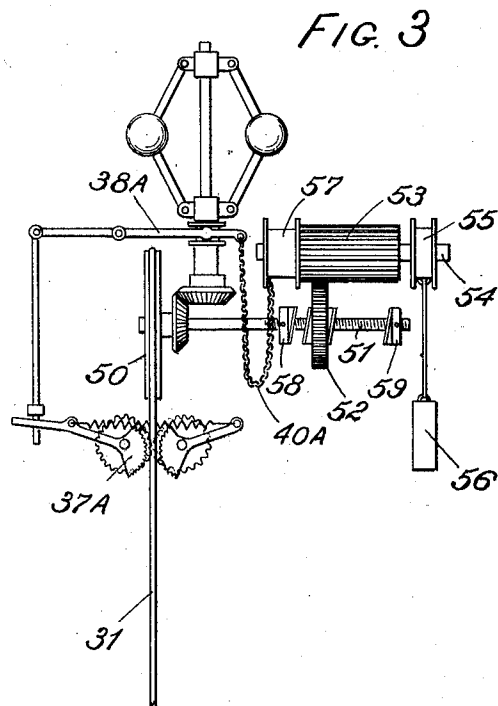
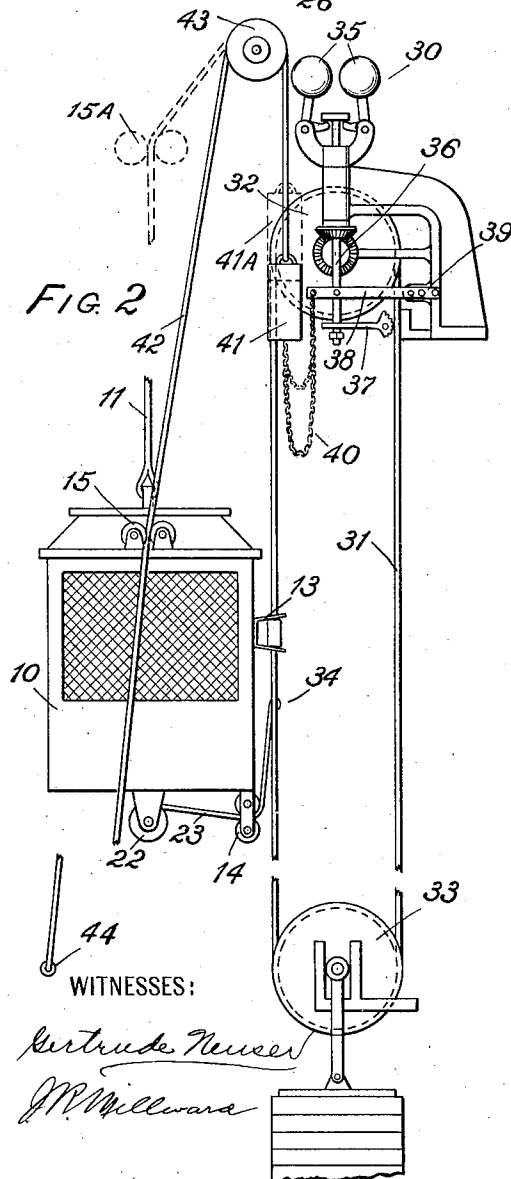
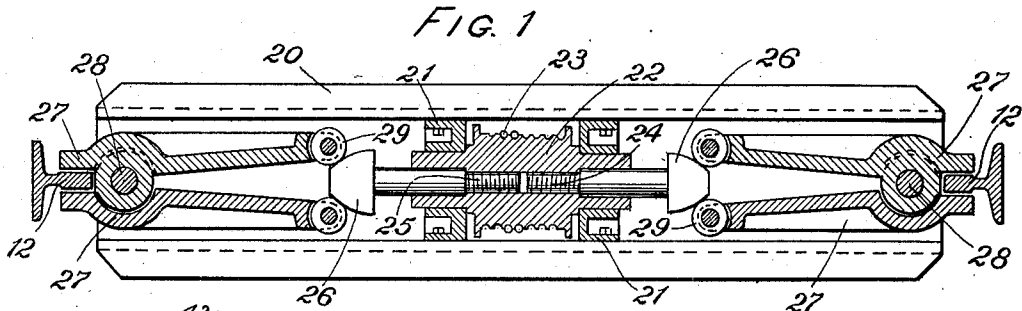


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 ACTUATING MECHANISM FOR ELEVATOR SAFETY DEVICES.
 APPLICATION FILED JULY 12, 1911.

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Patented Apr. 8, 1913.
 2 SHEETS—SHEET 1.



INVENTORS
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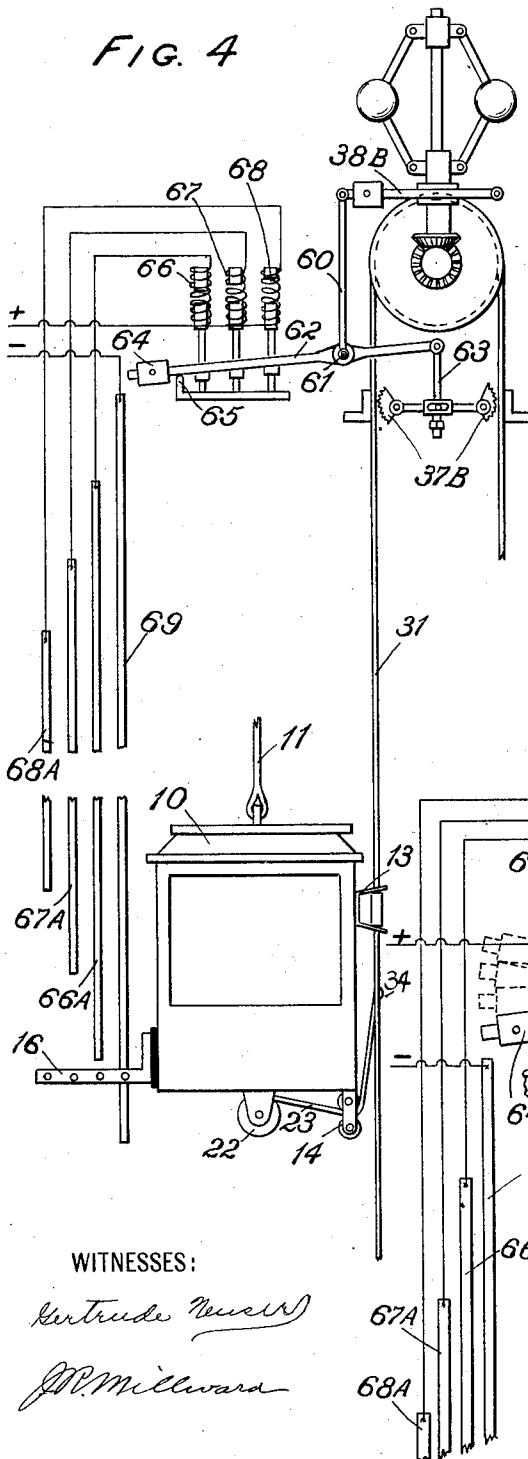
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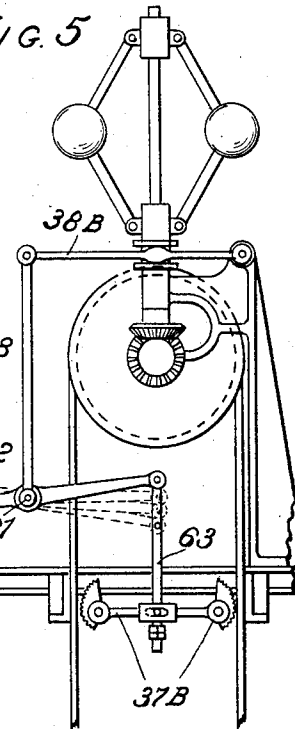
FIG. 4



WITNESSES:

Katherine Mueser
J. P. Millward

FIG. 5



INVENTORS

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UNITED STATES PATENT OFFICE.

HOWARD F. GURNEY, OF HACKENSACK, NEW JERSEY, AND ANDREW M. COYLE, OF NEW YORK, N. Y., ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO GURNEY ELECTRIC ELEVATOR COMPANY, OF HONESDALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ACTUATING MECHANISM FOR ELEVATOR SAFETY DEVICES.

1,058,670.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Continuation of application Serial No. 559,284, filed May 4, 1910. This application filed July 12, 1911. Serial No. 638,186.

To all whom it may concern:

Be it known that we, HOWARD F. GURNEY and ANDREW M. COYLE, citizens of the United States, and residents, respectively, of Hackensack, in Bergen county, and State of New Jersey, United States of America, and of the borough of Manhattan, in the city, county, and State of New York, United States of America, have invented certain new and useful Improvements in Actuating Mechanisms for Elevator Safety Devices, of which the following is a specification.

Our invention relates to actuating mechanisms for elevator safety devices or clutches such as are used to lock elevator cars to the guides over which they run. Its object is to so arrange and construct the device which automatically actuates the car safety device that it will go into operation under different conditions, dependent upon the position of the car in relation to its path of travel.

This application is a continuation of a former application for patent Serial No. 559,284 filed May 4, 1910.

We will describe our invention in the following specification and point out the novel features thereof in the appended claims.

Referring to the drawings, Figure 1 is a bottom plan view, partly in section, of a common type of elevator safety device, in combination with which our invention may be used. Fig. 2 shows an elevator-car and some of its connected parts including a governor and a novel arrangement for varying the adjustment thereof. In Fig. 3 we have shown another arrangement for varying the sensitiveness or adjustment of a governor. Fig. 4 shows a car with its connected controlling governor, together with an electrically controlled mechanism for changing the point at which the governor will act to set the car safety device. The governor and this arrangement for control are shown in side elevation in Fig. 5 on a somewhat larger scale.

Like characters of reference designate corresponding parts in all of the figures.

10 designates an elevator-car and 11 its hoisting cables. 12, 12 are the guides over which the car is arranged to run and with which the safety device may engage to arrest the movement of the car. 20 is the frame of

the elevator safety device. This is arranged to be affixed to the car and carries brackets 21 which rotatably support a winding drum 22. 23 is a rope wound about this drum, with one of its ends attached thereto. 24, 25 designate threaded shafts one of which is right-handed and the other left-handed. These fit into similar threads on the inside of the drum 22. On the outer ends of these shafts are wedge-shaped cams 26. 27, 27 designate gripping-jaws which are pivoted to the frame at 28 and are arranged to engage with the rails 12 over which the car runs. The inner ends of the gripping-jaws are provided with antifriction rollers 29 between which the cams 26 are arranged to act. The operation of this device is as follows: Whenever the rope 23 is pulled so that it is unwound from the winding drum 22, and the drum is rotated thereby, the right and left-hand screws 24 and 25 will be forced outward and will force the wedges 26 between the antifriction rollers 29. Thus the inner ends of the gripping-jaws will be forced apart and the other ends will be forced against the guides 12 which will firmly clamp the elevator-car to the stationary guides and will bring it to rest. This is a common form of elevator safety device, well known in the art. We have briefly described it in order to more clearly show the operation of the present invention which we will now describe.

Referring now to Fig. 2, 30 designates a centrifugal governor which is driven by an endless rope 31 which passes about the governor sheave 32, and a weighted sheave 33 which keeps it taut and in driving engagement with the governor sheave. This rope is connected with the car 10 by a light yieldable leaf spring 13. The rope 23 from the winding drum of the safety device is carried between guide-pulleys 14 on the car and to the governor rope 31 to which it is fastened at 34. Thus the governor will be driven by the movement of the car at a speed proportional thereto. This rotation will have a tendency to drive its balls 35 apart which, in turn, will raise a rod 36 which is connected with a pivoted lock lever 37, the outer end of which is eccentric to its pivot and is so shaped that it may engage the governor

rope 31 and securely hold it against further movement. This operation takes place whenever the speed of the car and the governor exceed certain predetermined amounts.

Continued movement of the car after the governor rope has been thus locked will disengage the rope from the spring 13 and exert a pull upon the safety rope 23, which will unwind and set the clamping jaws in a manner which has already been pointed out. So far the operation of the parts is in accord with common practice. It has, however, been the practice to oppose the movement imparted to the rod 36 by a spring or weight and to so regulate or adjust this opposing element that the governor will act at a certain predetermined speed somewhat in excess of that corresponding with the maximum normal speed of the car.

According to our invention a lever 38 is pivoted to the frame of the governor and is also connected with the actuating rod 36. We have shown a plurality of holes at 39 in the lever 38 through any one of which and through a corresponding hole in the frame of the governor its pivot may be placed according to whether the governor is to be used with high or low speed elevators. To the outer or free end of the lever 38 one end of a heavy chain 40 is affixed. The other end of this chain is fastened to a weight 41 which is supported by a cable 42. This cable is carried over the guide sheave 43 near the upper end of the elevator-well and at one side thereof, and thence down to a fixed anchorage 44 near the lower end of the elevator-well at the opposite side thereof. Intermediate the sheave 43 and the anchorage 44 this rope runs between a pair of deflecting pulleys 15 on the car. The operation of this arrangement may now be seen. The centrifugal effect of the governor 30 is opposed by the weight of the chain 40. When the car is in the middle portions of its run the greater part of the weight of the chain is supported by the lever 38 and opposes its upward movement. But as the car nears the ends of its run the cable 42 is deflected and causes weight 41 to be lifted, thus gradually decreasing the effective weight of the chain 40 on the lever 38. An example of this is illustrated in dotted lines in Fig. 2 and shows that when the deflecting pulleys reach the position in which they are shown at 15^A, the weight will be lifted into some such position as that in which it is shown at 41^A. The result will be that the sensitiveness of the governor or the speed at which it will act to set the rope clamp will be changed as the car nears the ends of its run so that it will actuate the car safety device at much lower speeds than it will when the car is farther away from the ends of its travel.

In Fig. 3 another arrangement of accom-

plishing similar results is shown. In this case the governor rope 31 drives the sheave 50 which has an extended threaded shaft 51. Mounted upon this shaft is a gear 52 the hub of which is also threaded. This gear is in mesh with a cylindrical gear 53 which is loosely mounted upon a shaft 54. Two drums are connected with the gear 53, with one of which, 55, a centering weight 56 is connected by a chain or cable. The other drum 57 is so arranged that a chain 40^A may be wound about it. One end of this chain is affixed to the drum and its other end to a lever 38^A which opposes the centrifugal action of the governor. The lever 38^A is also connected to actuate clamps 37^A to lock the governor rope at predetermined speeds of the governor. On the shaft 51 are adjustable stop-nuts 58 and 59. When the car is moving up and down through the intermediate parts of its run the gear 52 will travel back and forth on the shaft 51 on account of its engagement with the gear member 53 which is held against rotation by the centering weight 56. But when the car approaches the ends of its run the hub of gear 52 will be engaged by either one of the stop-nuts 58 or 59, the positions of which on the shaft may be adjusted, so that it must then rotate with the shaft, thus rotating the gear member 53 and raising the centering weight 56. This rotation will also be imparted to the drum 57 and will wind up the chain 40^A, thereby gradually releasing a part of its weight from the lever 38^A. Obviously, this will change the speed point at which the governor will act in much the same manner as that we have previously pointed out. When the car moves away from the ends of its travel the centering weight 56 will cause the chain drum to have an opposite rotation so that the chain will be unwound and its weight will again be thrown onto the lever 38^A.

The arrangement of parts in Figs. 4 and 5 will also produce similar effects on the adjustment of the governor. In this case the lever 38^B carries a weight of constant value which opposes the centrifugal effect of the governor. But this arm is not directly connected with the rope clamps 37^B. It is connected therewith by means of a rod 60 which is connected at 61 with a differential or "floating" lever 62, one end of which is connected by a link 63 with the rope clamps. On the outer end of lever 62 is a weight 64 which, when the lever is uninfluenced by other agencies, causes this end of the lever to rest upon a fixed stop 65. 66, 67 and 68 designate electromagnets or solenoids, the cores of which are so connected with the lever 62 that when energized they will lift it from the stop 65 and shift it up about its pivoted connection at 61. + and - designate mains from a suitable source of elec-

trical supply. One of these is connected with one terminal of each of the magnets; the other is connected with a contact strip 69 in the elevator-well. The other terminals of the magnets 66, 67 and 68 are connected with contact strips 66^A, 67^A and 68^A, respectively, in the elevator-well. These strips are of different lengths. On the car 10 is a contact maker 16 which is so arranged that it connects the strip 69 with the strips 66^A, 67^A and 68^A during different parts of the car's travel.

From the above it may be seen that the governor is most sensitive when the lever 62 is in the position in which it is shown in the drawings in full lines. This is the position which it will assume when the car is at the ends of its run. When the car has moved a certain distance from the ends of its travel the contact 16 on the car will connect the strips 66^A with the strip 69, thus energizing the magnet 66. This will slightly raise the end of lever 62 and, through its connections with the governor and the rope clamp, will change the adjustment in such a manner that a greater speed of the governor and a longer lift of the link 63 will be required to cause it to actuate the governor rope clamps. Further travel of the car will cause strip 67^A to also be connected with strip 69, thus energizing magnet 67 and further raising the end of lever 62, thus still further increasing the speed point at which the governor will act. Similarly, a still further movement of the car will energize magnet 68 by closing its circuit between strips 68^A and 69, raising the end of lever 62 still more, and changing the adjustment of the government connections so that a still greater speed is required for it to actuate the rope clamps.

It is obvious that as the car approaches its limits of travel the operations above described will be reversed.

Obviously, an elevator car may run safely at greater rates of speed in the intermediate positions of its travel than it can as it approaches the top or bottom of its run. This invention provides for the automatic actuation of the car safety device at different speeds, dependent upon the position of the car relative to the limits of its travel.

We have illustrated several modifications of our invention and have shown it applied to different types of governors and to different forms of rope clamps to show that we do not limit ourselves to any specific construction and arrangement of parts.

What we claim is.—

1. An elevator-car, a centrifugal governor connected therewith, an element arranged to oppose the centrifugal effect of the governor, and means automatically actuated by the change of position of the car for varying the effect of said opposing element.

2. An elevator-car, a centrifugal governor

connected therewith, an element arranged to oppose the centrifugal effect of the governor, and means for progressively decreasing the effect of said opposing element as the car nears the end of its path of travel.

3. An elevator-car, a centrifugal governor connected therewith, a weight arranged to oppose the centrifugal effect of the governor, and means automatically actuated by a change of position of the car for lifting a portion of said weight.

4. An elevator-car, a centrifugal governor connected therewith, a chain arranged to oppose the centrifugal effect of the governor, and means automatically actuated by a change of position of the car for lifting a portion of said chain as the car nears the ends of its travel.

5. An elevator-car, a centrifugal speed governor arranged to be driven thereby, a rope obliquely disposed across the path of travel of the car and arranged to be deflected thereby, and a connection between said rope and the governor whereby the sensitiveness of the governor may be varied.

6. An elevator-car, a centrifugal speed governor connected therewith, an element arranged to oppose the centrifugal effect of the governor, a rope obliquely disposed across the path of travel of the car and arranged to be deflected thereby as the car nears the end of its travel, and a connection between the rope and said element whereby the effect of said opposing element may be varied.

7. An elevator-car, a speed governor arranged to be driven thereby, a fixed rope set obliquely across the path of travel of the car, means on the car for deflecting the rope, a weight on one end of said rope, and a chain connected with said weight and with the governor.

8. An elevator-car, a safety device thereon, a centrifugal speed governor driven by the movement of the car and arranged to cause said safety device to be actuated when the speed of the car exceeds predetermined rates, a chain arranged to oppose the centrifugal effect of the governor, and means automatically actuated by a change of position of the car for lifting a portion of said chain as the car nears the ends of its travel.

9. An elevator-car, a safety device thereon, a centrifugal speed governor driven by the movement of the car and arranged to cause said safety device to be actuated when the speed of the car exceeds predetermined rates, a rope obliquely disposed across the path of travel of the car and arranged to be deflected thereby, and a connection between said rope and the governor whereby the sensitiveness of the governor may be varied.

10. An elevator-car, a safety device there-

on, a centrifugal speed governor driven by
the movement of the car and arranged to
cause said safety device to be actuated when
the speed of the car exceeds predetermined
5 rates, a fixed rope set obliquely across the
path of travel of the car, means on the car
for deflecting the rope, a weight on one end
of said rope, and a chain connected with
said weight and with the governor arranged
10 to oppose the centrifugal effect of the gov-
ernor, and to lower the speed point at which

the governor will cause the safety device to
be actuated as the car nears the ends of its
travel.

In testimony whereof we have signed our 15
names to this specification in the presence
of two subscribing witnesses.

HOWARD F. GURNEY.
ANDREW M. COYLE.

Witnesses:

W. L. O'CONNELL,
ARTHUR E. PETTIT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
