E. E. SAPHORE.

DOOR LOCK AND SWITCH.

APPLICATION FILED MAR. 18, 1909.

948,796.

Patented Feb. 8, 1910.

2 SHEETS—SHEET 1.

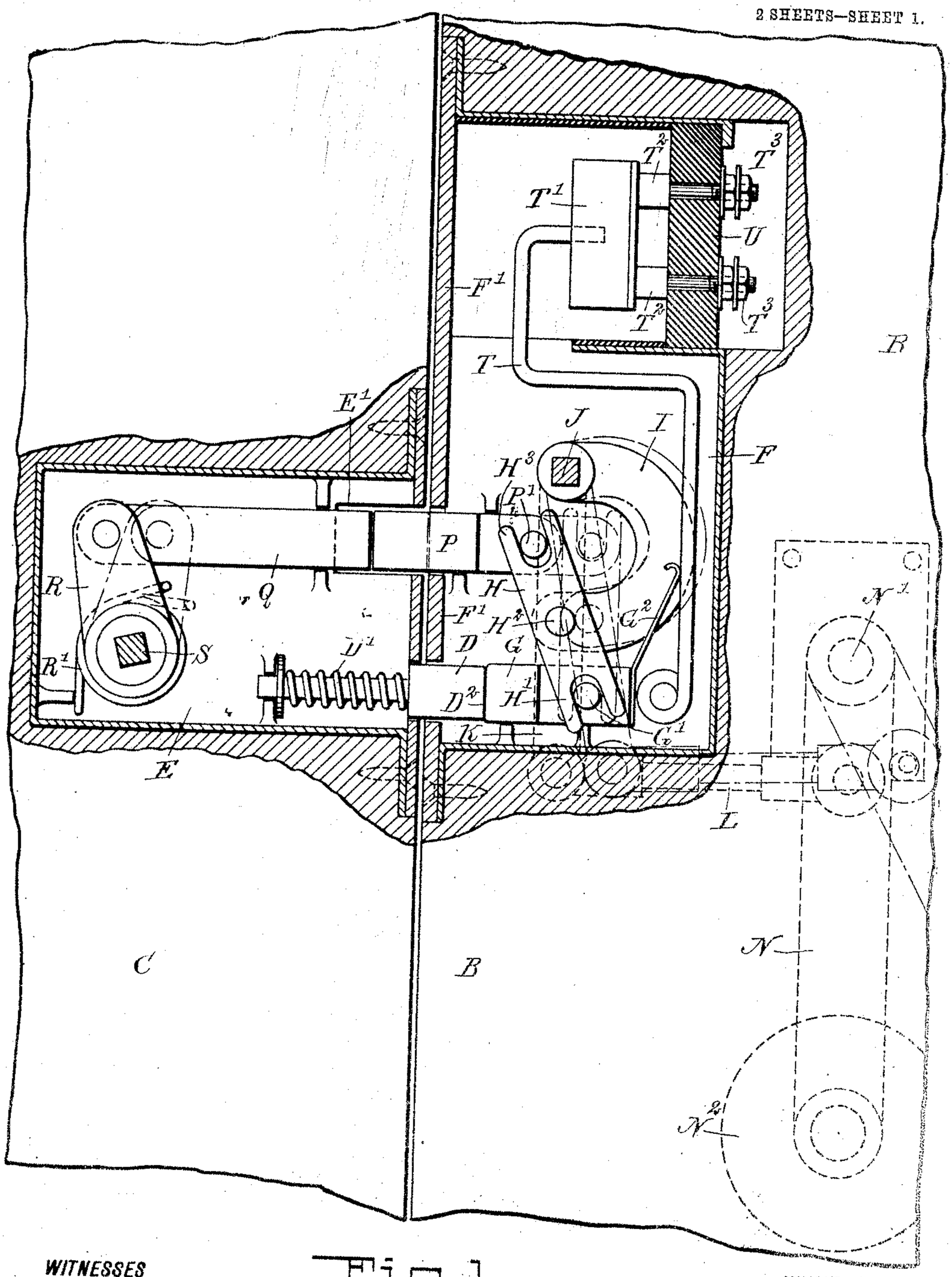

Fig. 1

WITNESSES

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Fig. 4

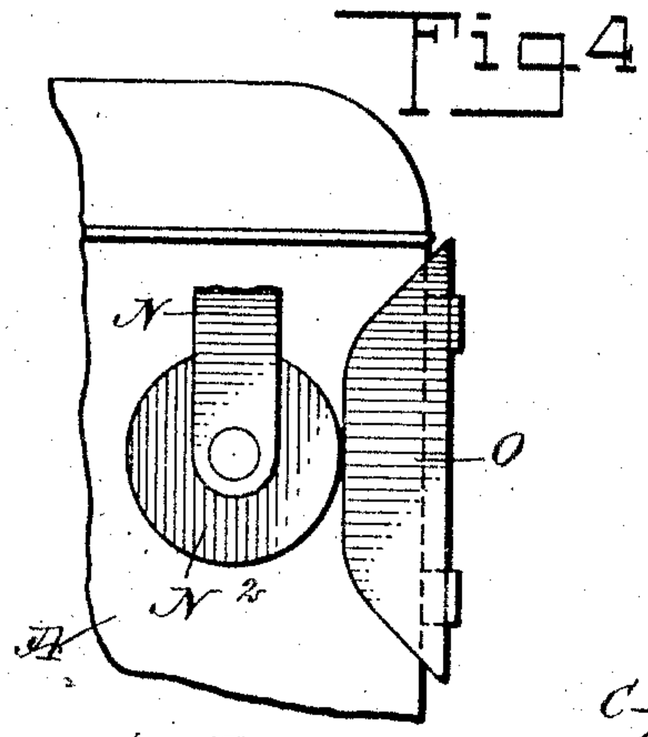

Fig. 2

Fig. 3

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DOOR LOCK AND SWITCH.

948,796. Specification of Letters Patent. Patented Feb. 8, 1910.

Application filed March 18, 1909. Serial No. 484,222.

To all whom it may concern:

Be it known that I, EDWARD E. SAPHORE, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Door Lock and Switch, of which the following is a full, clear, and exact description.

The invention relates to elevators and its object is to provide a new and improved door lock and switch, arranged to prevent the shaft door from being opened at the time the car is not at the landing, and to prevent the car from being moved away from the landing, either in its ascent or descent, until the door is again locked.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement as applied and showing the door locked; Fig. 2 is a like view of the same, showing the door unlocked at the time the car is at the landing; Fig. 3 is a plan view of the improvement, the shaft and the door being shown in section; and Fig. 4 is a side elevation of the cam on the car for actuating part of the lock.

As illustrated in Fig. 3, the car A ascends and descends in the elevator shaft B by the use of an electric or other hoisting device of any approved construction, and at each landing of the elevator shaft B is arranged a swing door C for controlling the ingress and egress of the passengers of the car A. Normally the door C is locked and for this purpose use is made of a bolt D mounted to slide in a lock casing E, mortised or otherwise attached to the door C. The bolt D is normally held in a shot-out position by a spring D′, and the beveled head D^2 of the bolt extends into the keeper plate F′ of a keeper casing F held in the wall of the elevator shaft B.

On the head D^2 of the bolt D abuts a releasing bar G, mounted to slide in the keeper casing F, and provided with a pin G′ engaging the lower forked end H′ of a lever H, fulcrumed at its middle at H^2 on a swing arm I arranged within the keeper casing F and secured to a shaft J extending transversely and journaled in the keeper casing F, the inner end of the shaft J projecting into the elevator shaft B, as plainly indicated in Fig. 3. On the inner end of the shaft J is secured a downwardly-extending rock arm K, connected by a link L with a swing arm N, pivoted at its upper end at N′ to the inner face of the shaft B, and on the lower free end of the arm N is mounted a friction roller N^2 adapted to be engaged by a cam O, secured on the car A (see Figs. 3 and 4). Normally the arm N hangs vertically downward, so that the cam O in its ascent or descent does not actuate the friction roller N^2, but when the arm N is swung over to the right, as hereinafter more fully explained, then the cam O in moving up or down with the car A engages the friction roller N^2 and swings the arm N back to vertical position.

The upper forked end H^3 of the lever H engages a pin P′ formed on a striking bar P, mounted to slide in the keeper casing F and adapted to pass through openings in the keeper plate F′ and in the front plate of the lock casing E into the latter, as indicated in Fig. 1, and the free end of the striking bar P abuts against the free end of a push bar Q, mounted to slide in the lock casing E. The push bar Q is pivotally connected with an arm R held on a spindle S, mounted to turn in the lock casing E, and provided inside and outside of the door C with knobs S′, adapted to be turned by a passenger or attendant of the elevator car A, as the case may be. A spring R′ presses the arm R so as to normally hold the same in the position shown in full lines in Fig. 1, that is, with the push bar Q withdrawn, to allow the striking bar P to extend into the lock casing E opposite the cut out portion E′ of the same.

On the end of the releasing bar G is secured a spring G^2 engaging a switch arm T fulcrumed in the keeper casing F and carrying a contact T′ adapted to engage contacts T^2 on binding posts T^3 held in an insulation block U mounted in the upper portion of the casing F. The binding posts T^3 are connected by wires with the electric hoisting mechanism of the car A, and the switch is normally closed, as shown in Fig. 1, so as not to interfere with the hoisting and lowering of the car A at the will of the attendant in charge of the car A. When, how-

ever, the switch is thrown open, as shown in Fig. 2, then the hoisting mechanism is stopped and the car cannot be started until the switch is again in the closed position shown in Fig. 1.

The operation is as follows: When the several parts are in the position shown in Fig. 1, the door C is locked against opening by the bolt D engaging the keeper plate F′ of the keeper casing F. Now in case the passenger at the landing outside of the door C turns the knob S′ at the time the car A is not at this landing, then the arm R causes the push bar Q to push the striking bar P to the right, thus imparting a swinging motion to the lever H turning on the pin G′ as a fulcrum, as the releasing bar G is held against movement by the bolt D held in a shot out position by its spring D′. Now the swinging motion given to the lever H by the striking bar P causes a swinging of the arm I to the position shown in dotted lines in Fig. 1, and the motion of the arm I is transmitted to the shaft J which by the arm K and the link L imparts a swinging motion to the arm N to the right, but as the car is not at the landing, the cam O does not engage the friction roller N^2, and consequently the parts remain in this position, that is, the door C remains locked. In other words, the turning of either knob S′ at the time the car A is not at the landing does not unlock the door C. In case, however, the knob S′ is turned as described and the car reaches the landing, then the cam O engages the friction roller N^2 and pushes the swing arm N back into a vertical position, and, in doing so, the link L and the arm K turn the shaft J back to normal position, so that the arm I moves the fulcrum H^2 to the left, that is, a swinging motion is given to the lever H with the pin P′ as the fulcrum, whereby the releasing bar G pushes the bolt D back into open position, thus unlocking the door C and allowing opening of the same either for the egress or ingress of the passengers at this landing. When the releasing bar G is moved from the right to the left for unlocking the door, then the spring G^2 releases the switch arm T so that the latter swings to the left by its own weight, thus breaking the contact between the contacts T′ and T^2, and thereby cutting off the electric power for the car A. Now the attendant in the car A cannot start the car, as the power is shut off by the switch, and, in order to close the latter, it is necessary that the door C be first swung shut. It is understood that when the door C is opened and the knob S′ is released, the arm R and the push bar Q are returned to their normal position by the action of the spring R′; and when the door is shut then the bolt D by the action of its spring D′ is shot out, thus pushing the releasing bar G back to its normal position, as shown in Fig. 1, whereby a swinging motion is given to the lever H, to return the same to normal position, as shown in Fig. 1. Now the inward movement of the releasing bar G causes the spring G^2 to act on the switch arm T, with a view to move the same back into closed position. When this takes place, the car A can again be started by the attendant, in the usual manner.

From the foregoing it will be seen that by the arrangement described, the door C cannot be opened unless the car is at the landing, that is, the knob S′ is turned and the cam O acts on the friction roller N^2. It will also be noticed that the car cannot move away from the landing in either an upward or a downward direction unless the door C is again closed.

It is understood that the turning of the knob S′ does not unlock the door unless the car cam O coacts at the same time, and the up and down movement of the car does not unlock the door when passing the landing, as the friction roller N^2 is then in dormant position and is not moved into active position unless the knob S′ is turned.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An elevator door lock, comprising a locking device, normally locking the door against opening, a manually-controlled device on the door, and a car-controlled device normally in inactive position, adapted to be thrown into active position by the said manually-controlled device, and adapted to be actuated by the car when in active position, the said manually-controlled device and the said car-controlled device being singly ineffective relative to the said locking device, and effective on the combined simultaneous action, to actuate the said locking device for unlocking the door.

2. An elevator door lock, comprising a locking device, normally locking the door against opening, a manually-controlled device on the door, a car-controlled device normally in inactive position, adapted to be thrown into active position by the said manually-controlled device, and adapted to be actuated by the car when in active position, the said manually-controlled device and the said car-controlled device being singly ineffective relative to the said locking device and effective on the combined simultaneous action, to actuate the said locking device for unlocking the door, and an electric switch for the car-hoisting mechanism and actuated by the combined simultaneous action of the said manually-controlled device and the said car-controlled device.

3. An elevator door lock, comprising a spring-pressed bolt on the door, normally engaging a keeper on the door casing to keep the door locked, car controlled means normally in inactive position, and adapted

to be actuated by the car when in active position to move the bolt to unlock the door, and manually controlled means for throwing the car controlled means into active position.

4. An elevator door lock, comprising a door bolt normally locking the door against opening, a releasing bar for moving the said bolt into unlocking position, a lever connected at one end with the said releasing bar, a shaft mounted on the elevator shaft and having an arm on which the said lever is fulcrumed, a striking bar pivotally connected with the other end of the said lever, a push bar adapted to engage the said striking bar, a door spindle connected with the said push bar, and a swing arm connected with the said shaft, and a cam on the car for engaging the said swing arm at the time the latter is in active position.

5. An elevator door lock, comprising a door bolt normally locking the door against opening, a releasing bar for moving the said bolt into unlocking position, a lever connected at one end with the said releasing bar, a shaft mounted on the elevator shaft and having an arm on which the said lever is fulcrumed, a striking bar pivotally connected with the other end of the said lever, a push bar adapted to engage the said striking bar, a door spindle connected with the said push bar, a swing arm connected with the said shaft, and a cam on the car for engaging the said swing arm at the time the latter is in active position, an electric switch connected with the hoisting means for the car, and a yielding connection between the said releasing bar and the movable member of the switch.

6. An elevator door lock, comprising a lock casing in the door, a keeper casing in the shaft, a spring-pressed bolt mounted in the said lock casing and normally engaging the said keeper casing, a spindle mounted in the lock casing and provided with door knobs and a spring-pressed arm, a push bar pivotally connected with the said arm and mounted to slide in the said lock casing, a striking bar mounted in the said keeper casing and in contact at one end with one end of the said push bar, a shaft mounted to turn in the said keeper casing and provided with a carrying arm within the casing and with a rock arm extending in the elevator shaft, a lever fulcrumed at its middle on the said carrying arm and pivotally connected at its upper end with the said striking bar, a releasing bar mounted in the said keeper casing and engaging the said bolt, the said releasing bar being pivotally connected with the lower end of the said lever, a swing arm fulcrumed on the elevator shaft and connected with the said rock arm, and a cam on the elevator car adapted to engage the said swing arm.

7. An elevator door lock, comprising a lock casing in the door, a keeper casing in the shaft, a spring-pressed bolt mounted in the said lock casing and normally engaging the said keeper casing, a spindle mounted in the lock casing and provided with door knobs and a spring-pressed arm, a push bar pivotally connected with the said arm and mounted to slide in the said lock casing, a striking bar mounted in the said keeper casing and in contact at one end with one end of the said push bar, a shaft mounted to turn in the said keeper casing and provided with a carrying arm within the casing and with a rock arm extending in the elevator shaft, a lever fulcrumed at its middle on the said swinging arm and pivotally connected at its upper end with the said striking bar, a releasing bar mounted in the said keeper casing and engaging the said bolt, the said releasing bar being pivotally connected with the lower end of the said lever, a swing arm fulcrumed on the elevator shaft and connected with the said rock arm, a cam on the elevator car adapted to engage the said swing arm, an electric switch for the car-hoisting means, and a spring on the said releasing bar and engaging a movable member of the said switch.

8. In an elevator door lock, a locking device normally locking the door against opening, a releasing device, for moving the said locking device into unlocked position, car controlled means connected with the releasing device, the said car controlled means being normally in inactive position and adapted when in active position to be actuated by the car to cause the releasing device to move the locking device to unlock the door, and manually controlled means for moving the said car controlled means into active position.

9. An elevator door lock, comprising a door bolt normally locking the door against opening, a releasing bar engaging the bolt for moving the said bolt into unlocking position, a swing arm adapted to be actuated by the car when said arm is in the active position, connections between the swing arm and the releasing bar to actuate the latter to move the bolt to unlock the door, and manually controlled means for moving the swing arm into active position.

10. An elevator door lock, comprising a spring pressed bolt on the door, normally engaging a keeper on the door casing to keep the door locked, a releasing device in the keeper casing engaged by the bolt, a lever connected with the releasing device, a car controlled means connected with the lever and adapted when in the active position to be actuated by the car to move said lever to cause the releasing device to act on the bolt and unlock the door, and manually controlled means for moving said lever to throw the car

controlled means into active position, the said releasing device remaining inactive under the movement of the lever by the said manually controlled means.

11. In an elevator door lock, a spring pressed bolt normally locking the door against opening, a releasing bar engaged and moved by the bolt in one direction, car controlled means for actuating the releasing bar in the opposite direction to move the bolt to unlocked position, and an electric switch for the car hoisting mechanism controlled by the movement of the said releasing bar.

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

EDWARD ERNEST SAPHORE.

Witnesses:
STEPHEN F. GLIMM,
JAMES J. YOUNG.