relaxed. A like arrangement may be upon the counterweight O, as shown, or the arrangement may be only upon the counterweight or only upon the cage.

By interposing a spring-bearing between the two separate parts of the frame N, carrying the driving-sheaves and counter-sheaves, we are enabled to take up shocks and vibrations resulting from irregularities in the movements of the driving mechanism, compensate for any expansion or contraction of the cables between the two sets of sheaves, and secure a better frictional adhesion of the cables to the driving-sheaves.

The driving-sheaves may be driven in any suitable manner. As shown, there is an electric motor M, and there is a control device P within the cage, by means of which the movements of the motor may be controlled as required.

Instead of making the two sets of cables r r' of the same size we make the driving-cables r' , which have to convey motion, but do not support the weight of the cage, much smaller than the suspension-cables r , so that they are

more flexible, and this permits us to use smaller driving and counter sheaves.

By driving the cage by means of cables passing around, but not wound upon, the driving drum or sheave, connecting both ends of the cables directly or indirectly with the cage, we are enabled to use a drum of comparatively-small size and secure a direct operation upon the cage and drive it positively in both directions by means of light cables, the counterbalance in some instances lifting the cage without the exercise of any direct propelling force on the part of the motor and the load in the cage in other instances driving it downward without assistance from the motor. It is also possible in the arrangement shown to connect the motor directly to the shaft of the driving-sheaves, thereby dispensing with a worm and gear, this resulting from the fact that the passage of the cable around the two series of sheaves is sufficient to retard the movements of the cables and prevent any undue speed of the cage, even if the motor and brake should cease to act. By thus doing away with the necessity of using a worm and gear a very large proportion of the power required is saved. Another important advantage in this connection is that inasmuch as the cage will ascend under the action of the counterweight the motor in such case is driven by the movement of the cage, causing a counter electromotive force, which serves as a brake to the too-rapid upward movement of the car, and in like manner when the car is descending under its load and drives the mo-

tor there is a similar counter electromotive force which acts as a brake to prevent too-rapid downward movement.

Without limiting ourselves to the precise construction and arrangement of parts shown, we claim as our invention—

1. The combination with a car, its counterweight, and upper and lower sheaves, of flexible connections passing from the top and bottom of the car to the counterweight, a frame in two sections, a set of sheaves supported by each section, the lower flexible connections passing around both of the sets of sheaves carried by said frame, springs between the sections, a motor connected to drive the lower sheaves of the frame, and means for controlling the motor from the car, substantially as set forth.

2. The combination with the car, of driving-cables, two sets of sheaves around which the cable passes and means for separating them under yielding tension, eyebolts connected with said cables and passing through a part of the car and provided with nuts, and springs interposed between the nuts and bearings on the car, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CYRUS W. BALDWIN.

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Witnesses:

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