(No Model.)

C. R. PRATT.

CONTROLLING MECHANISM.

No. 459,090. Patented Sept. 8, 1891.

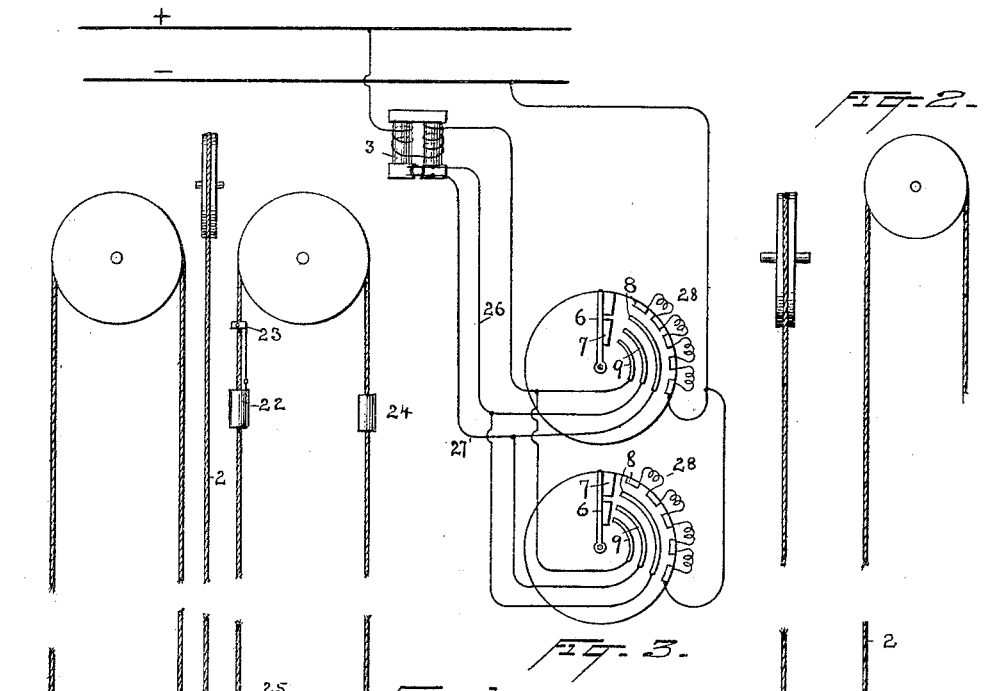


Fig. 3.

Fig. 2.

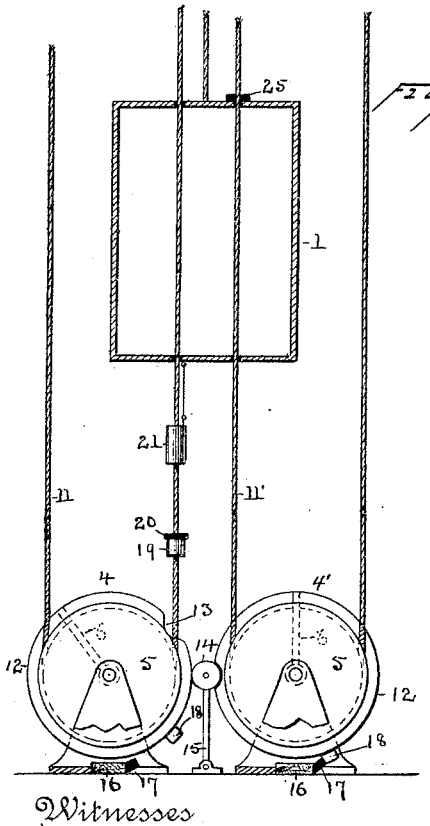
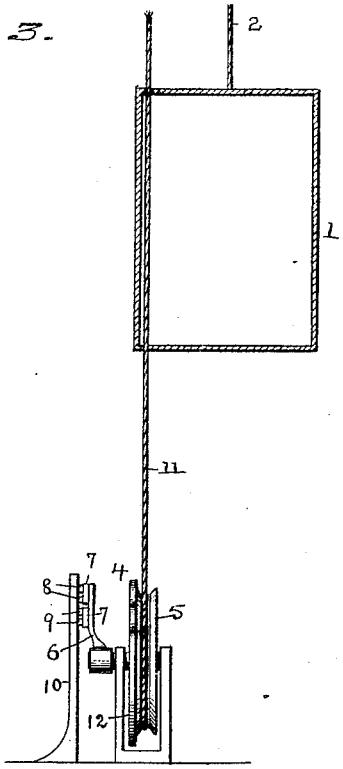


Fig. 1.



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CHARLES R. PRATT, OF NEW YORK, N. Y.

CONTROLLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 459,090, dated September 8, 1891.

Application filed October 30, 1890. Serial No. 369,816. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. PRATT, a citizen of the United States, residing at New York, in the county and State of New York, have invented a certain new and useful Improvement in Mechanism for Controlling Electric and other Motors, of which the following is a specification.

This invention relates to means for starting, stopping, and reversing motors or other mechanism; and the object of the invention is to provide simple means for the purpose named which shall be so constructed that it cannot be operated to reverse the motor or machine until the part which was moved to cause the motor to turn in one direction shall be brought entirely back to the zero or normal position, and the construction is such that when operated to move the motor in one direction the means for moving the motor in the opposite direction will be locked; another object of the invention is to provide an improved controlling and safety device, as hereinafter described.

The invention consists in an apparatus the principles and construction of which are illustrated in the accompanying drawings, in which—

Figure 1 shows the controlling mechanism applied to an elevator. Fig. 2 is a view at right angles to Fig. 1, and Fig. 3 is a diagram of the circuit connections which may be employed.

1 indicates the elevator-car, and 2 the hoisting-cable, which passes to the top of the elevator-shaft over suitable pulleys to the hoisting mechanism, which is not shown, since it does not form a part of the present invention. The hoisting mechanism preferred is operated by an electric motor, which can be driven in one direction to raise the elevator-car and in an opposite direction to lower it in a well-known manner. Such a motor is indicated at 3 in Fig. 3.

At some suitable point, preferably at the bottom of the elevator-well, is placed means for controlling the elevator mechanism. The means shown is in two sections and consists of two circuit-closers 4 4′. Each circuit-closer or changer consists of a pulley 5, suitably journaled and having a switch-arm 6 provided with suitable contacts 7 for electrically connecting the circuit-terminals 8 and 9, respectively, supported on the switch-board 10. The switch-arms and contacts, with their supports, are termed "controllers" for the motor. Around these pulleys are placed cables 11 11′, one side of each cable passing through the car, as shown, the cables being provided with pulleys at the top of the elevator-well.

Rigidly connected with the pulleys 5 are projecting flanges 12, each of which is provided with a depression or notch 13. When the elevator-car is at rest and the motor is out of circuit, the two notches face each other and the wheel 14 on the pivoted standard 15 rests loosely between the two flanges and either of the pulleys and switch-arms can be moved. When either of said pulleys is moved, (for example 4, as shown in Fig. 1,) the wheel 14 is pressed toward the other pulley riding on the surface of the rim of the pulley first moved, thereby forming a lock for the other pulley.

16 are blocks which constitute stops for the circuit-closers. Preferably an elastic material 17 is connected with the block 16 to form a cushion, against which the co-operating projection 18 on the rim 12 may strike.

On the cable 11, preferably near the bottom of the elevator-well, is fixed a stop 19, having an elastic striking-surface 20.

Below the bottom of the car is a freely-suspended weight 21, preferably arranged to slide over the shifting cable 11.

On the cable 11′, preferably near the top of the elevator-well, is a freely-suspended weight 22, connected to the cable at 23.

24 is a weight fixed to the cable on the other side of the pulley and forming a counter-balance for the weight 22.

25 is an elastic striking-block on the top of the elevator-car. These cables and weights constitute means for operating the controllers.

Referring now to Fig. 3, the circuit connections will be described. From the plus side of a supply-circuit a branch wire leads through the field-magnet coil of the elevator-motor 3, thence to a contact 9 on the upper switch-board, and to a similar contact on the other board. When the contacts 9 at the upper board are united by means of the switch-arm 6 and a contact 7, the circuit is continued by wire 26 to the motor-armature, thence by wire

27 to contact 8, thence to and through the resistances 28, and to the negative side of the supply-circuit. The circuits will be similar when the lower switch is operated, except that the circuit through the armature will be in the opposite direction.

The operation of the above-described apparatus will now be briefly set forth. Suppose the elevator-car to be at the bottom of the well and it is desired to ascend. The operator in the car will pull down cable 11′, throwing arm 6 of circuit-closer 4′ onto its contacts, thereby closing the circuit through the motor in the direction to raise the elevator-car. The cable is moved to a greater or less extent in accordance with the amount of resistance 28 which it is necessary to throw out of circuit in order to regulate the current to give the motor sufficient power to do its work. Should the operator fail to throw the motor out of circuit before the car reaches the top of the elevator-well, the car will strike the weight 22 and raise it, destroying the balance between 22 and 24, when weight 24 will operate to turn the switch back to its zero position, thus opening the motor-circuit. The length of the cord or wire supporting weight 22 is so adjusted as to stop the car at the proper point. When it is desired to descend, 4′ having been moved back to zero, the operator in the car will move cable 11, closing the motor-circuit at the other circuit-closer, as will be evident from the diagram. Should the operator fail to stop the motor before the car reaches the bottom of the well, the weight 21 will strike the stop 19 20 and move the switch-arm back to its zero position, thus opening the motor-circuit and stopping the elevator-car at the proper point.

The advantage of operating the circuit-closers by means of the freely-suspended weights are obvious, the main advantages being the ease with which the position of the weights can be changed or adjusted and the gradual manner in which they operate on the cables which move the pulleys. As has already been indicated, it is necessary to return one pulley to its zero position before the other can be operated. This arrangement makes it certain that the circuit through the motor in one direction will be entirely opened before the circuit is closed through the motor in the opposite direction. The stops 17 give the operator positive means for determining when the switch-arms are brought to the zero position, since they can be moved no farther, and the operator is not obliged to depend on the use of his eye or hand to note the position of a device secured to the cable in the car. When the weight strikes the stop on the cable, it moves it to open the motor-circuit before the car or the elevator mechanism reaches the end of its travel, and the strain on the cable is only that due to the weight. This strain is much less than in old arrangements, in which the car itself co-operates directly with a stop on the cable. In the latter case when the car going at a high speed strikes the stop it frequently breaks the cable, even when elastic buffers are used. This difficulty is overcome by my arrangement of suspended weights, which are movable in relation to the car, as will be evident. This apparatus would stop the car before it reached the end of its travel; but at the same time the operator can retain control of the car by pulling on the cable to overcome the effect of the weight.

It will be evident that the locking device is applicable to other forms of apparatus than those shown in the drawings. Hence I do not confine myself to the exact construction shown.

Having thus described the invention, what I claim is—

1. The combination of a motor having a suitable source of power for driving it, a controlling device for the motor, made in two sections, one for admitting said power to the motor in one direction and one for admitting power to the motor in the opposite direction, and a lock operated by the movement of either section to hold the other at its normal position, substantially as described.

2. The combination of a motor movable in two directions, a controlling device for admitting power to the motor to cause it to move in one direction and a separate controlling device for admitting power to cause the motor to move in the opposite direction, means for moving either of said devices, and a lock operated by movement of the first controlling device to hold the other, said lock consisting of a pivoted lever between the two devices, and said lock being released when the first device is returned to zero, substantially as described.

3. The combination of an electric motor having a suitable current-supply, a circuit-changer for admitting current to the motor in one direction and for regulating the current strength, a circuit-changer for admitting current to the motor in the opposite direction and for regulating current strength, and a lock for the circuit-changer, substantially as described.

4. A double circuit-changer consisting of two switch-arms with co-operating contacts, means for moving either section of the circuit-changer, and a lock operated by movement of either section to hold the other section, substantially as described.

5. A double circuit-changer consisting of two switch-arms, disks adapted to rotate, to which said arms are connected, co-operating contacts for said arms, and a lock operated by the movement of either disk to lock the other, substantially as described.

6. A double circuit-changer consisting of two disks mounted side by side, switch-arms movable with the disks, and a lock between the disks thrown into positive engagement by the movement of either disk, substantially as described.

7. A double circuit-changer consisting of two disks mounted side by side, switch-arms movable with the disks, and a locking-wheel supported between the disks, substantially as described.

8. The combination of a motor, a device for controlling admission of power to the motor, and a freely-suspended weight moving with or in accordance with the apparatus driven by the motor and acting on said device to move it, substantially as described.

9. The combination of an elevator-car, a motor, a controlling device for controlling admission of power to the motor, a freely-suspended weight, a cable connected to said device for moving it, and a fixed stop on the cable, said freely-suspended weight being movable in line with the stop, substantially as described.

10. The combination, with an elevator-car, of a motor, a controller for the motor, a cable connected to the controller, a fixed stop on the cable, and a weight suspended in position to strike said stop when the car is near the limit of its movement, substantially as described.

11. The combination, in an elevator apparatus, of a motor, a device for controlling admission of power to the motor, a cable connected to said device to move it, a weight by which the cable may be moved, said weight being normally restrained from action, and a second weight in the path of the elevator-car and adapted to be moved thereby for causing said first-mentioned weight to act on the cable, substantially as described.

12. The combination, in an elevator apparatus, of a motor therefor, two devices for controlling admission of power to the motor, cables for operating said devices, one in one direction and one in the opposite direction, a fixed stop on one cable, a weight suspended below the car in position to strike the stop, a weight suspended on the other cable in the path of the car and adapted to be moved thereby, and a counterbalanced weight, substantially as described.

This specification signed and witnessed this 25th day of October, 1890.

CHAS. R. PRATT.

Witnesses:
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