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B. F. DIANO ET AL
MECHANICAL DOOR OPERATOR

2,736,552

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2 Sheets-Sheet 1

Fig. 1.

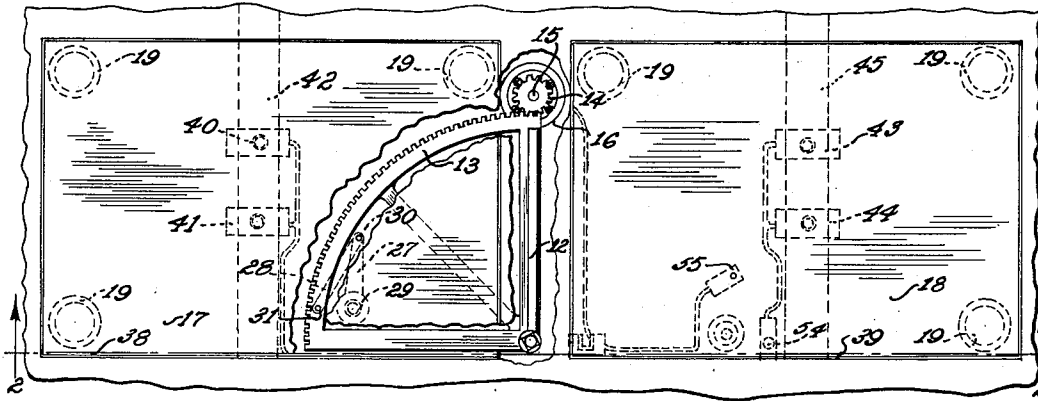
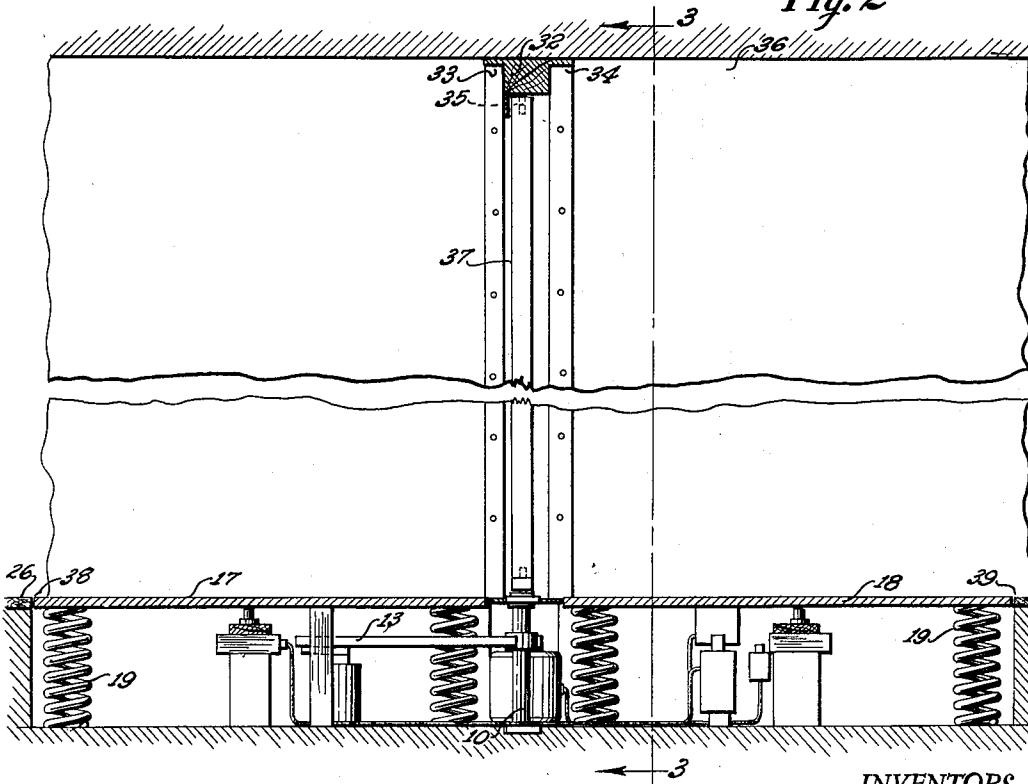


Fig. 2



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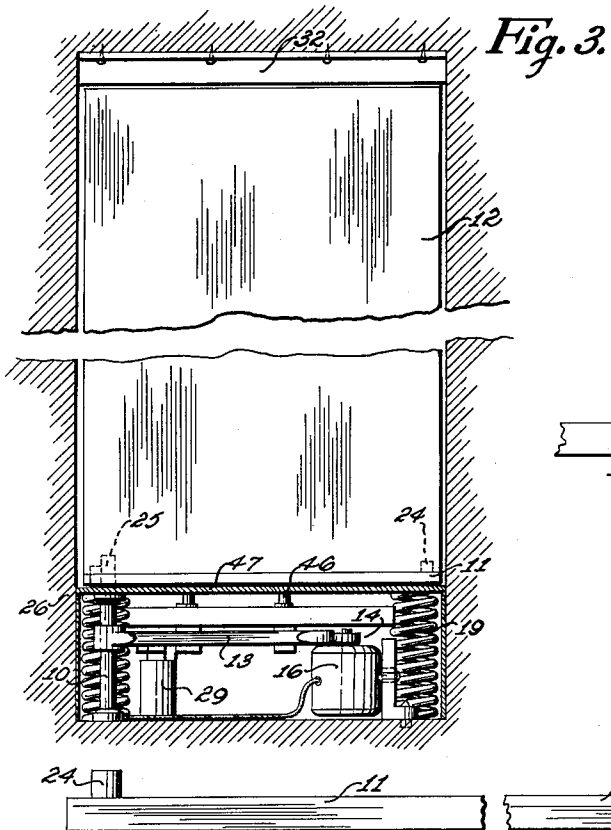
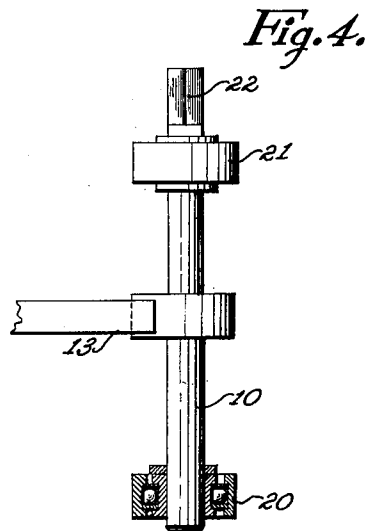
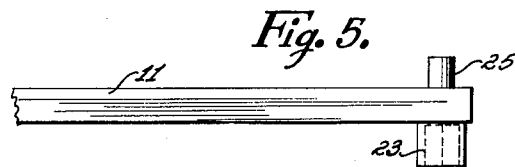
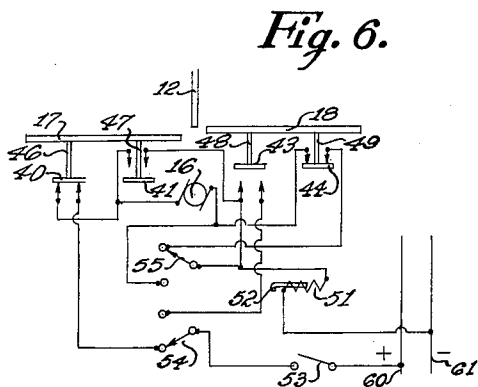
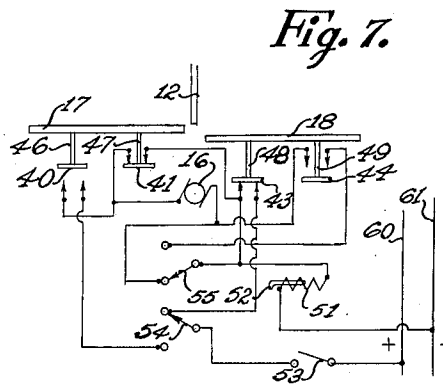
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MECHANICAL DOOR OPERATOR

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1 Claim. (Cl. 268—33)

This invention relates to door opening and closing devices particularly of the mechanical type, and in particular a door operating device in which mechanical door operating instrumentalities positioned below a door are operated by a motor upon completion of a circuit to the motor by the weight of a person upon a foot plate extended from one or both sides of the door.

The purpose of this invention is to provide a door opening device that operates automatically by mechanical means as a person approaches a door.

Various electrical devices, such as the electric eye, have been used for opening and closing doors with the approach of a person from either side of the door, however, such devices require responsive photo-electric elements that are not only costly but that are difficult to install. For this reason doors of this type are not universally adapted to either commercial, or domestic use. With this thought in mind this invention contemplates a pair of plates suspended by springs on both sides of a door and a motor for opening the door through gears as a circuit is completed to the motor with switches closed by the weight of a person on one of the plates.

The object of this invention is, therefore, to provide mechanical means whereby a door opens as a person approaching the door steps upon a plate extended from the door.

Another object of the invention is to provide a mechanical door opening device in which means is provided for arresting the opening movement of the door to prevent the door striking a person approaching the door.

A further object of the invention is to provide a mechanical door opening device which is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a door carried by an arm mounted on a vertically disposed shaft journaled in a frame below a floor above which the door is positioned with a gear segment mounted on the shaft and positioned to mesh with a pinion on a shaft of a motor also positioned below the floor and wherein the weight of a person on a plate extended from either side of the door closes the circuit to the motor for rotating the pinion to actuate the segment to swing the door in the opening movement.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a plan view illustrating the improved door operating device showing floor plates extended from both sides of a door with part of one of the plates and also part of the floor broken away to show a gear segment positioned below the floor.

Figure 2 is a longitudinal section through the door opening being taken on line 2—2 of Fig. 1.

Figure 3 is a cross section taken on line 3—3 of Fig. 2 showing the door with the mounting elements thereof positioned below the door and floor.

Figure 4 is a detail illustrating the door operating shaft

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with the parts shown on an enlarged scale, and with other parts omitted.

Figure 5 is a detail illustrating a bar upon which the door is mounted and showing part of the bar broken away.

Figure 6 is a typical wiring diagram illustrating the electric circuits to the motor, latch actuating solenoid and switches.

Referring now to the drawings wherein like reference characters denote corresponding parts the improved door operating instrumentalities of this invention include a vertically disposed shaft 10, a bar 11 positioned on the upper end of the shaft and upon which a door 12 is mounted, a gear segment 13 positioned to mesh with a pinion 14 on a shaft 15 of a motor 16, floor plates 17 and 18 positioned on springs 19, and a plurality of electric circuits and switches for opening and closing circuits to the motor and latching elements.

The shaft 10 is positioned as illustrated in Fig. 2 and 3 with the lower end journaled in a bearing 20 and the upper end in a similar bearing 21 and, as illustrated in Fig. 4, the upper end of the shaft is provided with a square section or splines 22. The upper end 22 of the shaft extends into a socket 23 on the lower surface of the bar 11, the upper surface of which is provided with pins 24 and 25 that extend into the lower end of the door 12.

The motor 16, is positioned below the floor, which is indicated by the numeral 26 and as a circuit is completed to the motor the pinion 14 is rotated in a counterclockwise direction whereby the segment 13 travels in a clockwise direction from the position shown in Fig. 1, whereby the door 12 is actuated from the closed position shown in Fig. 1 through an angle of 90° to the open position.

The door closer of this invention, see Fig. 1, is also provided with an automatic door closure having arms 27 and 28, the arm 27 extended from the housing 29 of the door closure and the arm 28, which is pivotally connected to the end of the arm 27 with a pin 30 being connected to the segment 13 with a pin 31.

As illustrated in Fig. 2, the upper part of the door opening may be provided with a beam 32 having flanges 33 and 34 at the sides, and the upper end of the door is anchored in the beam with a pin 35. The beam 32 is positioned against a ceiling 36 and similar beams, as indicated by the numeral 37 may be provided at the sides, if desired.

The plates 17 and 18 are positioned in openings 38 and 39 in a floor or the like and, as illustrated in Fig. 2 the springs 19 suspend the plates with the upper surfaces thereof flush with the surface of the floor 26.

The plates 17 and 18 are positioned to engage contacts or buttons of switches for opening and closing circuits and, as illustrated in the wiring diagram, switches 40 and 41 are provided on a beam 42 below the plate 17 with switches 43 and 44 on a beam 45 below the plate 18.

The switches 40 and 41 are provided with button 46 and 47 respectively and similar buttons 48 and 49 are provided on the switches 43 and 44. With the buttons contacting the lower surfaces of the plates 17 and 18 the weight of a person on one of the plates moves the buttons below the plate downwardly closing one of the switches on the beam below the plate, and opening the other.

With the floor plates 17 and 18 free or located at floor level, the switch 40 is open and the switch 41 closed, and, on the opposite side of the door, the switch 43 is open and the switch 44 closed.

The weight of a person on the plate 17 at one side of the door moves the plate 17 downwardly, as shown in Figure 6, opening the switch 41 and closing the switch 40, whereby a circuit is completed from the plus current supply wire 60 through the switches 53, 54, 40, to the motor

16, from the motor through the switches 44 and 55 to the solenoid 51, and from the solenoid to the minus current supply wire 61.

By the same means a circuit is completed to the motor as the switch 44 is opened and the switch 43 closed as a person steps on the plate 18.

By this means the weight of a person on one of the plates closes circuits to actuate the door whereby the door automatically opens as a person advances toward the door opening, and after the door is open it is retained by the latch 52 in the open position until the circuit is broken by a switch 53.

The circuit is also provided with a switch 54 which is positioned to be opened by a person stepping on the plate 18 to prevent operation of the door when a person approaching the door from one side is within the area covered by the door.

The switch 54, is located, as illustrated in Fig. 1 whereby a person standing on the plate 18 at this point or in the path of the opening door will hold the switch open thereby preventing completion of the circuit to the motor so that the motor will not operate when this section of the plate is depressed by the weight of a person standing thereon.

With the parts arranged in this manner a door operating device is provided which with the operating instrumentalities installed below a floor completes a circuit that starts a motor positioned below the floor and the motor rotates a pinion that meshes with a gear segment which turns a door from a closed to an open position.

Upon arriving at the open position the segment engages a switch, such as the switch 54 which breaks the circuit and stops the operation of the motor, and at the same time the segment engages the latch 52 that holds the door open and prevents the automatic door closure from closing the door until the latch is released.

It will be understood that modifications within the scope of the appended claim may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

In combination, a vertically disposed shaft, a bar positioned on the upper end of said shaft, a door mounted on said bar, a pair of horizontally disposed floor plates arranged on opposite sides of said door, a plurality of coil springs engaging the lower surface of said plates, a motor positioned below one of said plates, a drive shaft operated by said motor and having a pinion thereon, a gear segment arranged in meshing engagement with said pinion, bearings arranged in engagement with said drive shaft, the upper end of said drive shaft being provided with a square section, said bar being provided with a socket in its lower surface for receiving said square section, pins extending upwardly from said bar and projecting into the lower end of said door, a horizontally disposed beam adapted to be secured to the ceiling and connected to said door, a floor surface arranged in the same plane as the upper surfaces of said plates, and switch means actuated by said floor plates for operating said motor.

References Cited in the file of this patent

UNITED STATES PATENTS

807,043	Nishimoto	Dec. 12, 1905
953,259	De Hoog	Mar. 29, 1910
1,018,246	Korytowski	Feb. 20, 1912
1,700,433	Cox	Jan. 29, 1929
1,775,849	Cox	Sept. 16, 1930
1,822,042	Kohl et al.	Sept. 8, 1931
2,242,706	Hanson	May 20, 1941
2,639,142	Morgan et al.	May 19, 1953