No. 756,685. PATENTED APR. 5, 1904.

S. H. McCARROLL.

ELEVATOR SAFETY APPLIANCE.

APPLICATION FILED JAN. 24, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 5.

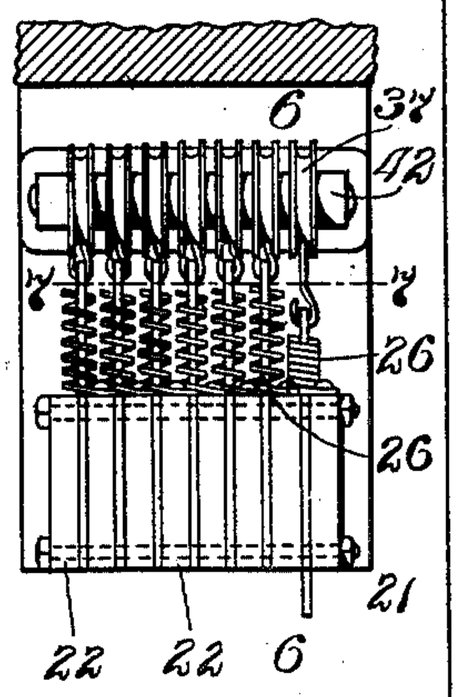


Fig. 6.

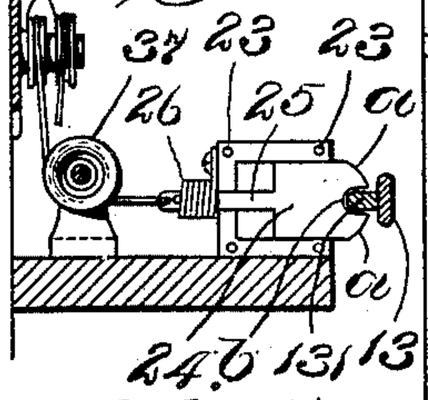


Fig. 7.

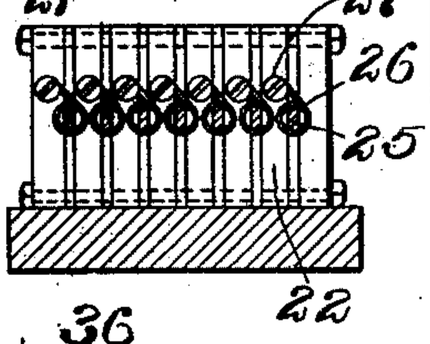


Fig. 8.

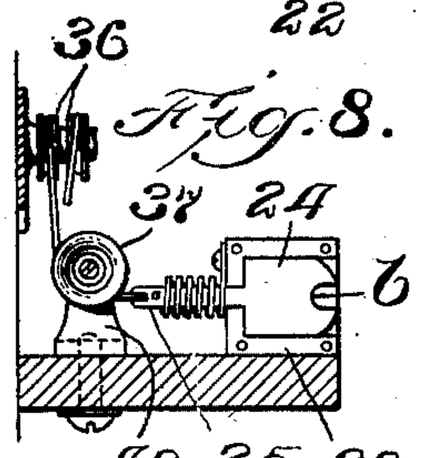
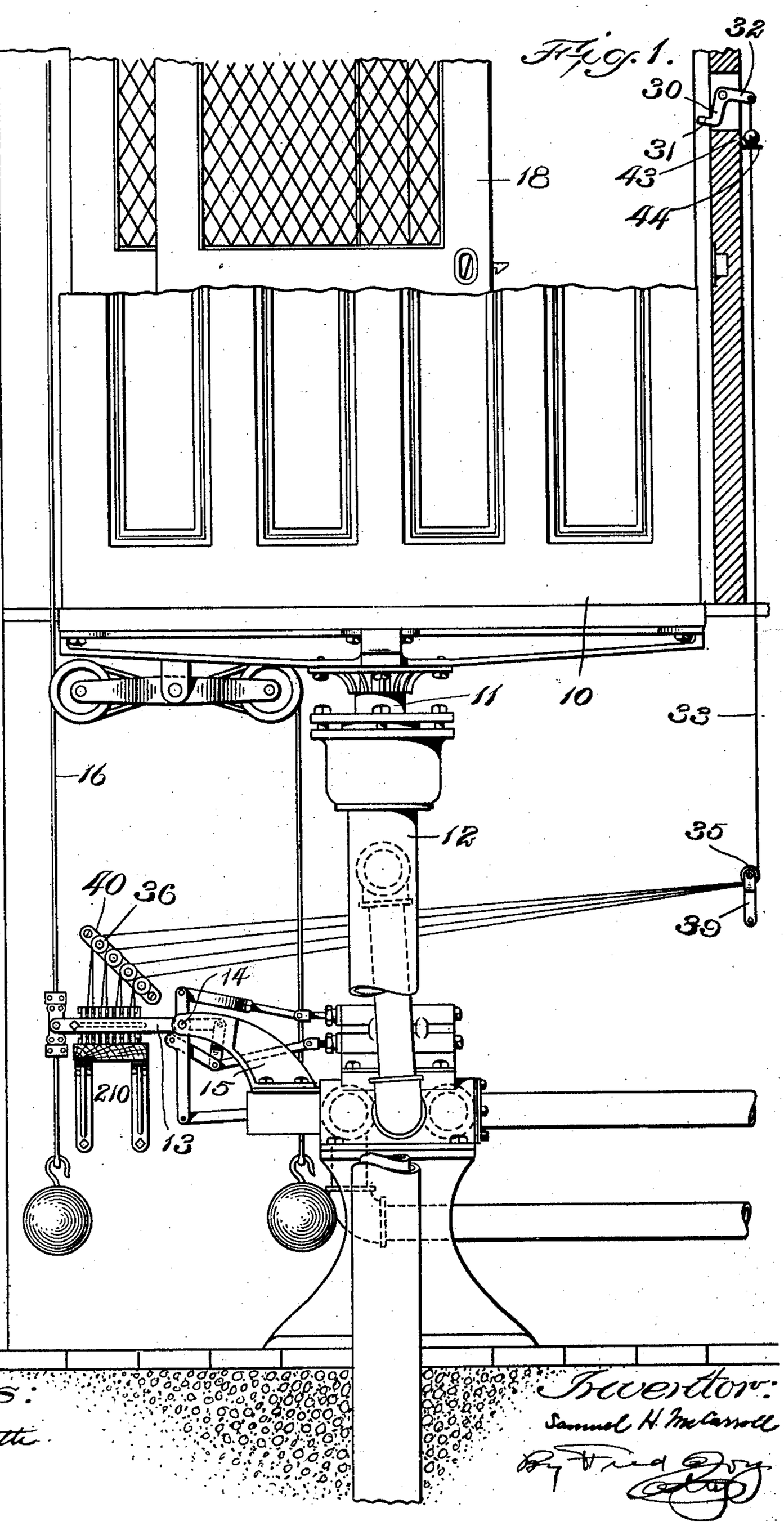


Fig. 1.



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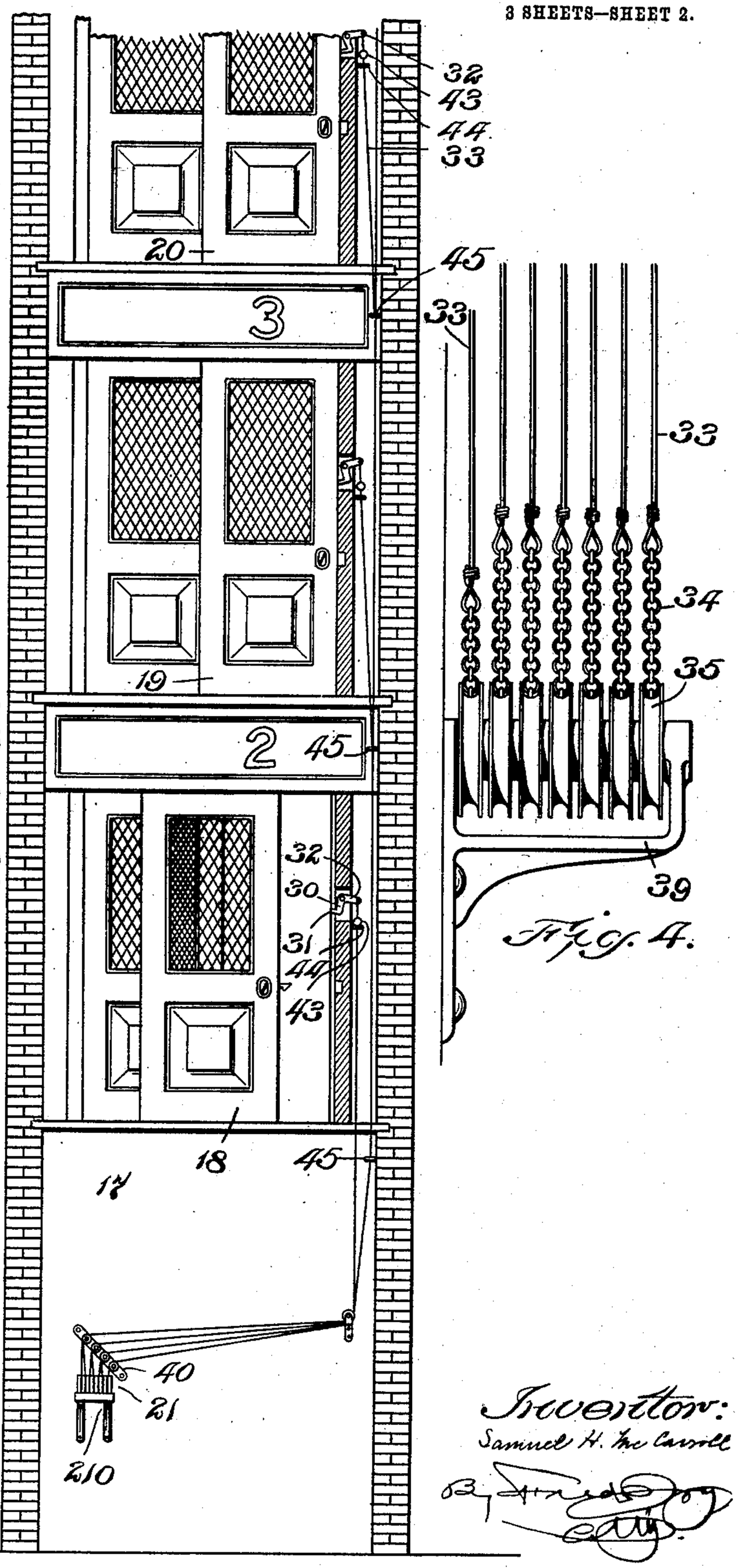
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.



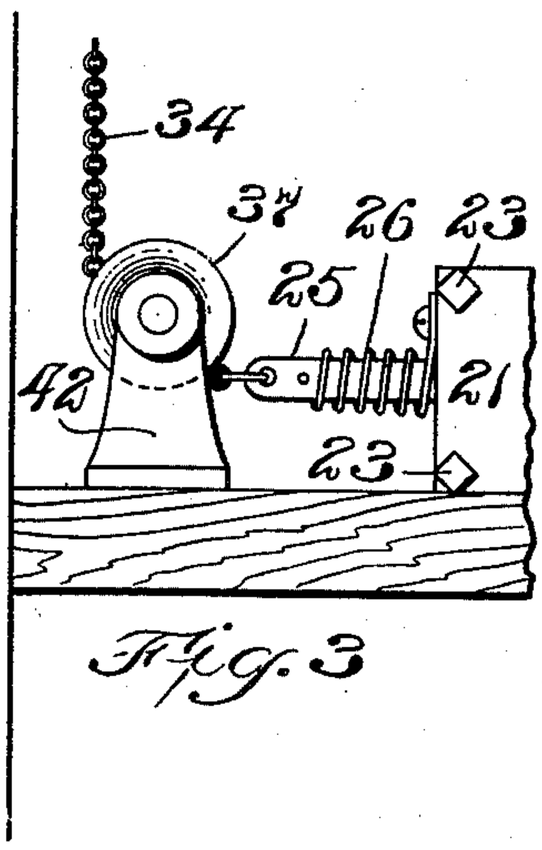


Fig. 3

Fig. 4.

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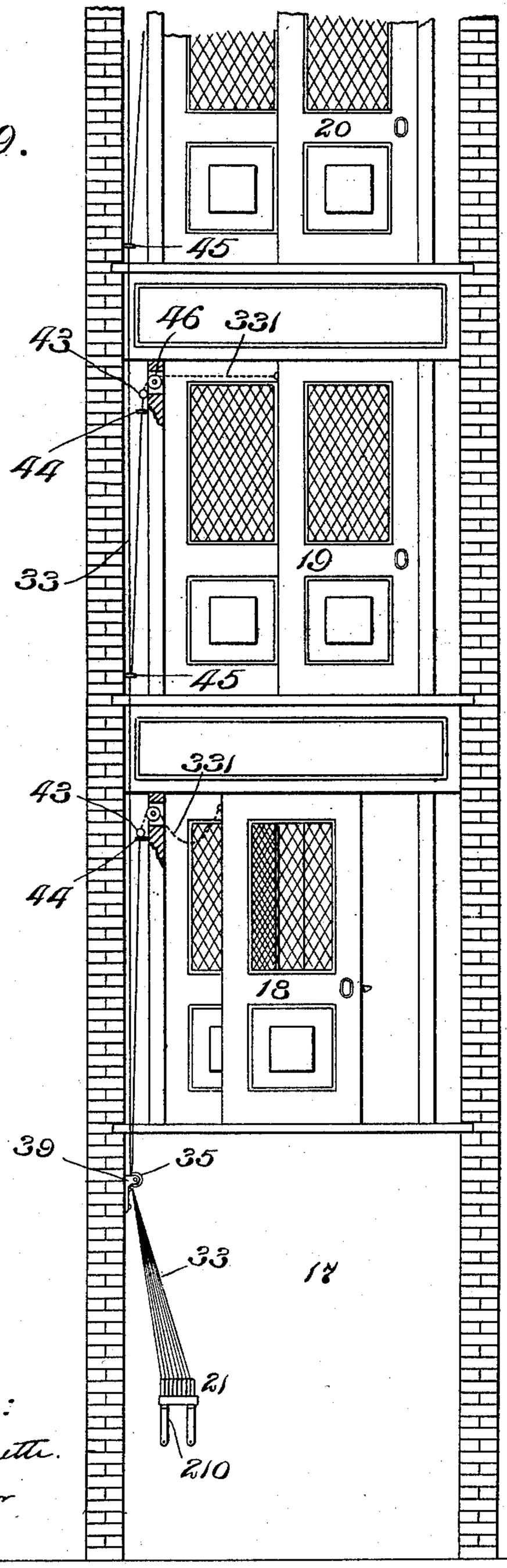
APPLICATION FILED JAN. 24, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 9.



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No. 756,685. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

SAMUEL H. McCARROLL, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AMERICAN EQUIPMENT COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF MAINE.

ELEVATOR SAFETY APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 756,685, dated April 5, 1904.

Application filed January 24, 1903. Serial No. 140,342. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL H. McCARROLL, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Elevator Safety Appliances, of which the following is a specification.

This invention has relation to elevator safety appliances of the type in which the opening of a door leading into the elevator-well locks the valve mechanism to prevent the actuation or movement of the car from a state of rest; and it has more particular relation to that class of such contrivances in which the locking mechanism engages or locks the valve-lever.

On the accompanying drawings, Figure 1 represents an elevator and shows the landing-door, a car, a car-hoisting mechanism, including the valve, and the devices for locking the valve-lever when the door is open. Fig. 2 represents an elevator-well with several doors leading thereinto, one of the doors being open, and shows the devices operatively interposed between the several doors and the lock and valve-lever for locking the said lever. Fig. 3 represents the locking device somewhat enlarged and is for the purpose of showing the connection of a wire or chain with each latch. Fig. 4 represents a bracket which carries the idlers around which the flexible connections pass. Fig. 5 represents a plan view of the gang-lock, one of the latches being projected into operative position. Fig. 6 represents a section through the same on the line 6 6 of Fig. 5. Fig. 7 represents a section on the line 7 7 of Fig. 5. Fig. 8 represents a view similar to Fig 6 with the latch withdrawn. Fig. 9 represents a view of an elevator-well somewhat similar to Fig. 2 and illustrates another way of connecting the wires with the doors.

On the drawings, 10 indicates an elevator-car which is supported upon a plunger 11 and a cylinder 12. The plunger and cylinder constitute the hoisting mechanism, the passage of liquid under pressure to and its exhaust from the cylinder 12 being controlled by suitable valve mechanism, the details of which need not be described. It is sufficient to state that the valve mechanism is controlled by a valve-lever 13, which is fulcrumed at 14 on a suitable bracket 15.

The valve-lever is adapted to be oscillated about its axis above and below a horizontal or neutral position, as shown in Fig. 1. In this neutral position the passage of fluid to or from the cylinder 12 is cut off. Suitably connected to the outer end of the valve-lever 13 there is a controlling-line 16, which may be raised and lowered by a suitable hand device on the car or may be grasped directly by the attendant on the car and raised or lowered, as the case may be, to start the car in either direction or stop it. As shown upon the drawings, however, this line is adapted to be operated by a lever on the car. The car is adapted to be carried by the hoisting mechanism up and down the well 17, (see Fig. 2,) past a series of landing-doors, which are indicated at 18 19 20, respectively. As thus far described the elevator does not differ from those which are now in use.

In connection with the lever and with the landing-door there is provided what may be termed a "gang-lock." This lock consists of a casing 21, formed of a plurality of sections 22, connected together at their corners by bolts 23. Between the sections of the casing are arranged sliding latches 24, equal in number to the landing-doors. Each latch is placed loosely in a recess between the two sections 22 and is adapted to be withdrawn thereinto, so that its front or operative edge is flush with or behind the front face of the casing 21. This casing may be supported upon a bracket 210 in proximity to the valve-lever 13, as shown in Figs. 1 and 6, so that when any one of the latches is projected, as will be explained, it may engage the lever and hold it against oscillatory movement.

The operative end of each latch is beveled or curved, as at *a a*, and is provided with a notch *b* for the reception of a rib 131, secured to or formed on the valve-lever 13. The purpose of the curving or beveling of the front end of

the latch is so that if a latch were projected when the lever 13 were above or below its horizontal neutral position the latch would yield rearwardly upon movement of said lever to neutral position until the rib 131 registered with the notch *b*, after which the latch would be projected to hold the lever against further movement.

Each latch is provided at its rear end with a pin or shank 25, projecting beyond the rear face of the casing 21. A helical contraction-spring 26 is coiled about each shank, its outer end being secured to the end of the shank and its inner end being fastened by a screw 27 to one of the sections 22 of the casing. Each spring when permitted to contract forces its latch yieldingly into operative position. The connections between the latches and the doors will now be explained.

By reference to Figs. 1 and 2 it will be observed that pivoted in the casing of each door there is a bell-crank lever 30, having an end 31 projecting into the path of the door and adapted to be forced rearwardly by the door as it reaches fully-closed position. The arm 32 of each bell-crank is connected by a flexible connection with the shank of one of the latches, so that each latch is controlled by a single door independently of the other latches and the other doors.

The flexible connection may consist of a wire, cord, chain, or other suitable or equivalent device. As shown, it consists of a wire 33 and a chain 34. The upper end of each flexible connection is connected to one of the bell-cranks, and it extends downwardly therefrom around and under a pulley 35, around and over a pulley 36, and under a third pulley 37. The number of pulleys employed for guiding the flexible connection depends upon the location of the doors and the location of the valve-levers, and it is only necessary to employ such pulleys as may be necessary to provide for the passage of each flexible connection from its bell-crank to its latch.

The pulleys 35 are journaled in a bracket 39, suitably attached to the wall of the well, as shown in Fig. 4. The pulleys 36 are supported upon a bracket 40, and whereas the pulleys 35 may be all arranged on the same shaft the pulleys 36 are arranged in pairs upon independent stud-shafts. Each pair of pulleys 36 may support two of the flexible connections 33, as shown. The pulleys 37 are all arranged on a shaft in a bracket or support 42 in the rear of the latch-casing 21.

The flexible connections are stretched sufficiently taut so that when the doors are all closed the bell-cranks 30 are shoved to the right in Fig. 1, so as to retract all of the latches. Upon the opening of any one of the doors—as, for instance, the door 18 in Figs. 1 and 2—the bell-crank opposite said door is permitted to swing to the left and downward, so that the latch connected with that bell-crank is forced yieldingly forward by its spring, so as to engage the rib on the lever 13 and hold it and the lever against movement.

To prevent each wire from moving beyond a predetermined extent, there is placed upon each wire or flexible connection a clip 43, which is adapted to be arrested by a check or stop 44, attached to the door-frame or to the wall of the well, as shown in Fig. 1.

The flexible connections may be held against lateral dislocation by suitable guides 45. (See Fig. 2.)

In Fig. 9 is illustrated another way of connecting the flexible connection with the doors so as to dispense with the necessity of employing the number of guide-pulleys shown in Figs. 1 and 2. Each wire 33 has connected to its upper end a chain 331, which passes over a pulley 46, placed in the frame of the door and connected to the rear top edge of the door. When the door is fully closed, the chain 331 is stretched taut, so as to draw upon the wire 33 and retract a latch which is connected thereto. Upon the first movement of the door toward open position the latch is released and its spring moves it to operative position. As the door continues to move toward open position the chain 331 forms a loop, as shown. With this form of device the clips and stops 43 44 are arranged just below the pulleys 46. The chain 331, connected to the top rear edge of the door, and the bell-crank 30 may be regarded as mechanical equivalents, since they perform substantially the same function.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. The combination of a controller, a series of doors, a series of independent latches, and independent connections between said latches and said doors whereby upon opening any one of said doors its corresponding latch is moved to operative position to engage said controller.

2. The combination of a controller, a series of doors, a series of independently-movable latches, a casing adapted to contain said latches, and independent connections between said latches and said doors respectively.

3. The combination of a controller, car-hoisting mechanism, a member operated by the controller for governing the hoisting mechanism, a latch adapted to engage said member and movable in a line perpendicular to the plane of movement of said member, said latch having a notch in its end with bevel edges on either side thereof, whereby when the latch is in operative position the said mechanism-governing member when moved toward neutral position retracts or pushes back the latch un-

til the said member registers with the notch in the latch.

4. The combination of a controller, car-hoisting mechanism, a member operated by the controller for governing the hoisting mechanism, a locking mechanism to engage said member and including a latch movable in a line perpendicular to the plane of movement of said member, said latch having a notch in its end with bevel edges on either side thereof, a series of doors, and operative means between said doors and said locking mechanism.

5. The combination of a controller, a door, a valve, an oscillatory valve-lever connected to the controller, a latch adapted to engage the oscillatory valve-lever and movable in a line perpendicular to the plane of movement of said oscillatory valve-lever, said latch having a notch in its end with bevel edges on either side thereof, whereby when the latch is in operative position the oscillatory valve-lever when moved toward neutral position retracts or pushes back the latch until the said lever registers with the notch in the latch.

6. The combination of a door, a controller, a valve, an oscillatory valve-lever connected to the controller, a latch movable in a line perpendicular to the plane of movement of said oscillatory valve-lever, means for yieldingly moving the latch to engage the said oscillatory valve-lever, and means for retracting the latch when the door is closed, said means including a flexible line extending from the latch to the door.

7. The combination of a controller, a series of doors, a valve, an oscillatory valve-lever connected to the controller, a locking mechanism to engage said oscillatory valve-lever and including a latch having a notch in its end with bevel edges on either side thereof, and connections between said doors and said locking mechanism.

8. The combination of a controller, a valve, a valve-lever connected to the controller, a series of doors, a gang-lock having a series of independent latches, and independent connections between said latches and the said doors whereby upon opening any one of said doors its corresponding latch is moved to operative position to engage the valve-lever.

9. The combination of a controller, car-hoisting mechanism, a member operated by the controller for governing the hoisting mechanism, a series of doors, a series of latches adapted to engage said member, and independent connections between said latches and said doors.

10. The combination of a controller, car-hoisting mechanism, a member operated by the controller for governing the hoisting mechanism, a series of doors, a series of latches adapted to engage said member, each of said latches having a notch in its end with bevel edges on either side thereof, and independent connections between said latches and said doors.

11. The combination of a controller, car-hoisting mechanism, a member connected to and governing the hoisting mechanism, said member being connected to and operated by the controller, locking mechanism to engage said member, a series of doors, and independent connections between said locking mechanism and said doors.

12. The combination of a car-hoisting mechanism, a controller, a member adapted to be operated by said controller for governing said hoisting mechanism, a series of doors, a series of independently-movable latches, a casing adapted to contain said latches, and independent connections between said latches and said doors respectively.

13. The combination of a car-hoisting mechanism, a controller, a member adapted to be operated by said controller for governing the car-hoisting mechanism, a casing containing a series of yieldingly-actuated latches, a series of doors, and a flexible connection between each latch and one of the doors, for withdrawing said latch when the door is closed, whereby upon the opening of each door its latch is moved yieldingly into operative position independently of the other latches.

14. The combination of a car-hoisting mechanism, a controller, an oscillatory member adapted to be operated by said controller for governing said hoisting mechanism, a plurality of latches movable in lines perpendicular to the plane of movement of the said member and adapted to engage said members independently of each other, a series of doors, and independent connections between said doors and said latches.

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

SAMUEL H. McCARROLL.

Witnesses:
WILLIAM DAVIDSON WETMORE,
WALTER S. REYNOLDS.