(No Model.)

J. H. CLARK.

CONTROLLER FOR ELEVATORS

No. 464,452. Patented Dec. 1, 1891.

Fig: 1.

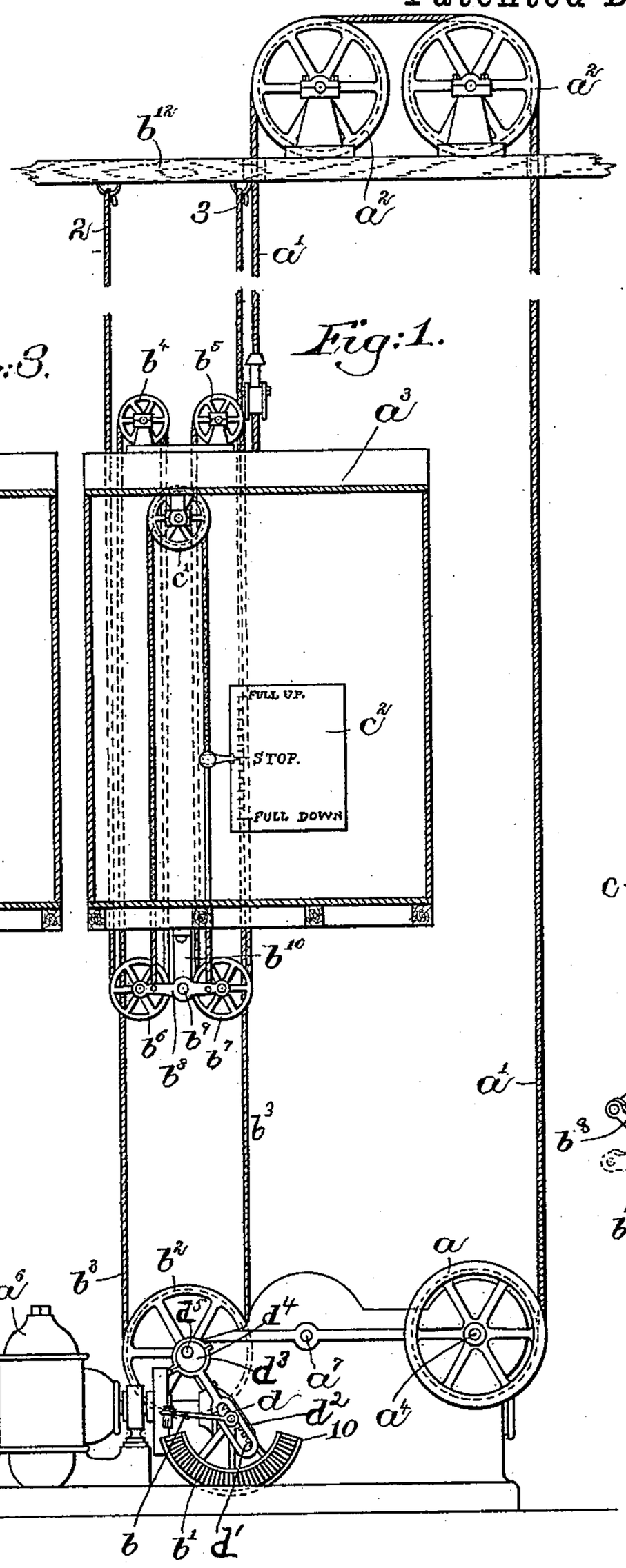


Fig: 2.

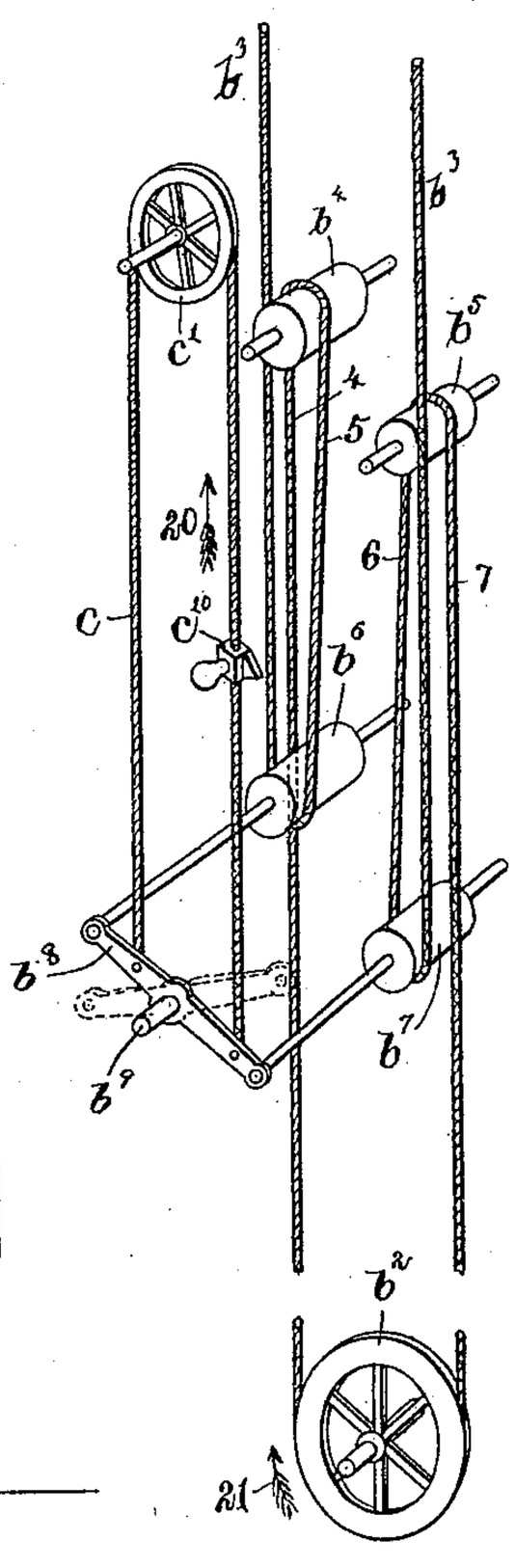
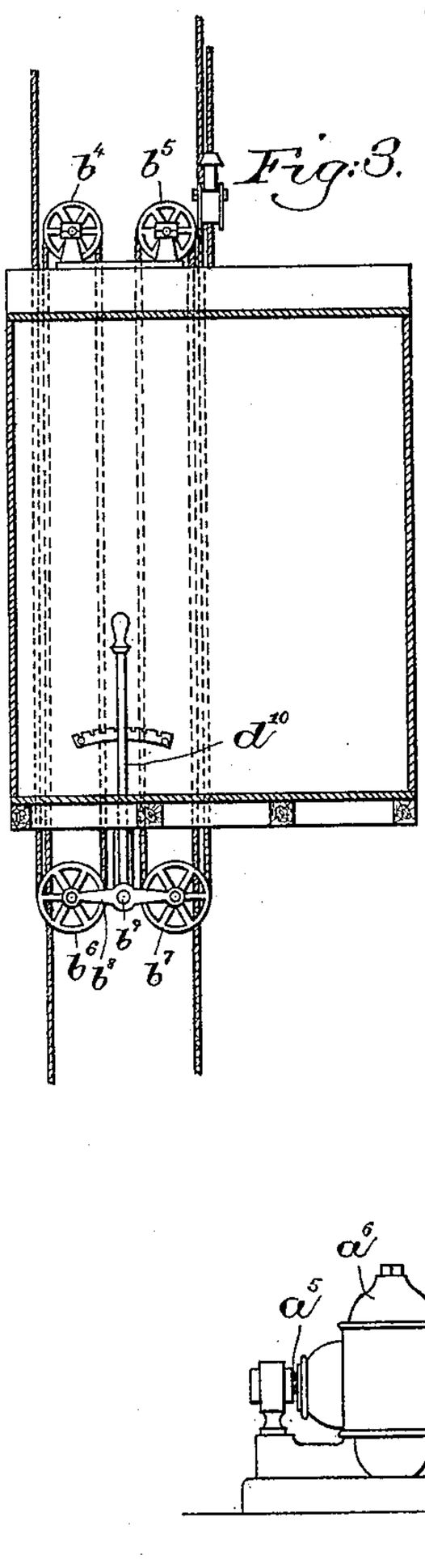


Fig: 3.



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JOHN H. CLARK, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE WHITTIER MACHINE COMPANY, OF SAME PLACE.

CONTROLLER FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 464,452, dated December 1, 1891.

Application filed April 9, 1891. Serial No. 388,217. (No model.)

To all whom it may concern:

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

This invention in elevator mechanism relates to that class of elevators in which the motor mechanism employed to actuate the elevator car or platform is controlled by operating what is commonly called the "shipper-rope." In elevator mechanism the motor mechanism is of a given or predetermined capacity—that is, it is capable of furnishing power sufficient to lift a given load or weight—and in practice the extent to which the motor mechanism is operated is governed by the particular work required—namely, the load to be lifted. In practice the extent to which the motor mechanism is operated is controlled by the operator on the elevator moving the shipper-rope a greater or less extent, according to the exigencies of the case. As now commonly practiced, the operator on the elevator car or platform moves the shipper-rope sufficiently to overcome the load on the car and to lift the same. The load to be lifted may be a varying one, and especially is this true in passenger-elevator service—as, for instance, when starting from one floor of a building (for instance, the first floor) a maximum load is required to be lifted, but at the second floor the load is diminished, as by persons leaving the elevator at the said floor. When starting from the first floor, the operator moves the shipper-rope in one direction until the car ascends, and then moves it in the opposite direction until the car stops. As the shipper-rope is moved in the opposite direction, the power is reduced, and it frequently happens that the power is not entirely cut off, but is merely counterbalanced by the load in the car, so that when the load is reduced, as by one or more persons leaving the elevator at the second floor, the equilibrium is destroyed and the power predominates, thus again starting the elevator in operation, and thereby giving rise to liability of accident, as the elevator may start while a passenger is in the act of leaving the elevator-car. This liability of accident is largely augmented in elevators employing electricity as the motive power.

My present invention has for its object to provide a shipper mechanism, as will be described, whereby the motor mechanism may be entirely cut off or rendered inoperative when the car is stopped, and this fact is made known to the operator on the elevator car or platform.

In accordance with my invention the shipper-rope is passed about a series of pulleys or sheaves carried by the car in such manner, as will be described, that the movement of one set of pulleys on the car will be multiplied on the shipper-rope, whereby a limited movement of the shipper mechanism will produce a substantially-increased movement of the shipper-rope and of the parts of the motor mechanism attached thereto.

The particular features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 represents a sufficient portion of an elevator mechanism embodying my invention to enable it to be understood; Fig. 2, a detail of the shipper mechanism shown in Fig. 1, and Fig. 3 a modification to be referred to.

The elevator mechanism with which I have chosen to illustrate my invention as herein shown is what is technically known as the "drum-elevator," it consisting of one or more drums a, upon which is wound one or more hoisting ropes or cables a', passed about pulleys or sheaves a^2 at or near the top of the elevator well or shaft, the said hoisting ropes or cables being secured in any suitable or desired manner to the elevator car or platform a^3. The winding drum or drums a—there being only one herein shown—is fast on a shaft a^4, driven by suitable gearing, deriving motion, as herein represented, from the armature-shaft a^5 of an electric motor a^6, which may be of any usual or well-known construction.

The motor mechanism does not form part of my present invention, and consequently need not be specifically described, but may be described in general as follows, viz: The

drum-shaft a^4 has fast on it a gear in mesh with a gear on a shaft a^7, and the said gears are preferably rotated by means of a right and left worm on a shaft, preferably detachable from, but secured to, the armature-shaft of the motor. The current to the motor a^6 is controlled, as herein shown, by a switch b, cooperating with a resistance b' in circuit with the motor. The switch b, as represented, is operated from a shaft, upon which is mounted the shipper sheave or pulley b^2, about which is passed the shipper-rope b^3. I prefer to use one continuous shipper-rope b^3; but, if desired, the said rope may be divided into two parts and one end of both parts secured to the shipper sheave or pulley b^2.

In accordance with my invention the shipper-rope is passed about two sets of guides, preferably sheaves or drums carried by the elevator-car a^3. One set of guides carried by the car comprises, as shown, two sheaves or drums b^4 b^5, having their shafts supported in fixed or stationary bearings on the car, they being herein shown as located at the top of the car. The other set of guides also comprises, as herein shown, two sheaves or drums b^6 b^7, having their shafts supported in movable bearings, preferably levers b^8, only one of which is shown, it being pivoted, as at b^9, in brackets b^{10}, depending from the car. The shipper-rope b^3 has its ends rigidly fastened near the top of the elevator-well, they being represented as fastened to the cross-bar b^{12}, which supports the hoisting-sheaves a^2. The movement of the lever b^8 is multiplied on the shipper-rope in accordance with my invention by passing the said shipper-rope about the sheaves on the car to form one or more loops, according to the extent it is desired to multiply the said movement.

As herein represented the shipper-rope is passed about the sheaves or drums on the car to form a single loop, by which the movement of the lever b^8 is doubled on the shipper-rope, and the shipper-wheel b^2 is turned twice as far as it would be if the shipper-rope were passed over the sheaves in a direct manner—that is, without being doubled on itself to form loops. The loops referred to may be formed as follows, viz: One end of the shipper-rope—for instance, the end marked 2—is fastened to the cross-bar, and the said rope is then passed down under the sheave b^6, up over the sheave b^4, then down under the shipper-sheave b^2, up over the sheave b^5, then down under the sheave b^7, and then up to the cross-bar b^{12}, where its other end 3 is made fast, as described. The portions of the shipper-rope between the sheaves or drums b^4 b^6 and marked 4 5, and the corresponding portions between the sheaves or drums b^5 b^7 and marked 6 7, form the loops referred to, which are lengthened and shortened according to the direction in which the elevator-car should travel. The loops referred to are lengthened and shortened by turning the lever b^8 on its pivot—as, for instance, into its dotted-line position in Fig. 2. The movement of the lever b^8 is preferably accomplished, as shown in Figs. 1 and 2, by means of an auxiliary starting or operating rope c, passed about a pulley c' near the top of the car and having its ends connected, as shown, to the lever b^8 on opposite sides of the pivot b^9. The auxiliary or starting rope c is preferably provided with a button, pointer, or other indicating device c^{10}, which registers with suitable marks; or it may be a scale c^2, located within the car, the said scale, as represented, being provided with devices by which the exact extent of movement of the shipper-rope may be made known to the operator, and consequently the exact position of the parts of the motor mechanism operated by the shipper-rope is also made known. As represented in Fig. 1, the scale c^2 is marked "Full up," "Stop," and "Full down." Normally the indicator c^{10} is opposite the word "Stop" on the scale c^2, and the motor mechanism at such time is inoperative, and when a motor mechanism as herein shown is used the switch b is out of contact with the resistance b' and the current is cut off from the motor. If now it is desired to start the car upward, the operator moves one arm or branch of the auxiliary rope c in the direction of arrow 20, Fig. 2, and if it is desired to employ the full capacity of the motor the said arm of the auxiliary rope is moved in the direction of arrow 20 until the indicator c^{10} is opposite "Full up" on the scale. The movement of the auxiliary rope turns the lever b^8 into its dotted-line position, Fig. 2, lengthens the loop 4 and 5, and rotates the shipper-wheel b^2 in the direction of arrow 21, Fig. 2. When the lever b^8 is turned into its dotted-line position, the loop 6 and 7 is shortened. As the shipper-wheel b^2 is rotated in the direction of arrow 21, the switch b is brought in contact with the resistance and the motor is started in operation. The movement of the lever b^8 but a substantially small distance is multiplied on the shipper-rope, so that when the indicator registers with "Full up" the switch is in contact with the least resistance and the motor is working at its full capacity. The point of least resistance may be represented by 10 in Fig. 1. When it is desired to stop the travel of the car in an upward direction, the operator moves the indicator c^{10} to "Stop" on the scale, and the lever b^8 is brought back to its normal or full-line position, Fig. 2, and the switch b is moved back over the resistance into its normal position (shown in Fig. 1) out of contact with the resistance. If it is desired to descend, the indicator c^{10} is moved in a direction opposite to that indicated by arrow 20 until it registers with "Full down." The lever b^8 is turned into a position opposite to that indicated by dotted lines, Fig. 2, the loop 6 7 being lengthened, the loop 4 5 being shortened, and the shipper wheel or sheave b^2 rotated in a direction opposite to that indicated by arrow 21. The movement of the lever b^8, as just described, again brings

the switch *b* to the point 10 of least resistance, and the motor is operating in a reverse direction at its full capacity. The movement of the switch-arm in the same direction to bring it into contact with the resistance is accomplished by means of a pinion *d*, to which the switch is connected, meshing with teeth *d'* on one side of a slotted arm d^2, fastened by a strap d^3 to a disk d^4, eccentrically mounted on a stud or shaft d^5, secured to or forming part of the shaft on which the shipper-sheave is mounted. The armature of the motor a^6 is reversed on the downward movement of the indicator c^{10} on the auxiliary rope, and this may be accomplished by means of a suitable pole-changer, (not shown,) but which may be operated by the rock-shaft on which the shipper sheave or wheel b^2 is mounted. I prefer to employ the auxiliary rope *c* as the means by which to move the lever b^8; but I do not desire to limit myself in this respect, as the said lever may be moved in any other desired manner—as, for instance, by means of an arm d^{10}, fast to the lever b^8 and extended into the car, as shown in Fig. 3. In practice the shipper-rope will preferably be located on the outside of the car and only the auxiliary rope *c* be located within the car.

By means of my improved shipper mechanism the motor mechanism may be absolutely controlled and danger from accidental starting of the car is entirely obviated, for in all cases the operator on the car knows that when his indicator c^{10} registers with the word "Stop" on the scale c^2 the motor is at such time inoperative. I prefer to construct the stationary set of guides on the car as sheaves or drums; but I do not desire to limit myself in this respect, as the said guides may be made in other forms—as, for instance, they may be rods, studs, or projections, over which the shipper-rope is passed.

By means of the multiplying-loops a limited movement of the auxiliary starting device or mechanism within the car produces a multiplied movement of the shipper-rope.

I am aware that a shipper-rope has been passed about a stationary and a movable sheave, and I do not claim such construction, broadly; but I am not aware that prior to my invention a shipper-rope has been passed over a stationary and a movable sheave so as to form a multiplying-loop, so that a limited movement of the movable sheave would produce a multiplied movement of the shipper-rope.

I claim—

1. In an elevator mechanism, the combination, with the elevator car or platform, a motor mechanism to operate it, a fixed set of guides, and a movable set of guides carried by the said car or platform, of a shipper-rope passed about the said set of guides to form multiplying-loops 4 5 6 7 and connected to the motor mechanism and fastened at its ends to a stationary support, and means to operate the movable guides from the car, whereby a limited movement of the said movable guides produces a multiplied movement of the shipper-rope, substantially as described.

2. In an elevator mechanism, the combination, with the elevator car or platform, a motor mechanism to actuate it, and a fixed set of sheaves or drums and a movable set of sheaves or drums carried by the said car or platform, of a shipper rope or cable multiplied on itself about the said sets of sheaves to form loops 4 5 6 7, as described, and connected to the shipper sheave or wheel of the motor mechanism, and an auxiliary rope to actuate the movable set of sheaves on the car, substantially as described.

3. In an elevator mechanism, the combination, with the elevator car or platform, a motor mechanism to actuate it, and a fixed set of sheaves or drums and a movable set of sheaves or drums carried by the said car or platform, of a shipper rope or cable multiplied on itself about the said sets of sheaves to form loops 4 5 6 7, as described, and connected to the shipper sheave or wheel of the motor mechanism, and an auxiliary rope to actuate the movable set of sheaves on the car, an indicator c^{10} on the auxiliary rope, and a scale on the car with which the indicator registers, a limited movement of the auxiliary rope producing a multiplied movement of the shipper-rope, substantially as described.

4. In an elevator mechanism, the combination, with the elevator car or platform, an electric motor mechanism to actuate it, a resistance in circuit with the motor mechanism, a switch co-operating with said resistance, a shaft to which said switch is connected, and a shipper wheel or sheave on said shaft, of two sets of sheaves or drums carried by the elevator car or platform, one of the said sets being movable, as described, a shipper-rope doubled on itself about the sheaves or drums to form loops 4 5 6 7 and passed about the shipper-wheel, and means to actuate the movable set of sheaves on the car, whereby a limited movement of the movable sheaves produces a multiplied movement of the said switch, substantially as described.

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

JOHN H. CLARK.

Witnesses:

JAS. H. CHURCHILL,

E. L. RICHARDS.