July 21, 1936. R. S. PEELLE 2,048,514

OPERATOR FOR ELEVATOR GATES

Filed March 12, 1934 2 Sheets-Sheet 1

Fig. 1.

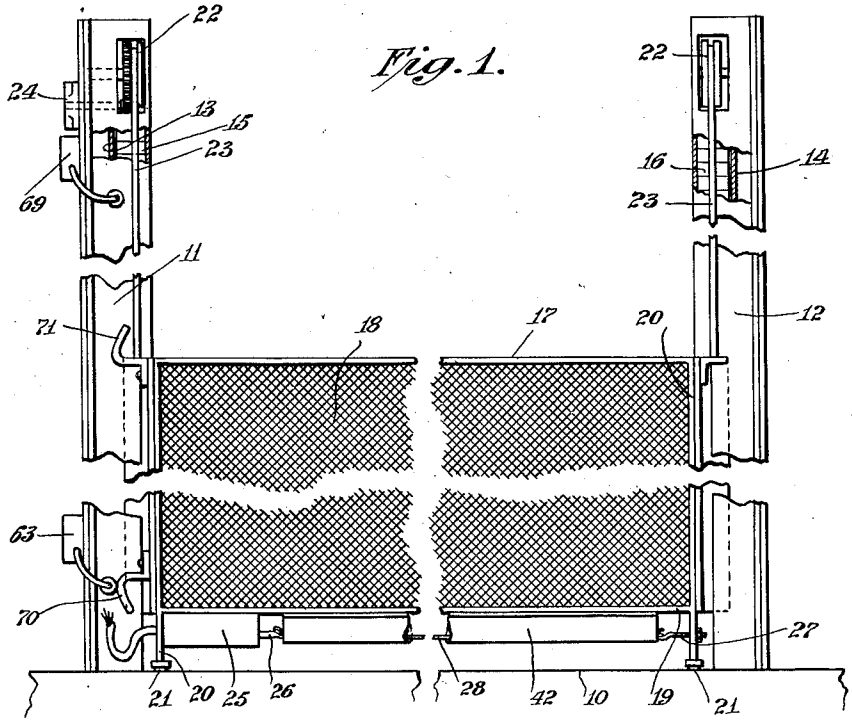
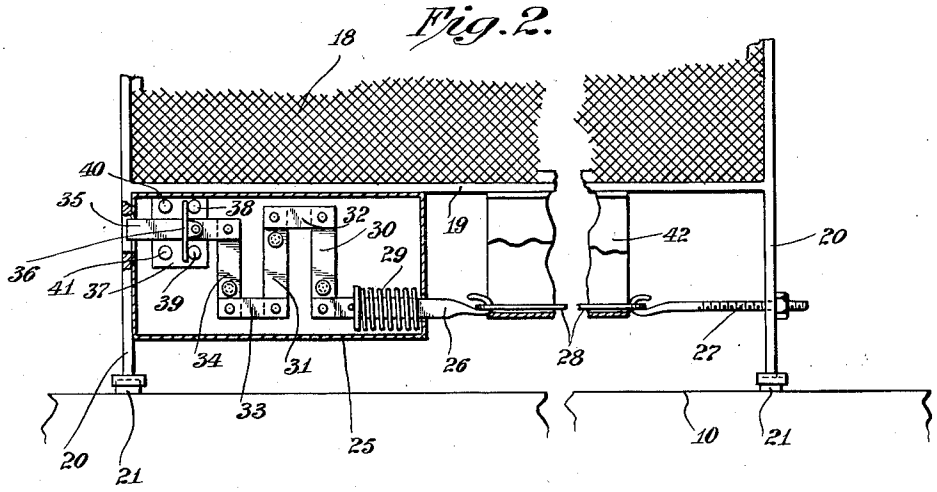


Fig. 2.



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Fig. 3.

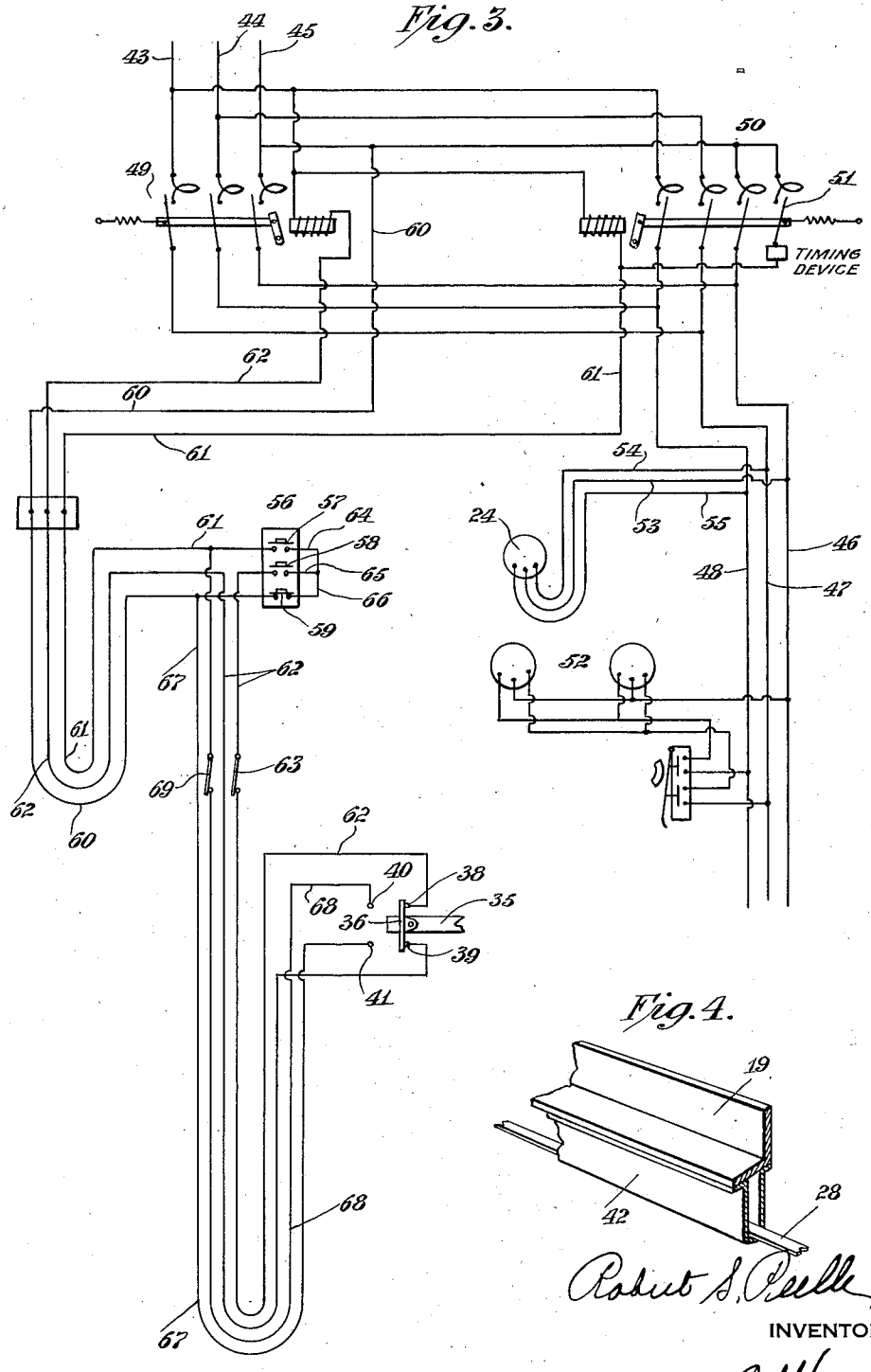


Fig. 4.

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UNITED STATES PATENT OFFICE

2,048,514

OPERATOR FOR ELEVATOR GATES

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Application March 12, 1934, Serial No. 715,207

12 Claims. (Cl. 268—59)

The invention relates to operators for elevator gates, and more particularly to an electric motor actuated operator.

An elevator gate, as distinguished from a fire retardant door for an elevator shaft opening, is used solely as a barrier for preventing injury or damage to persons or materials upon an elevator car while the car is in motion.

Such gates ordinarily consist of a wire mesh carried by an angle metal frame mounted in vertical guides carried by the elevator car, and consist of a single section which is moved upwardly, usually to a height to permit the use of the full capacity of the door opening. Such gates have no fire retardant properties, aside from the fact that they themselves are made of non-combustible material.

There is little likelihood of injury or damage to persons or material while passing to or from the car as a result of the movement of the elevator doors, since these doors, as almost universally used at the present time, are two-part vertically sliding doors, one of the sections of which moves upwardly and the other of which moves downwardly. Users of elevator cars, the shafts for which are equipped with counterbalanced elevator doors of the type above referred to, may, however, overlook the presence of the gate upon the car and thus allow some part of the person to get in the path of movement of the gate so as to receive injury therefrom, since notwithstanding the light structure of the gate as compared with an elevator door, particularly in large cars, it still possesses considerable weight and moves rapidly when it is being either opened or closed.

To minimize likelihood of personal injury from elevator doors, the power system operative upon such doors is so arranged as to either permit the doors to coast into the fully closed position, or to complete their closing movement at reduced speed. This arrangement is not feasible with an elevator gate because of the high cost of such a power system and because with a gate, accidents are more apt to happen during the initial closing movement of the gate than toward the end thereof.

The application of power to the motor for opening the gate is usually controlled by manually operative electric switches carried by the car, it being possible to utilize these switches for simultaneously controlling the application of power to the motors acting upon the elevator doors. The electric lines supplying power to the gate motor are carried in a cable having movement with the car, and, if desired, the operation of the gate may be controlled entirely independently of the door operating circuits.

With the above conditions in mind, I have provided an operator for elevator gates wherein movement is imparted to the door by an electric motor, the circuit including which is controlled in the usual manner for imparting opening and closing movement to the gate, which gate, however, is provided with a switch mechanism actuated by a yieldable impact member carried adjacent the bottom of the gate, so that in the event of an obstruction being encountered by the gate, this mechanism will actuate a pole changing switch to interrupt the circuit actuating the motor for imparting closing movement to the gate and close a circuit to the motor to cause its rotation in the opposite direction to impart opening movement to the gate. This mechanism is positioned below the bottom rail of the gate but spaced therefrom to permit the maximum movement of the cushioning switch actuating member necessary to interrupt the closing circuit to the motor and close the opening circuit thereto, thus avoiding any possibility of the engagement of any rigid portion of the gate with the person or object in the path of its movement.

The arrangement of the supplemental impact actuated switch mechanism is such as to ensure the operation of the mechanism with very slight movement of the impact member, thus avoiding any possibility of the development of material resistance to the downward movement of the door, before the power to the motor is interrupted to stop closing movement of the gate and re-applied to impart opening movement thereto. Means are provided whereby the timing of the interruption of the closing circuit to the motor, and the closing of the opening circuit may be finely adjusted so as to control the extent of movement of the gate after the actuating member has engaged with an object in the path of movement of the gate.

The invention consists primarily in an operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including a magnetically operated closing switch and a manually operative control switch guides of an inherently flexible impact member extending across said gate and below and spaced from the lower

rail thereof, yieldable means tautening said impact member, a switch mechanism including a movable contact member, means connecting said contact member with one end of said flexible member, and a fixed contact cooperating with said movable contact and included in a circuit controlled by said manually operative closing switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch; and in such other novel features of construction and combination of parts as are hereinafter set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a laterally and vertically condensed view in elevation of an elevator car gate embodying the invention;

Fig. 2 is a view upon a larger scale of the lower portion of the gate;

Fig. 3 is a wiring diagram illustrating the electrical conditions in the operator; and

Fig. 4 is a perspective view of a fragmentary portion of the switch control impact member.

Like numerals refer to like parts throughout the several views.

An elevator gate is carried by and movable with the elevator car, so that notwithstanding that there may be a number of door openings in a shaft; that the operator for the gate may be actuated simultaneously with that of any door in the shaft and that the application of power to the gate operator may be controlled through the same mechanisms utilized for controlling the application of power to the operators for the elevator doors, the invention relates merely to the agencies employed in controlling the action of the operator acting upon the gate. If desired, the electrical system throughout may be limited to gate operation, but as a matter of expediency, it ordinarily is used in connection with the electrical system controlling the power to the door operators and is so shown in the drawings.

Referring to the drawings, **10** indicates the platform of an elevator car. Projecting upwardly from this platform, are vertical guides **11** and **12**, each of which has associated therewith a weight box **13** or **14** within which counterweights **15** and **16** respectively have movement. The gate structure proper usually comprises an angular metal frame **17** closed by a wire mesh **18**. The lower bar of the metal frame **17** is shown at **19**. The side bars of the gate frame project downwardly of the lower rail **19** thereof so as to provide legs **20** which by contact with the platform **10** will stop downward movement of the gate with the lower rail **19** well above the car platform, the purpose of which construction will be hereinafter referred to. The legs **20** may be provided with cushioning bumpers **21** of rubber or other material.

Carried by the vertical guides **11** and **12** toward the top thereof, are sheaves **22** over which flexible connections **23** pass from the gate frame **17** to the counterweights **15** and **16**. Operative upon one or each of the sheaves **22** is a reversible electric motor **24**, the construction of which is immaterial to the present invention.

With wide elevator cars, the weight of the gate coupled with its high speed, particularly during the closing movement, may result in injury to any person or object positioned in the path of movement of the gate, and to prevent this, I embody in the gate structure, a safety attachment which in the event of its engagement with a person or object will not only yield so as to cushion the blow, but will, as a result of its yielding, interrupt the circuit to the motor **24**, and stop further downward movement of the gate. The construction of parts is preferably such that in addition to stopping downward movement of the gate in case of an emergency of the character above described, the safety device will apply power to the motor to cause its rotation in a reverse direction so as to immediately cause movement of the gate from a person or object and restore it to its fully open position where it will remain until closing power is again applied to the motor **24**.

The safety device above referred to comprises a switch housing **25**, carried by the gate at one side thereof close to a leg **20**. Within this housing is a double acting switch mechanism, which will be described in connection with the electrical conditions, this switch mechanism being actuated by a compound multiplying lever system having a stem **26** projecting through the wall of this housing. Upon the opposite leg **20**, an adjustable eye bolt **27** is mounted, an impact member consisting, as shown, of a flexible flat band **28** of metal extending from the stem **26** to the eye bolt **27** or across the gate parallel with but spaced below the lower rail **19** of the gate from and above the lower ends of the legs **20**. Acting upon the stem **26** is a coiled spring **29**, the tension of which spring may be controlled by the adjustment of the eye bolt **27** so as to not only hold the flat band or impact member **28** taut, but to determine the amount of pressure required to cause the impact member to yield sufficiently to actuate the switch mechanism controlled thereby.

The compound lever system above referred to, comprises a lever **30**, to the short arm of which the stem **26** is pivotally connected. Adjacent this lever **30** is a second lever **31**, the short arm of which is connected by a link **32** with the long arm of the lever **30**. The long arm of the lever **31** is connected by a link **33** to the short arm of a lever **34**, the long arm of which lever has pivoted thereto, a slide **35** of fiber or other electro-non-conductive material having pivotally mounted thereon a bridge contact member **36**. One end of the slide **35** passes through openings in the housing **25** and the adjacent leg **20**. These openings are large enough to compensate for any departure of the slide **35** from a right line movement due to the arc of movement of the lever **34**. Adjacent the slide **35** is a plate **37** carrying spaced contacts **38** and **39** which are included in the gate closing circuit, and two spaced contacts **40** and **41**, which are included in a circuit closed across the gate opening switch so as to apply opening power to the motor **24** notwithstanding that the manually operative opening switch carried in the elevator car may be open at the time of the actuation of the safety device as a result of the yielding of the band or impact member **28**. If desired, the band **28** may be inclosed by a flexible guard **42**, but this is largely a matter of appearance since without this guard, the form and yieldability of the band or member **28** will prevent injury to any person or object with which it may contact.

In Fig. 3 of the drawings, I have shown a wiring system which is utilized for applying power to the motors of the elevator door operators, as well as to the motor for the elevator car gate; but, as heretofore stated, the wiring system used may be applied only to the gate operator if so desired. In Fig. 3 of the drawings, the wiring system is for use with three-phase, alternating

current motors, and may be varied according to the type of motors used.

In the drawings, the electrical mains are shown at 43, 44 and 45 and in the shaft are three shaft lines 46, 47 and 48 which are adapted to be connected with the mains by means of a well known form of electro-magnetic pole changing switch mechanism including what may be termed an electro-magnetic closing switch 49 and an electro-magnetic opening switch 50.

The switch mechanism 50 ordinarily is provided with means forming a holding circuit, this means being shown at 51 and being ordinarily controlled by a timing mechanism indicated in the drawings for the purpose of controlling the duration of the make of the holding circuit.

The construction and operation of the switches 49 and 50 in controlling the energizing of the shaft lines 46, 47, and 48 is well known, so that a detailed description of these switches and their mode of operation is not necessary.

Connected with the shaft lines 46 to 48 in the usual manner are a plurality of door operator mechanisms, one of which is shown at 52. This mechanism 52 is immaterial to the present invention and therefore will not be described in detail.

The shaft lines 46 to 48 are dead at all times excepting when one of the electro-magnetic controlling switches is actuated.

The gate operator motor 24 is connected by branch lines 53, 54, and 55 with the shaft lines 46, 47, and 48 respectively, so that the direction of rotation of said motor is determined by the application of energy to the shaft lines as a result of the closing of one of the electro-magnetic switches 49 or 50.

In the elevator car, is a switch mechanism 56 ordinarily containing three switches, an opening switch 57, a closing switch 58 and an emergency stop switch 59 controlling the circuit to both of said other switches. The switch 59 is connected through a lead 60 with the main line 45. The switch 57 is connected through a lead 61 with the winding of the electro-magnet forming a part of the opening magnetic switch mechanism 50 and the main line 43. The closing switch mechanism 58 is connected through a lead 62 and the winding of the electro-magnet forming a part of the closing magnetic switch mechanism 49 and the main line 43.

The lead 62 includes therein a limit switch mechanism 63 and the contacts 38 and 39 of the safety device switch. The switch mechanism 59 is connected with each of the switches 57 and 58 by the connections 64, 65 and 66.

The lead 60 is connected by the branch line 67 with the contact 41 of the safety switch mechanism, and the contact 40 of said mechanism is connected through a branch line 68 including therein a limit switch 69 with the lead 61. In this manner, the circuit to the electro-magnetic opening switch mechanism 50 may be closed across the switch mechanism 57 with the actuation of the contact 36 in a manner to close the circuit across the contacts 40 and 41.

The leads 60, 61, and 62 are carried by a cable movable with the elevator car, while the branch lines 67 and 68 are carried in a cable movable with the elevator car gate, this cable also including the portions of the lead 62 between the switch mechanism and the contacts 38 and 39.

The limit switch mechanisms 63 and 69 are actuated by cams 70 and 71 carried adjacent the bottom and adjacent the top of the gate by one of the side rails thereof.

By reason of the use of the holding circuit 51, controlled by the timing device, the opening switch 57 need be only momentarily actuated. Since the electro-magnetic closing switch 49 has no holding circuit, the switch 58 is what is known as a constant pressure switch, the manual actuation of which must continue to ensure continuing movement of the gate. A constant pressure switch is used in controlling the gate or the door closing circuits so as to permit the attendant to control the application of power to the motor for imparting closing movement to the gate or the door. At times, however, the attendant may not act with sufficient celerity to avoid injury in the event that a person or object is in the path of the downward movement of the door, and the structure of the present application is for the purpose of making the switch 58 inoperative to continue the application of power to the motor for closing a door, even though the attendant fails to release this switch.

The operation of the herein described operator for elevator gates is substantially as follows:—

When it is desired to open the gate, the attendant merely actuates the opening switch 57 momentarily, thus closing the circuit through the line 61 to the winding of the magnet of the opening switch mechanism 50, which may be located at any conveniently accessible point. The actuation of said switch closes the circuit from the mains 43, 44, and 45 to the shaft wires 46, 47, and 48, thus applying power to the motor 24 in a direction to raise the gate 17.

The holding circuit 51 of the electro-magnetic switch mechanism 50 maintains the circuit through the winding of the magnet of the mechanism 50 until this circuit is opened by the timing device. Consequently, there is a continued application of energy to the shaft line and the motor 24, even though the switch 57 is open. This condition is well known in elevator door and elevator gate operators.

The counterweights 15 and 16, in addition to permitting the movement of the gate with the development of low power in the motor will, upon the limit of their movement, destroy the equilibrium of pressures upon opposite sides of the sheave 22 and permit slippage between said sheaves and the flexible connections 23, which ordinarily are chains. This avoids any necessity for accuracy in the timing of the interruption of the circuit to the motor 24.

As the gate reaches the limit of its upward movement, the cam shoe 70 carried thereby actuates the limit stop mechanism 69 so as to prevent the closing of the circuit to the electro-magnetic opening switch mechanism 50 by the safety device actuating mechanism. Hence, it is impossible, when the gate is in the open position, to close the circuit to said electro-magnetic opening switch mechanism 50 except by the actuation of the closing switch 58. The use and operation of this limit switch, however, is not material to the invention, and may be dispensed with if desired.

When the mechanism 52 is used, the energizing of the shaft wires 46 to 48 results in the application of power to the motor 24 simultaneously with the application of power to the motors of the elevator door operating mechanism. This, however, is also immaterial to the invention.

When it is desired to close the gate, the attendant actuates the manually operative closing switch mechanism 58, thus closing the circuit to the winding of the electro-magnetic closing switch mechanism 49. This impresses upon the wires

46, 47, and 48 of the shaft line, energy from the source, and changes the polarity of the current impressed upon the motor 24 in a manner to cause its rotation in a direction opposite to that required when opening the gate. The limit switch 69 and the contacts 36, 38 and 39 are included in the circuit controlled by the manually operative switch 58, the circuit being normally closed at the contacts 36, 38, and 39, so that the only point at which the circuit is normally open is at the switch 58.

It will be noted that there is no holding circuit in the electro-magnetic switch mechanism 49, so that it is necessary for the attendant to exert a constant pressure upon the movable member of the switch 58 in order to ensure a continued application of power to the motor 24 and continued closing movement of the gate. The contact 36 is engaged with the contacts 38 and 39 by the tension of the spring 29.

If a person or object is positioned below and in the path of movement of the gate 17, the yieldable impact member 28 will engage therewith before any other part of the gate structure, and thus limit the force of the blow to the resistance to movement of this impact member, due in part to the flexibility inherent to said member and in part to the tension of the spring 29. By a proper adjustment of the impact member 28 and the spring 29 by means of the eye bolt 27, the amount of this resistance may be so finely controlled as to make the force of the impact negligible. In fact, in actual practice, the engagement of the impact member 28 with a finger placed in the path of movement of the door, may be made to cause almost an instantaneous movement of the member 28 sufficient to cause the interruption of the circuit at the switch 36, 38, and 39 without the slightest injury to the finger.

This result is secured by reason of the compound multiplying lever system interposed between the stem 26 and the slide 35 carrying the contact 36. The construction shown in the drawings is such that a very slight movement of the stem 26 will impart a sufficient throw to the slide 35 to not only disengage the contact 36 from the contacts 38 and 39, but to engage said contact 36 with the contacts 40 and 41, thus instantly opening the circuit to the winding of the switch mechanism 49, notwithstanding that the constant pressure switch 58 is being actuated by the attendant, and immediately thereafter closing the circuit to the winding of the magnet of the electro-magnetic opening switch mechanism 50 so as to impart opening power to the motor 24 and thus instantly check any moving inertia of the gate and impart a reverse or opening movement thereto.

The circuit including the contacts 36, 40, and 41 is across the circuit which includes the manually operative opening switch 57 so that power is applied to the motor 24 in a manner to cause opening movement of the gate, notwithstanding that the switch 57 is open.

In the accompanying drawings, the construction of the compound switch mechanism is such as to ensure a relative movement of the stem 26 and the slide 35 carrying the contact member 36 as 1 to 64, so that a very slight movement of the stem 26 will give a throw to the switch member 36 sufficient to secure the mode of operation above described. This ratio is given merely as an example since it may be varied by modification of the compound lever system.

With a wide gate, the extent to which the impact member 28 flexes will vary at different points of the length of this member, but whatever the extent of flexure of said member, the very small movement of the stem 26, necessary to actuate the switch member 36, will require only a very small fraction of a second, the time interval being less when the contact with a person or object is at those portions of the member 28 towards the ends thereof where resistance to flexure of the member is greater than adjacent the longitudinal center thereof.

Consequently, where by reason of a lower flexibility of the member 28 the force of the impact would naturally be greater, the time interval required to interrupt the application of power to the motor 24 will be less and the speed at which the switch member 36 will be moved will be greater. Although the time interval between the initial engagement of the impact member with a person or object may vary slightly according to the point of such impact along the member 28, the variable flexibility or yieldability of said member 28 at different points thereof will so vary the timing in the actuation of the switch member 36 as to ensure a substantially uniform duration of the impact interval as to every point of the impact member.

The movement of the gate may be approximately one foot per second and the amount of flexure of the impact member 28 necessary to disengage the contact 36 from the contacts 38 and 39 and to engage said contact with the contacts 40 and 41 may be a quarter of an inch or less. Consequently, a very small fraction of a second is required to interrupt the closing power applied to the motor 24, and to apply opening power thereto. The moving inertia of parts will cause sufficient flexure of the member 28 to complete movement of the contact 36 into engagement with the contacts 40 and 41 following the interruption of the circuit at the contacts 38 and 39.

The limit switch 63 interrupts the circuit including the contacts 36, 38, and 39 and the manually operative closing switch 58 in the event that the impact member 28 encounters no obstruction during the closing of the gate, this limit switch being actuated toward the completion of the closing movement of the gate.

By means of the adjustable eye bolt 27, the quantity of flexure or yieldability of the impact member 28, necessary to actuate the safety attachment in the manner above described, may be regulated. By tightening the impact member 28 by means of this eye bolt, the speed of operation of the safety attachment may be increased. By a reverse adjustment of the eye bolt, the quantity of movement of the member 28 necessary to actuate the safety switch mechanism may be increased thus reducing the speed of operation of the safety attachment. Under no circumstances, can the impact member 28 be made so taut as to offer sufficient resistance to displacement, to injure a person or an object. Of course, there are limits to the amount of such adjustment, since excessive adjustment would disengage the contact 36 with the contacts 38 and 39.

Since with each actuation of the opening switch mechanism 50, the circuit controlled thereby will be closed for a definite period, and since the period required to re-open the gate in the event of its meeting an obstruction in the manner above described, is less than the duration of the operation of the timing attachment and holding

circuit operative upon the switch mechanism **50**, slippage must occur between the sheaves **22** and the connections **23** passing about these sheaves. Under ordinary circumstances, the gate will have had from one-third to one-half of its movement before the member **28** can engage an obstruction so that the duration of such slippage will only be a few seconds.

By eliminating the contacts **40** and **41**, damage resulting from engagement of the impact member **28** with a person or object may be so reduced as to be negligible, but by employing these contacts the likelihood of injury may be much further reduced, so that I preferably employ a safety attachment, wherein after the interruption of the power to the motor for closing the gate, power will be immediately applied to the motor for opening the gate, this last application of power being with sufficient rapidity to check the moving inertia of parts and imparting reverse movement thereto.

It is not my intention to limit the invention to the precise details of construction shown in the drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including a magnetically operated closing switch and a manually operative control switch, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, yieldable means tautening said impact member, a switch mechanism including a movable contact member, means connecting said contact member with one end of said flexible member, and a fixed contact co-operating with said movable contact and included in a circuit controlled by said manually operative closing switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch.

2. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including a magnetically operated closing switch and a manually operative control switch, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, a switch mechanism including a movable contact member, a compound multiplying lever system connecting said contact member with one end of said flexible member, and a fixed contact co-operating with said movable contact and included in a circuit controlled by said manually operative closing switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch.

3. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including a magnetically operated closing switch and a manually operative control switch, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, a switch mechanism including a movable contact member, means connecting said contact member with one end of said flexible member, a fixed contact co-operating with said movable contact and included in a circuit controlled by said manually operative closing switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch, and means whereby the quantity of movement of said impact member necessary to actuate said switch mechanism may be varied.

4. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including a magnetically operated closing switch and a manually operative control switch, of a switch mechanism comprising a fixed contact in a circuit controlled by said manually operative closing switch, and a movable contact member, a compound multiplying lever system operative upon said movable contact, a stem for actuating said lever system, a spring acting on said stem to normally engage said movable contact with said fixed contact, an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, and connections between one end of said impact member and said stem whereby flexure of said member will actuate said movable switch member to interrupt the circuit including said magnetic closing switch.

5. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including a magnetically operated closing switch and a manually operative control switch, of a switch mechanism comprising a fixed contact in a circuit controlled by said manually operative closing switch, and a movable contact member, a compound multiplying lever system operative upon said movable contact, a stem for actuating said lever system, a spring acting on said stem to normally engage said movable contact with said fixed contact, a flat flexible band extending across said gate and below and spaced from the lower rail thereof, connections between one end of said band and said stem whereby flexure of said band will actuate said movable switch to interrupt the circuit including said magnetic closing switch, an adjustable eye bolt and connections between said eye bolt and said band, whereby the tautness of said band and the tension of said spring may be varied to control the time interval required for the actuation of said switch.

6. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible

connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including a magnetically operated closing switch and a manually operative control switch, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, a switch mechanism including a movable contact member, means connecting said contact member with one end of said flexible member, a fixed contact co-operating with said movable contact and included in a circuit controlled by said manually operative closing switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch, a limit switch mechanism adjacent the bottom of one of said guides, and included in the circuit controlled by said manually operative switch, and means carried by the gate whereby said limit switch will be actuated to interrupt the circuit in which it is included toward the closing movement of the gate.

7. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including magnetically operated opening and closing switches and manually operative control switches, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, a switch mechanism including a movable contact member, means connecting said contact member with one end of said flexible member, and opposed fixed contacts co-operating with said movable contact and included respectively in the circuit controlled by said manually operative closing switch and in the circuit to said electro-magnetic opening switch across said manually operative opening switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch and close the circuit including said magnetic opening switch.

8. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including magnetically operated opening and closing switches and manually operative control switches, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, a switch mechanism including a movable contact member, a compound multiplying lever system connecting said contact member with one end of said flexible member, and opposed fixed contacts co-operating with said movable contact and included respectively in the circuit controlled by said manually operative closing switch and in the circuit to said electro-magnetic opening switch across said manually operative opening switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch and close the circuit including said magnetic opening switch.

9. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including magnetically operated opening and closing switches and manually operative control switches, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, a switch mechanism including a movable contact member, means connecting said contact member with one end of said flexible member, opposed fixed contacts co-operating with said movable contact and included respectively in the circuit controlled by said manually operative closing switch and in the circuit to said electromagnetic opening switch across said manually operative opening switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch and close the circuit including said magnetic opening switch, and means whereby the quantity of movement of said impact member necessary to actuate said switch mechanism may be varied.

10. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including magnetically operated opening and closing switches and manually operative control switches, of a switch mechanism comprising a fixed contact in the circuit controlled by said manually operative closing switch, and an opposed fixed contact connected in parallel with said manually operative opening switch in the circuit to said electro-magnetic opening switch, and a movable contact member adapted to be alternatively engaged with said fixed contacts, a compound multiplying lever system operative upon said movable contact, a stem for actuating said lever system, a spring acting on said stem to normally engage said movable contact with the fixed contact in circuit with said manually operative closing switch, an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, and connections between one end of said impact member and said stem whereby flexure of said member will actuate said movable contact member to interrupt the circuit including said magnetic closing switch, and close the circuit including said magnetic opening switch.

11. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including magnetically operated opening and closing switches and manually operative control switches, of a switch mechanism comprising a fixed contact in the circuit controlled by said manually operative closing switch, and an opposed fixed contact connected in parallel with said manually operative opening switch in the circuit to said electro-magnetic opening switch, and a movable contact member adapted to be alternatively engaged with said fixed contacts, a compound multiplying lever system operative upon said movable contact, a stem for actuating said lever system, a spring acting on said stem to

normally engage said movable contact with the fixed contact in circuit with said manually operative closing switch, a flat flexible band extending across said gate and below and spaced from the lower rail thereof, connections between one end of said band and said stem whereby flexure of said band will actuate said movable contact member to interrupt the circuit including said magnetic closing switch, and close the circuit including said magnetic opening switch, an adjustable eye bolt and connections between said eye bolt and the other end of said band whereby the tautness of said band and the tension of said spring may be varied to control the time interval required for the actuation of said switch.

12. An operator for elevator gates embodying therein the combination with a gate mounted for vertical movement upon guides upon a car, counterweights for said gate, sheaves, flexible connections passing from said gate to said counterweights and about said sheaves, an electric motor operative upon one of said sheaves, and electrical circuits including magnetically operated opening and closing switches and manually operative control switches, of an inherently flexible impact member extending across said gate and below and spaced from the lower rail thereof, a switch mechanism including a movable contact member, means connecting said contact member with one end of said flexible member, opposed fixed contacts co-operating with said movable contact and included respectively in the circuit controlled by said manually operative closing switch and in the circuit to said electromagnetic opening switch across said manually operative opening switch, whereby flexure of said flexible member will interrupt the circuit including said magnetic closing switch and close the circuit including said magnetic opening switch, limit switch mechanisms adjacent the top and the bottom of one of said guides and included respectively in the circuits controlled by said manually operative closing switch and in the circuit across the manually operative opening switch, and means carried by the gate co-operating with said limit switches respectively, whereby the circuits in which said limit switches respectively are included, will be interrupted toward the closing and the opening movement of the gate.

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