S. S. STOLP.

ELEVATOR SAFETY DEVICE.

APPLICATION FILED OCT. 4, 1909.

957,123.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

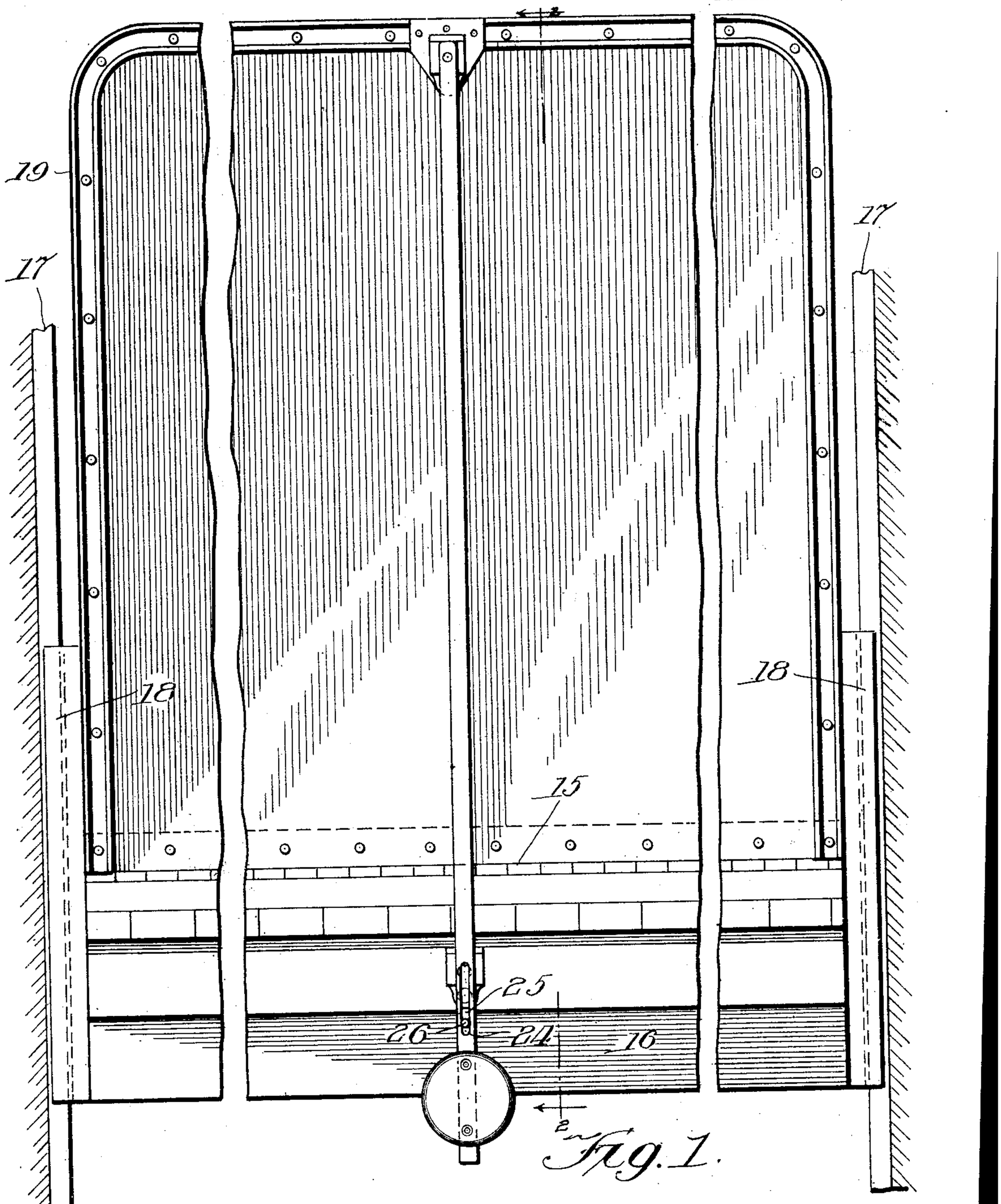

Fig. 1.

Witnesses:

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Henry A. Parks

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2 SHEETS—SHEET 2.

Fig. 2.

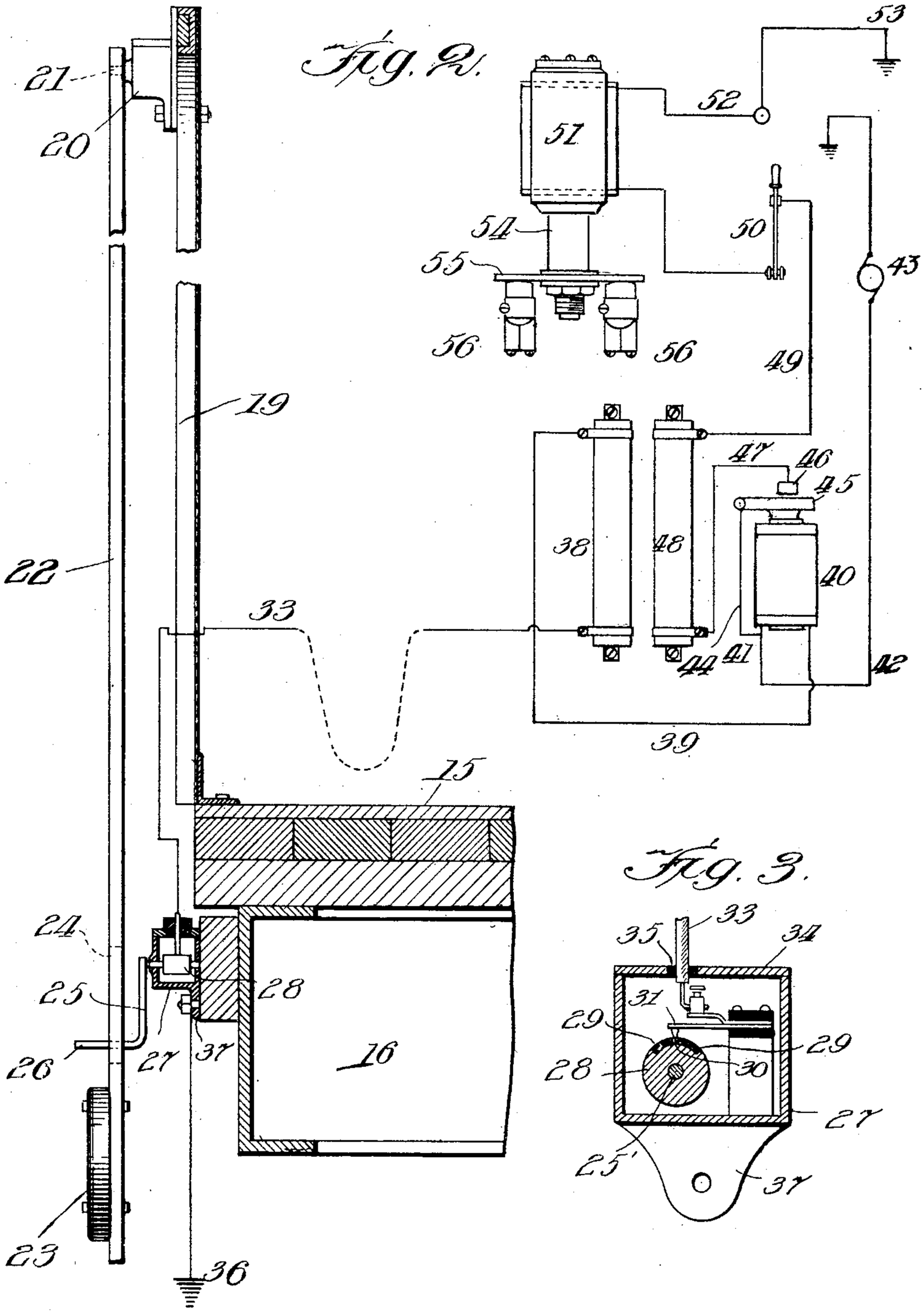

Fig. 3.

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UNITED STATES PATENT OFFICE.

SAMUEL S. STOLP, OF GLENCOE, ILLINOIS, ASSIGNOR OF ONE-HALF TO WILLIAM J. C. KENYON, OF CHICAGO, ILLINOIS.

ELEVATOR SAFETY DEVICE.

957,123. Specification of Letters Patent. **Patented May 3, 1910.**

Application filed October 4, 1909. Serial No. 520,958.

To all whom it may concern:

Be it known that I, SAMUEL S. STOLP, a citizen of the United States, residing at Glencoe, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Elevator Safety Devices, of which the following is a specification.

The principal object of my invention is to provide a device that may be used in connection with freight or passenger elevators to shut off the power when from any cause they may become tilted from normal position. This object and other objects will be made more readily apparent in the following specification and claims when taken in connection with the accompanying drawings.

My invention is defined in the appended claims, but for the purpose of clearly illustrating one specific embodiment thereof, I have shown one such embodiment in the accompanying drawings, and I now proceed to describe it in this specification.

Referring to the drawings—Figure 1 is a side elevation of an elevator car, showing certain elements of the safety device attached thereto. Fig. 2 is a section taken generally on the line 2—2 of Fig. 1 looking in the direction of the arrows; this figure also shows certain electrical circuits in diagram. Fig. 3 is a detail section of a switch which forms an element of the device.

The elevator car comprises the floor 15 resting on the floor framework 16. The stationary guides 17 at the sides of the elevator shaft engage the coacting guides 18 on the elevator car. At one side of the car is a side frame 19 which carries a bracket 20 at its upper part with a horizontally projecting pivot pin 21. The pendulum rod 22 with the weight 23 is pivotally hung from the pin 21. This pendulum 22 carries a slot 24 which engages the horizontally projecting pin 26 on the depending arm 25. The arm 25 hangs from the shaft 25′ which is journaled in the walls of the iron box 27 and carries a metal drum 28 with insulating segments 29 as shown in Fig. 3. The metal 30, between the insulating segments 29, is engaged by the contact tongue 31 which is connected to the conductor 33. The box 27 is closed above by the cover 34 which has a hole with an insulating bushing 35 to admit the conductor 33. The box 27 is bolted to the car floor framework by means of the integral bracket 37. The box 27 is grounded as indicated diagrammatically in Fig. 2 by the reference numeral 36. In practice such a ground may easily be secured by connecting to the car framework which is grounded through the elevator guides, supporting cables, &c.

The conductor 33 comprises a flexible cable and it leads from the elevator car to the apparatus shown at the right of Fig. 2, such apparatus being apart from the car and stationary. Tracing this conductor 33 from ground 36 through the switch contact members 30, 31, it leads to the resistance 38, thence by the conductor 39 to the magnet 40 and thence by the conductor 42 to the same source of electromotive force 43 which energizes the electric motor that drives the elevator.

At the point 41 on the conductor 42 the branch conductor 44 leads to the armature 45 which is normally held against the magnet 40. The back stop contact 46 has a conductor 47 leading through the resistance 48, conductor 49 and the hand switch 50 to the solenoid 51, and thence over the conductor 52 to ground 53. The solenoid 51 has a core or plunger 54 which carries a cross bar 55, that normally rests on the two contact terminals 56. These two contact terminals 56 are in the circuit of the motor which drives the elevator.

It will be seen that the circuit 36—30—31—33—38—39—40—42—43 is closed when the elevator car is in a normal position, because then the pendulum 22 hangs straight down holding the drum 28 in a position with the contact member 31 between the insulating segments 29. The current flowing in this circuit energizes the magnet 40 and holds the armature 45 away from the back contact 46. But in case the elevator tilts, then the pendulum 22 will swing relatively to the elevator car and the angular displacement of the pendulum 22 will produce a greatly increased angular displacement of the arm 25; this will rotate the drum 28, causing the insulating segments 29 to move under the contact terminal 31, thus breaking the circuit of the magnet 40, releasing its armature 45 and permitting the same to touch the back contact 46. This will close a circuit traced as follows; 43—42—41—44—45—46—47—48—49—50—51—52—53;

thus the solenoid 51 will be energized and will jerk the bar 55 away from the contact terminals 56, thus opening the power circuit of the elevator motor and thereby stopping the motor.

The hand switch 50 is provided so that in case the motor is stopped in the manner already described or if from any cause the conductor 33 should be broken, it shall be possible to start it again if desired without restoring the continuity of the circuit through the magnet 40.

Among other uses for this device is its application to long freight elevators, for example, such as are adapted for vehicles of considerable length placed upon them. When such an elevator is ascending or descending, if one end of the car should get caught or bound in the elevator shaft or guide, then the continued application of the power acting at the corners or the center of the car would tend to tilt the elevator from its normal angular position. Such tilting might increase the binding effect and in any case unless the power was very quickly shut off a serious accident to property and life might ensue. By my invention such an accident is promptly averted.

It will be noted that a very slight angular displacement of the pendulum 22 is sufficient to rotate the drum 28 through a considerable angle so that the device can be made very sensitive.

One advantage of the particular device disclosed is that even if it is made too susceptible to tilting no serious consequence will follow. That is, if there should be a slight incidental tilting of the elevator car not sufficient to do any harm whatever, but sufficient to break the circuit through the magnet 40, then the consequence would simply be that the elevator would stop and it could easily be started again by adjusting the angular position of the elevator car, or by shifting the pendulum 22 slightly, or by operating the hand switch 50.

Another advantage of the device is that the normal condition keeps the current on through the magnet 40; thus any cause which deranges the circuit elements so as to interrupt the current through the magnet 40, would at once stop the elevator and call attention to the disorder whatever it might be.

By making the pendulum accessible, the operator on the elevator car can manipulate it as may be needful to start the car in case it is stopped by slight tilting. If the tilting is only momentary then the pendulum will restore the normal condition automatically after a temporary interruption.

I claim:—

1. In combination, an elevator car, a pendulum carried by the same, an electric circuit, a switch controlling said circuit, a mechanical connection from said pendulum to said switch, and means controlled by the circuit for shutting off power from the elevator car.

2. In combination, an elevator car, a pendulum pivotally supported on the same, mechanism adapted to be actuated by said pendulum, and means controlled by said mechanism for shutting off power from the elevator car.

3. In combination, an elevator car, a pendulum carried by the same, an electric circuit, a normally closed switch in said circuit on the car, a mechanical connection from the pendulum to open the switch when the pendulum is deflected, and means controlled by the circuit for shutting off power from the elevator car.

4. In combination, an elevator car, a switch controlling the main electric power circuit for operating said elevator car, a pendulum carried by the car, and means for operating said switch automatically by the deflection of the pendulum.

5. In combination, an elevator car, a pendulum carried thereby, an electric switch in the main power circuit for the elevator, an electromagnet and associated circuit for operating said switch, a relay with a back contact adapted to close the last named circuit, a circuit through the relay magnet, a normally closed switch in said last named circuit on the car, and a mechanical connection from said switch to the pendulum to open the switch when the pendulum is deflected.

6. In combination, an elevator car, a member adapted to be automatically displaced relatively to the car when the car changes its angular position, and means controlled by said member for shutting off power from the elevator car.

In testimony whereof, I have subscribed my name.

SAMUEL S. STOLP.

Witnesses:
HENRY A. PARKS,
HARRY S. GAITHER.