R. P. LUMLEY & H. G. HILLMAN.

INTERLOCKING SAFETY DEVICE FOR ELEVATORS.

APPLICATION FILED OCT. 5, 1906.

956,536.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

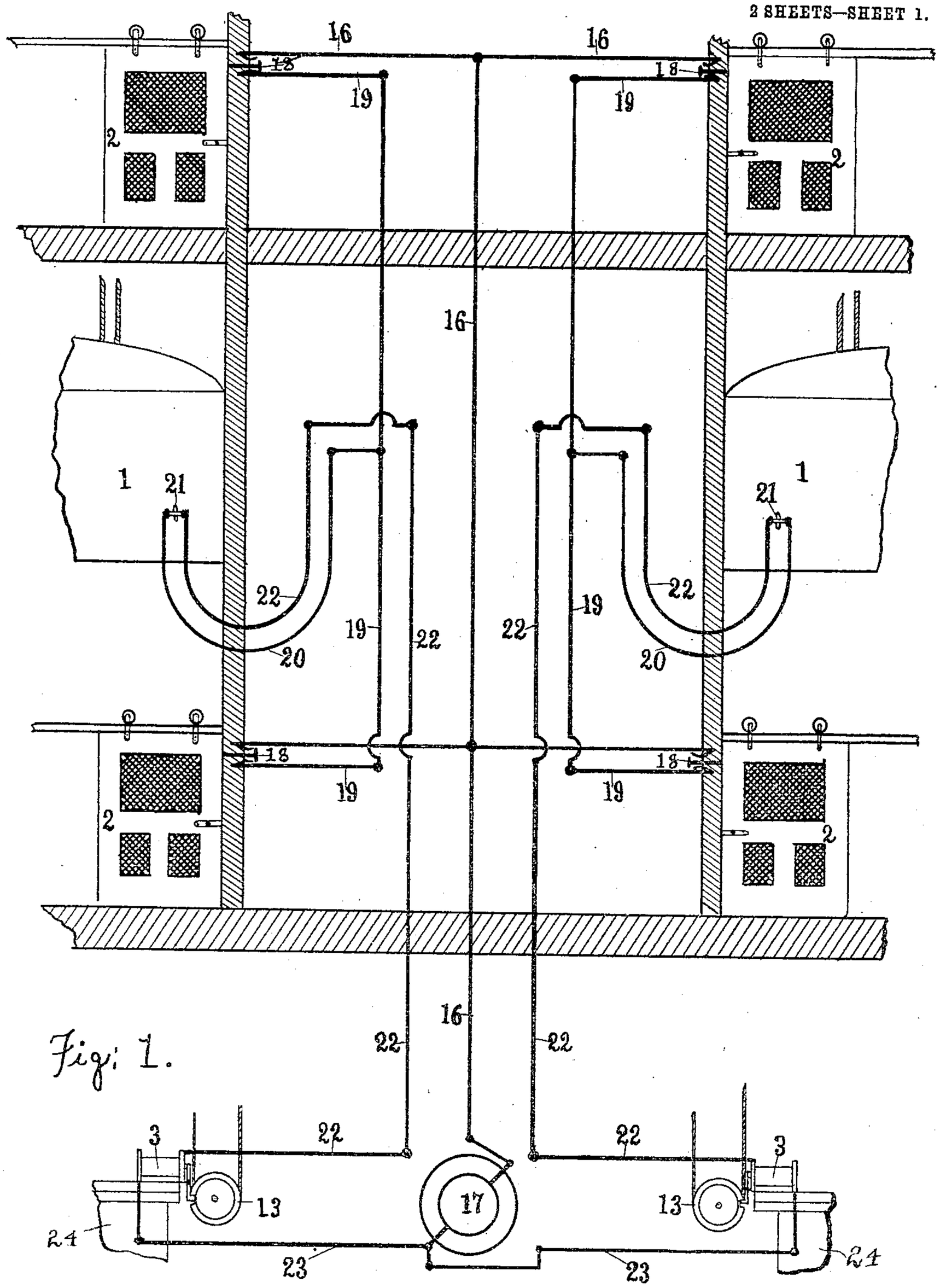

Fig. 1.

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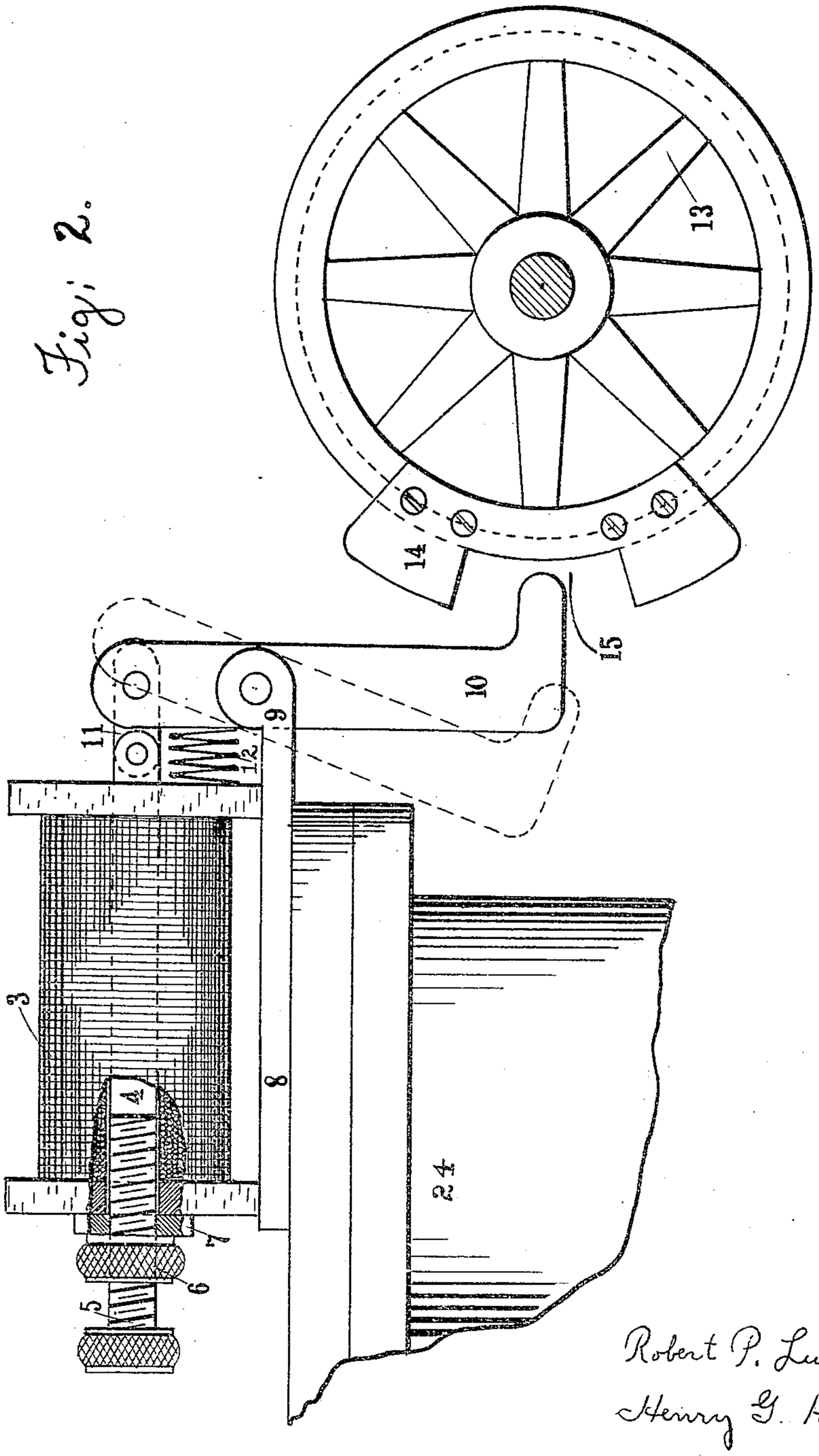
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

ROBERT P. LUMLEY AND HENRY G. HILLMAN, OF NEW YORK, N. Y., ASSIGNORS TO PUBLIC SAFETY COMPANY, OF WASHINGTON, DISTRICT OF COLUMBIA, A CORPORATION OF DELAWARE.

INTERLOCKING SAFETY DEVICE FOR ELEVATORS.

956,536. Specification of Letters Patent. **Patented May 3, 1910.**

Application filed October 5, 1906. Serial No. 337,661.

To all whom it may concern:

Be it known that we, ROBERT P. LUMLEY, a citizen of the United States, and HENRY G. HILLMAN, a subject of the King of Great Britain, residing at the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Interlocking Safety Devices for Elevators, of which the following is a specification.

Our invention relates to safety devices for elevators whereby the full control of the car is taken from the operator as long as any of the gates leading to a landing are open. Some of our objects are to provide mechanism that will be positive in operation, cheap to construct and install in connection with existing plants, and which, when applied, will afford the operator sufficient control over the movement of the car to compensate for any leakage in the cylinder, valves, piping, etc., or slipping which ordinarily causes the car to slowly sink or rise when the motor control wheel is at its cut-off position.

We attain our objects in the manner illustrated in the accompanying drawings illustrating one form of our invention.

Figure 1 is a diagrammatic view of the device and wiring system in connection with a pair of elevator cars. Fig. 2 is a view, partly in section, of the safety device applied to the motor control wheel of the motive power of the elevator.

As shown in connection with a regular elevator car operated by any suitable power our device and system comprises a solenoid, or electro-magnet, 3 having a separable or two part core 4 and 5. The part 5 of the core is threaded and provided with a thumb nut and carries a lock nut 6. The end of the spool is threaded to receive the screw core 5, or a threaded plate 7 may be secured to the solenoid to receive this screw. The solenoid is mounted on a base plate 8 having a bearing 9 at its forward end. A finger piece 10 is pivoted to this bearing and is connected at its upper end to the forward end of the movable core 4 by a link 11. A spring 12 normally holds the finger in the position indicated by the dotted lines in Fig. 2.

The control wheel has a notched plate 14 secured to the rim thereof, the notch 15 being larger than the end of the finger 10 for a purpose hereinafter set forth.

The general rule for determining the width of the notch may be laid down as wide enough to accommodate all idle play of the valve plus sufficient additional width to permit the opening of the valve to an extent that will give upward and downward movements to the car of about ten to twelve feet per minute. This enables the operator to compensate for the ordinary leakages in valves, pistons, etc. and permits him to hold the car to a floor level while a gate is open in spite of such leaks. If the leak causes a greater speed than twelve feet per minute the elevator is dangerous and should be repaired. Heretofore locking devices have been positive in their operation and the car would slowly rise or fall under the influence of leaks. By idle play of the valve is meant the distance through which the valve may be turned before it is opened sufficiently to allow the passage of fluid.

The solenoid and finger piece are mounted adjacent to the control wheel on the motive mechanism, preferably on the main valve chamber 24 if the motive power is hydraulic, in such position that the finger may enter the notch when the control wheel is in its cut-off or closed position. The depth to which the finger enters the notch is regulated by the screw core 5. It is apparent that when the current is passing through the solenoid the finger will be drawn into the notch, the core 4 passing into the solenoid and adhering magnetically to the screw core 5. While in this position the play afforded by the width of the notch will permit sufficient motion of the motor control wheel to give the elevator car a very slow movement, our intention being that only sufficient speed and control will be allowed to enable the operator to compensate for any slipping due to leakage or other cause enabling him to hold the car to a landing place, but not sufficient speed to make a trip. This feature of limited control and slow movement of the car while the safety device is in operation distinguishes our invention from other known devices.

When the current is interrupted the spring 12 will retract the finger 10 and the operator will regain full control over the movement of the car.

The invention is installed in the manner indicated in Fig. 1. A main trunk line 16

leads from a low voltage source of electricity to one side of the door switches 18 in the frame of each gate 2. These switches are of the normally closed type and are opened by fully closing the gates thereby breaking the circuit. A second wire 19 connects the opposite sides of all the switches in a given shaft. This second wire is tapped at any convenient point by a cable or third wire 20 which connects it to one side of an emergency car switch 21 in the car 1. A second cable or fourth wire 22 leads from the other side of the car switch to one end of a solenoid 3, the opposite end of the latter being connected to the generator by a fifth wire 23.

When all the gates are closed the switches 18 will all be open and no current will pass through the solenoid, the spring 12 holding the finger away from the notch. If the car is stopped and any one of the gates opened to any extent the circuit will be completed and the current will pass through the solenoid throwing the finger into the notch thereby limiting the movement of the motor control wheel. This limited movement enables the operator to hold the car to a floor but he cannot give it sufficient speed to endanger those getting on and off. On fully closing the door the circuit will be broken and the car again comes under the full control of the operator. By this system of wiring one trunk line will serve a plurality of cars the method being fully indicated in Fig. 1. For convenience we prefer to use one such trunk line for each pair of cars.

If for any reason it is desired to cut out any car the car switch 21 is opened thereby breaking the circuit regardless of the position of the doors.

We claim:—

1. In an elevator the combination of a car and a landing, a door at said landing, a movable power controlling device for the car having two spaced engaging parts, means operated from the car for moving said device, an electro-magnetically operated finger controlled from the door at said landing and mounted adjacent to said device and movable into position to be engaged by said engaging parts when the controlling device is operated and coöperating with said engaging parts thereon to limit the movement of said device by the operator so as to permit but a slow movement of the car in either direction.

2. In an elevator the combination with a car, a landing and a door at said landing, of mechanism including a valve controlling wheel and means operated from the car for moving said wheel for controlling the application of power to said car, two shoulders or stops on the wheel, a movable finger mounted adjacent to the wheel, electro-magnetic means for moving the finger in between the stops to be engaged thereby, a switch controlled by the door for governing the operation of said electro-magnetic means, said stops on the wheel being spaced apart so as to have a movement relative to and limited by the finger after the finger has been moved into locking position, for permitting limited operation of the wheel from the car for moving the latter.

3. In an elevator the combination with a car, controlling means operated from the car, a movable finger having an engaging and a non-engaging position coöperating with part of the controller mechanism to be engaged thereby, said finger being narrower than the coöperating and engaging part of said mechanism, thereby accommodating all idle play of said mechanism and permitting a movement of the car of about ten feet per minute while the finger is in its engaging position, a solenoid operating on said finger, an electric circuit for controlling said solenoid, and a switch in said circuit for controlling said solenoid to move the finger.

4. In an elevator, the combination with a car, and a landing, of an elevator controlling mechanism having engaging parts thereon, a movable finger having an engaging and a non-engaging position and coöperating with the engaging parts of said mechanism, the finger being narrower than the engaging part of said mechanism, thereby accommodating all idle play of said mechanism and permitting movement of the car of about ten feet per minute while the finger is in its engaging position, a solenoid operating on said finger, a normally open electric circuit for energizing said solenoid, and a switch at said landing for controlling said circuit to move the finger.

5. In an elevator the combination with a car, a landing and a gate at said landing, controlling mechanism for the car including a valve wheel, an emergency switch on the car, a switch operated by said gate, spaced stops on said wheel, a movable finger on the wheel having an engaging and a non-engaging position for coöperating with said stops, the latter being spaced apart so as to accommodate all idle play of the wheel and permit a movement of about ten feet per minute of the car while the finger is in its engaging position, a solenoid operating on said finger, and an electric circuit including said emergency switch, gate switch and solenoid.

6. In an elevator the combination with a car, a landing and a gate at said landing, controlling mechanism for said car comprising a valve shaft, a wheel on said shaft, a notched plate on said wheel, a movable finger having a non-engaging and an engaging position for coöperating with said notched plate to control the movement of the car, said notch in the plate being wide enough to

accommodate all idle play of the wheel and permit a movement of about ten feet per minute of the car while the finger is in its engaging position, a solenoid operating on said finger, an emergency switch on the car, gate operated switches, a source of current, a conductor leading from one side of the source to a contact on each of the gate switches, a second conductor connecting the other contact of each of the gate switches, a third conductor leading from the second conductor to one side of the car switch, a fourth conductor from the other side of the car switch to one terminal of the solenoid, and a fifth conductor from the opposite terminal of the solenoid to the other side of the source of current.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ROBERT P. LUMLEY.
HENRY G. HILLMAN.

Witnesses:
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