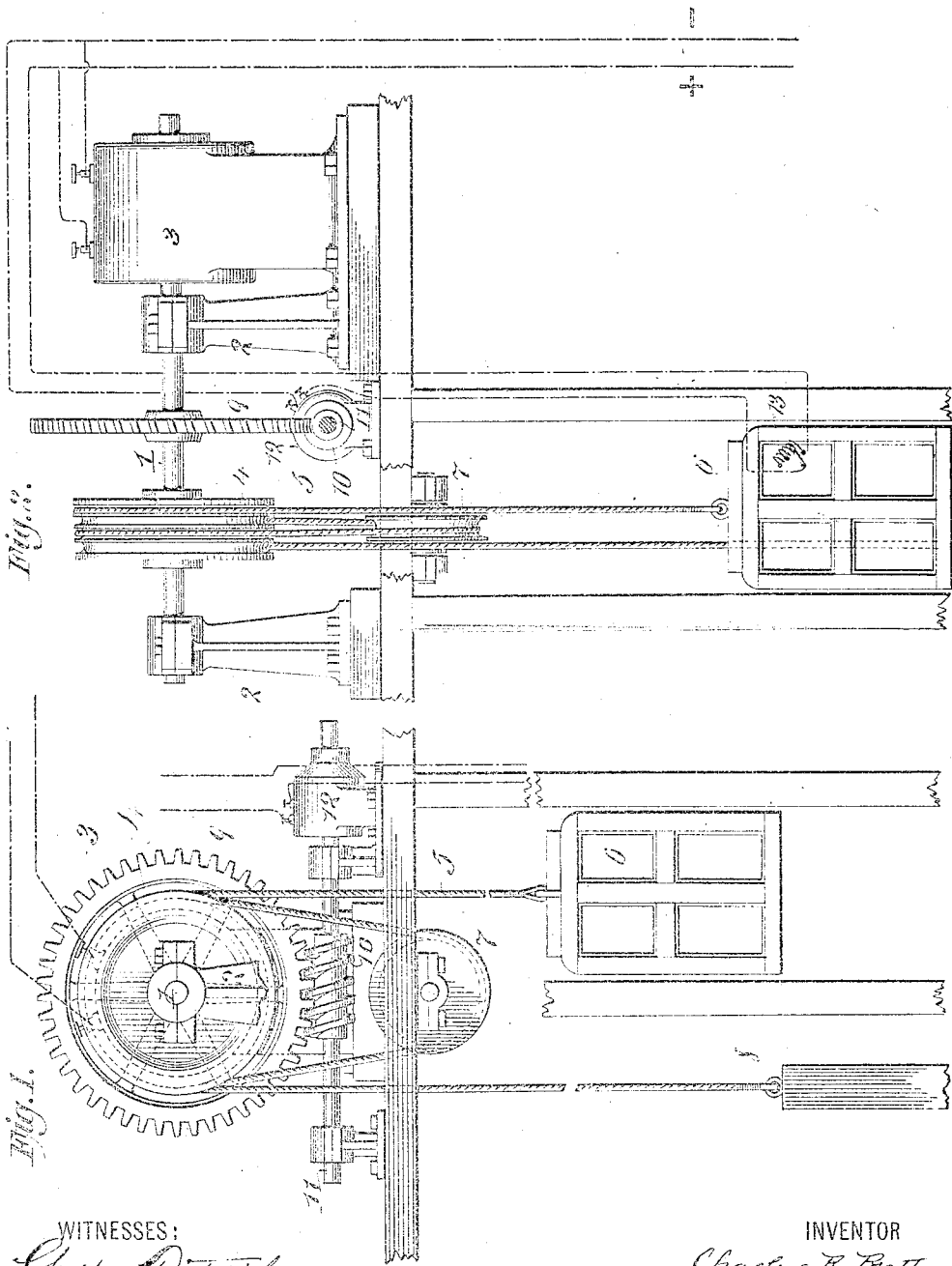


C. R. PRATT.
ELEVATOR.

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

ELEVATOR.

No. 865,205.

Specification of Letters Patent.

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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 of New York and State of New York, have invented a certain new and useful Improvement in Elevators, of which the following is a specification.

The invention relates to hoisting gear for elevators.

The object of the invention is to secure stoppages within positive limits, absolute limit and uniform acceleration of speed, the shortest possible car travel in starting and stopping, smooth motion, dead lock in stopped position, minimum occupancy of space, reduced cost of both installation and operation, and the abolition of brakes or other additional holding or safety devices.

The invention consists in the construction hereinafter set forth, whereby the rotation of the hoisting shaft driven by its motor, is controlled positively by gearing actuated by means independent of said motor; also in the combination with such hoisting shaft and motor of an independently actuated worm and gear, and also in the various combinations more particularly set forth in the claims.

The invention is herein shown applied to an electric traction elevator mechanism, but is, of course, not limited to employment in connection with that particular apparatus.

In the accompanying drawings—Figure 1 is a front elevation and Fig. 2 a side elevation of my improved hoisting gear for elevators.

Similar numbers of reference indicate like parts.

The main shaft 1 is supported in suitable bearings 2, and directly driven by the armature of electric motor 3. Fast on said shaft are the grooved pulleys 4. The hoisting cable 5 is attached at one end to the elevator car 6, passes over the pulleys 4 and a fixed idler pulley 7 and has its other end secured to the counterweight 8. Also fixed upon shaft 1 is a gear 9 which engages with the worm 10, on shaft 11. Said shaft is directly driven by the armature of a second electric motor 12.

The principal motor 3 is run at slow speed and is to be of sufficient power to take the gravity load. The speed of the smaller motor is to be such as to rotate the worm 10 at such a rate as to permit the gear wheel 9 and hence the shaft 1 to be turned by the principal motor. The construction of the gear wheel and worm is to be such that the worm cannot be driven by the gear wheel. The power of the smaller motor need only be a small fraction of that of the principal motor, say one-tenth.

In operation: circuit being established, and the elevator car being down, both motors start together. Motor 3 relieves motor 12 of all gravity load, and motor 12 being a high speed motor under very little load has a

uniform speed acceleration. Hence any jerking by motor 3 at starting is resisted by the worm 10, and the car begins its ascent free from the irregular movements ordinarily produced when motors of very slow speed are employed for direct driving of the hoisting shaft.

It will be obvious that the rotating worm serves as a means of keeping the car at fixed speed, since said car can neither be raised nor lowered any more rapidly or slowly than the movement of the worm will allow. In other words, the motor 12 tends to transmit a motion to the hoisting apparatus which synchronizes with all normal action of the elevator and positively resists all abnormal action. By normal action of the elevator, I mean a uniform acceleration from a state of rest to a given speed, maintaining said speed, uniform retardation back to rest again, and holding at rest. Abnormal action would be starting too suddenly or by a series of jerks, allowing the car to attain a speed in excess of its predetermined speed, stopping too suddenly, or failing to hold the car at rest.

There may be disposed in the circuit of the small motor any suitable device, such as a rheostat 13 preferably arranged in the car, for varying the speed of said motor. In this way the worm may be rotated at such a rate as to retard the downward travel of the car when the same is being lowered by the main motor, thus saving current expenditure in the latter.

Accidents involving abrupt descent of the car are prevented by the locking action of the worm 10 with the gear 9, and in like manner, upon stoppage, the car is positively held in position.

I claim:

1. In an elevator, the combination of a car, two motors, mechanism connecting one of said motors to said car to operate the same and capable of being driven by the action of gravity on the elevator, and other power transmission means positively connecting the other motor to the first-mentioned motor and controlling its movement in both directions and which cannot be driven by action of gravity on the elevator but can be driven by its motor in the direction such action of gravity would tend to drive it.

2. In an elevator, the combination of a car, two motors, mechanism connecting one of said motors to said car to operate the same and capable of being driven by the action of gravity on the elevator, and a worm and worm wheel connecting the other motor to said mechanism and which cannot be driven by action of gravity on the elevator.

3. The combination with a rotatable member, of two motors, and two means of power transmission, one of which connects one motor to said rotatable member and can be driven therefrom, while the other power transmission means connects the other motor to the rotatable member and cannot be driven therefrom although its motor can drive it in either direction.

4. In an elevator mechanism of the type herein set forth, a car, a counter-balance, a cable supporting both car and counter-balance, a pulley receiving said cable, a motive device, means connecting said motive device to the said pulley and adapted to transmit movement in both directions

between said parts, a worm wheel connected with said pulley, a worm engaging said worm-wheel, and a separate motive device for driving said worm.

5 In an elevator mechanism of the type herein set forth, a car, a counter-balance, a cable supporting both car and counter-balance, a pulley receiving said cable, a shaft carrying said pulley, an electric motor directly coupled to said shaft, a toothed gear on said shaft, a worm engaging said toothed gear, and a second electric motor for rotating said worm.

10 6. In an elevator, the combination with a car, a cable connected to said car, and a rotatable member to receive said cable, of driving and controlling mechanisms connected to said rotatable member, each adapted to turn it in either direction and one of them capable of being driven by the action of gravity on the elevator while the other cannot be so driven, and means for supplying energy.

15 7. In an elevator, the combination with a car, a cable connected to said car, and a rotatable member to receive said cable, driving mechanism connected to said rotatable member adapted to turn it in either direction and capable of being driven by the action of gravity on the elevator, mechanism positively and continuously controlling the rotation of said rotatable member, and means for supplying energy to said mechanisms independently.

20 8. In an elevator, the combination with a car, a cable connected to said car, and a rotatable member to receive said cable, a low speed driving motor, power transmission means connecting said driving motor to said rotatable member to turn it in either direction and capable of being driven by the action of gravity on the elevator, means for positively locking said rotatable member, and a high speed motor controlling said locking means.

25 9. In an elevator, the combination with a car, a cable connected to said car, and a rotatable member to receive said cable, motive means, means connecting said motive means to said rotatable member to turn it in either direction and capable of being driven by the action of gravity

40 ity on the elevator, continuously operating means for positively locking said rotatable member in any position, and means for controlling the said locking means independently of said motive means.

45 10. The combination of an elevator car, a source of motive power, power transmission apparatus connecting said source of power to said car to operate the same and capable of being driven by the action of gravity on the elevator, and controlling means positively connected to said power transmitting apparatus adapted to synchronize with all normal action thereof and to resist all abnormal action, as set forth.

50 11. The combination of an elevator car, a source of motive power, power transmission apparatus connecting said source of power to said car to operate the same and capable of being driven by the action of gravity on the elevator, controlling means positively connected to said power transmitting apparatus adapted to synchronize with all normal action thereof and to resist all abnormal action, as set forth, and means for regulating said controlling means.

55 12. In an elevator, the combination of a car, means adapted to transmit motive power to said car capable of being driven by the action of gravity on the elevator, and independently driven controlling means positively geared to said transmission means having driving and driven members in which the driving member cannot be moved or driven by the driven member.

60 13. In an elevator mechanism and in combination with the rotary hoisting shaft thereof, an electric motor having its armature on said shaft, mechanism for positively controlling the rotation of said shaft, and a second electric motor actuating said controlling means.

65 70 In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES R. PRATT.

Witnesses:

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GERTRUDE T. PORTER.