

J. R. KAISERMAN.
ELECTRICAL OPERATING MEANS FOR DOORS.
APPLICATION FILED AUG. 16, 1917.

1,249,110.

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Fig. 1 -

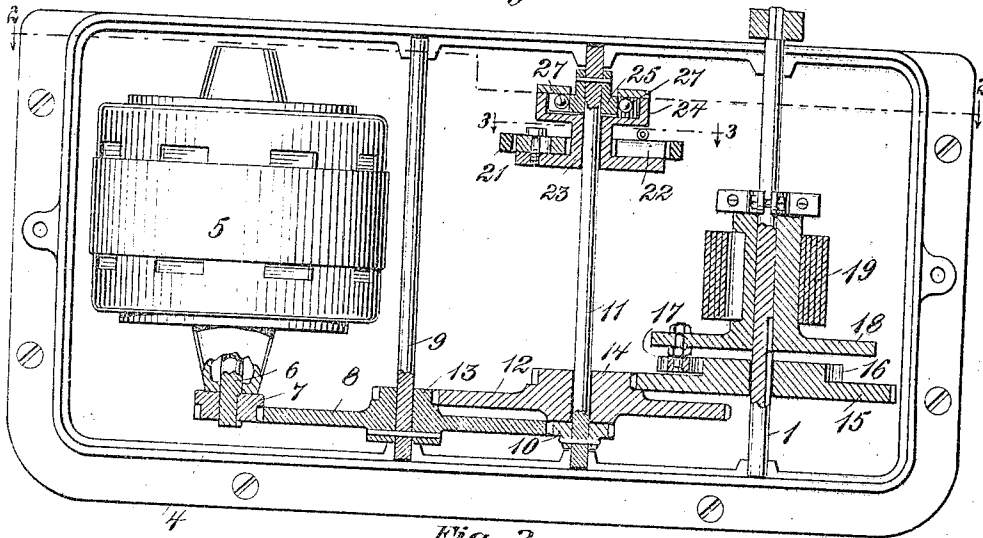


Fig. 2 -

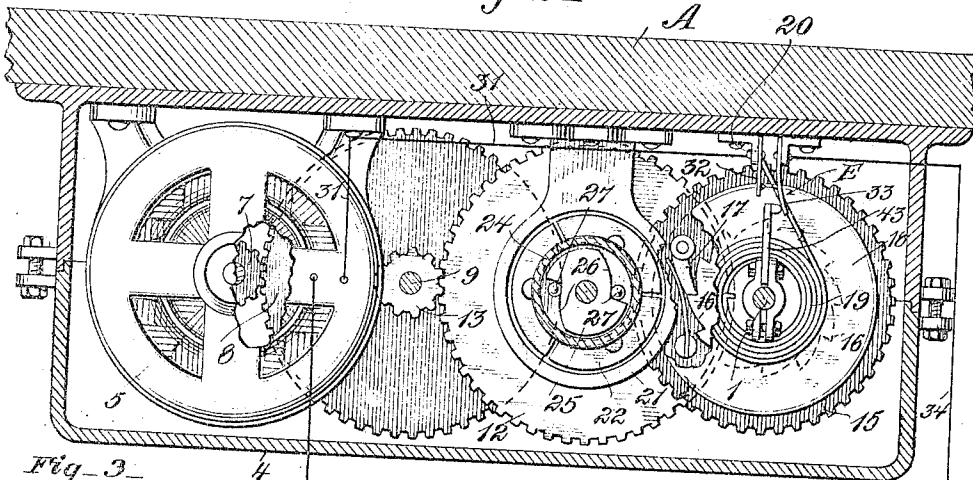
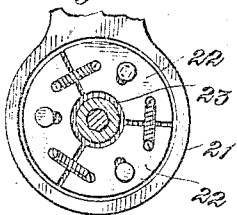
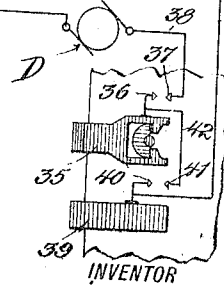
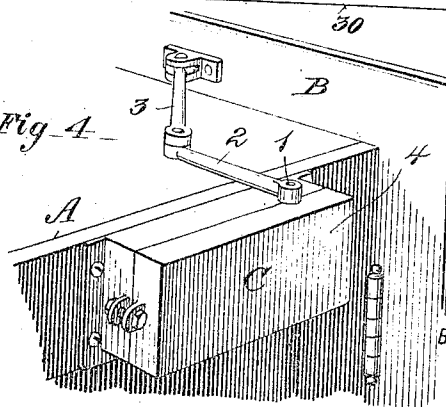


Fig. 3 -



WITNESSES
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Fig. 4 -



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ELECTRICAL OPERATING MEANS FOR DOORS.

1,249,110.

Specification of Letters Patent.

Patented Dec. 4, 1917.

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To all whom it may concern:

Be it known that I, JACOB R. KAISERMAN, a citizen of the United States, and a resident of Livingston, in the county of Park and State of Montana, have invented a new and Improved Electrical Operating Means for Doors, of which the following is a full, clear, and exact description.

This invention relates to electrical operating means for doors whereby the door is opened by an electric motor, the circuit of which is controlled by a knob, latch or other device, and in the opening of the door a spring is wound, which serves as a closing motor, there being means for permitting the door to be operated by hand if the power should fail.

The invention has for its general objects to improve and simplify the construction and operation of door-operating devices so as to be reliable and efficient in use, comparatively simple and inexpensive to manufacture, and so designed that the door can be opened by hand if power for the motor should fail, without altering any of the operating connections between the motor and door.

A further object of the invention is the provision of a friction device of novel construction and arrangement, whereby the door is prevented from closing too rapidly under the energy stored in the wound spring, and also the provision of a pawl and ratchet which permits the door to be opened by hand faster than the motor normally drives it, and also in case the power should fail the friction of the dead motor is overcome by the pawl merely overriding the ratchet, and again on closing, when the door is brought to a closed position, the pawl and ratchet will prevent the revolving effect of the motor under inertia from exerting undue pressure on the parts of the mechanism.

Still another object of the invention is the provision of a switch in the motor circuit which will open the said circuit automatically after the door is fully opened and when the operator holds the controlling switch closed too long.

With such objects in view, and others

which will appear as the description proceeds, the invention comprises various novel features of construction and arrangement of parts which will be set forth with particularity in the following description and claims appended hereto.

In the accompanying drawing, which illustrates one embodiment of the invention and wherein similar characters of reference indicate corresponding parts in all the views,

Figure 1 is a vertical section of the apparatus;

Fig. 2 is a horizontal section on the line 2—2, Fig. 1, with the electric circuit shown in diagram;

Fig. 3 is a detail sectional view on the line 3—3, Fig. 1, showing the retarding device; and

Fig. 4 is a perspective view showing the apparatus applied to a swinging door.

In the present instance the apparatus is shown in connection with a swinging door, but it is to be understood that it can be applied to sliding doors also. In Fig. 4, A designates the door, B the door frame, C the door operating mechanism that includes a rotary shaft 1, an arm 2 fastened thereto, and a link 3 connecting the free end of the arm with the door frame, whereby swinging of the arm 2 will cause the door to open or close. In case of a sliding door a sprocket or wheel may be mounted on the shaft 1 and operate in connection with an endless chain or cable to cause the door to open and close.

The door-operating mechanism C includes a casing 4, in which is contained an electric motor 5, the shaft 6 of which has a pinion 7. Meshing with this pinion is a gear wheel 8 on a shaft 9, which gear wheel also meshes with a pinion 10 keyed to a second shaft 11. On this shaft 11 is a loose gear wheel 12 that meshes with a pinion 13 fastened to the gear wheel 8, and on the gear 12 is a pinion 14 which meshes with a gear wheel 15 loose on the shaft 1. The gear 15 has ratchet teeth 16 with which engages a pawl 17 carried by a drum 18, this drum being keyed to shaft 1. A spring 19 has its inner end fastened to the drum and its outer end fastened to the casing at 20, Fig. 2, and consequently when the

motor operates to open the door the gear 15 will drive the drum 18 through the ratchet 16 and pawl 17 turning the shaft 1 and winding the spring 19.

5 The retarding device includes a stationary brake ring 21 within which are centrifugally acting weights 22, Figs. 1 and 3, which are mounted on a carrier 23 loose on the shaft 11. This carrier includes a drum 24
10 which forms part of a clutch. Within the drum is a clutch element 25 keyed to the shaft 11, said element having cam surfaces 26 which coöperate with the drum 24 to form wedge-shaped pockets into which are
15 adapted to wedge the balls 27. These balls do not have any clutching action during the opening of the door by the operation of the motor 5, but when the door closes under the tension of the spring 19, the shaft 11 will be
20 rotated through the gear 15, pinion 14, gear 12, pinion 13, gear 8, and pinion 10. The rotation of the shaft 11 causes the carrier 23 to be clutched to the shaft 11, since the balls 27 wedge in the narrow parts of the
25 clutch pockets. The rotation of the carrier 23 causes the weights 22 to fly outwardly and frictionally engage the brake ring 21 and thereby retard the whole mechanism, which in turn retards the closing of the door.

30 The motor 5 is adapted to be connected in circuit by the operation of a door knob, latch or other device adjacent to the door or by a switch at a remote point. The circuit connections and controlling means are
35 shown in Fig. 2, wherein D designates a source of current which is connected by a wire 30 with one terminal of the motor 5, and the other terminal is connected by a wire 31 with a switch E, which comprises
40 two contacts 32 and 33 normally engaged or in circuit-closing position. The contact 33 is connected by a wire 34 with the door lock. The drawing shows a latch bolt 35 of a lock which is adapted to be operated in
45 the usual manner by a knob, and on this bolt is a movable contact 36 arranged to engage a fixed contact 37 connected by a wire 38 with the source of current D. In order to prevent the motor circuit from being closed
50 while the door is locked, the locking bolt 39 has a contact 40 to which the wire 34 is connected, and this movable contact 40 is adapted to engage a fixed contact 41 when the bolt 39 is in unlocking position, the con-
55 tact 41 being connected by a wire 42 with the contact 36. It will thus be seen that the two switches formed by the contacts 36, 37 and 40, 41 are in series, and when they are both closed the motor will be operated.

60 When the door knob or latch is operated the motor 5 will rotate as long as the circuit is held closed, and if the circuit should be held closed longer than necessary to open the door, an arm 43 on the shaft 1, Fig. 2,

will engage the switch contact 33 and open 65 the motor circuit at the switch E, so that the motor will stop and undue strain on the operating mechanism will be avoided.

From the foregoing description taken in connection with the accompanying draw- 70 ing, the advantages of the construction and method of operation will be readily understood by those skilled in the art to which the invention appertains, and while I have described the principle of operation, to- 75 gether with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative and that such changes may be made when de- 80 sired as fall within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

85 1. The combination of a door, a shaft operatively connected with the door for moving the same, a motor, power-transmitting means between the motor and said shaft, a spring connected with the said shaft 90 and adapted to wind during the opening of the door by the said motor, a ratchet and pawl mechanism between the spring and said means for permitting the door to be operated independently of the motor, and 95 an automatic device operatively connected with the said means to retard the closing movement of the door under the action of the said spring.

2. The combination of a door, a shaft op- 100 eratively connected with the door for moving the same, a motor, power-transmitting means between the motor and said shaft, a spring connected with the said shaft and adapted to wind during the opening of the 105 door by the said motor, a ratchet and pawl mechanism between the spring and said means for permitting the door to be operated independently of the motor, an automatic device operatively connected with the 110 said means to retard the closing movement of the door under the action of the said spring, a circuit for the motor, means for closing the motor circuit to open the door, and a switch in said circuit and arranged 115 to be opened automatically when the door is fully opened.

3. The combination of a door, a shaft operatively connected therewith, a spring connected with the shaft to wind as the 120 shaft opens the door, a gearing, a ratchet and pawl device between the gearing and spring, a motor connected with the gearing, a brake means associated with the gearing, and a clutch connecting the brake means 125 with the gearing only when the closing movement of the door in one direction exceeds a predetermined rate of travel.

4. The combination of a door, a shaft operatively connected therewith, a spring connected with the shaft to wind as the shaft opens the door, a gearing, a ratchet and pawl device between the gearing and spring, a motor connected with the gearing, a brake means associated with the gearing, a clutch connecting the brake means with the gear- ing only when the closing movement of the door in one direction exceeds a predetermined rate of travel, a circuit for the said motor, a controller for the circuit, and a switch for automatically opening the circuit when the door is fully opened. 10

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