Dec. 25, 1928. 1,696,344

F. J. CLARK

DOOR OPERATING MECHANISM

Filed Oct. 27, 1925 3 Sheets-Sheet 1

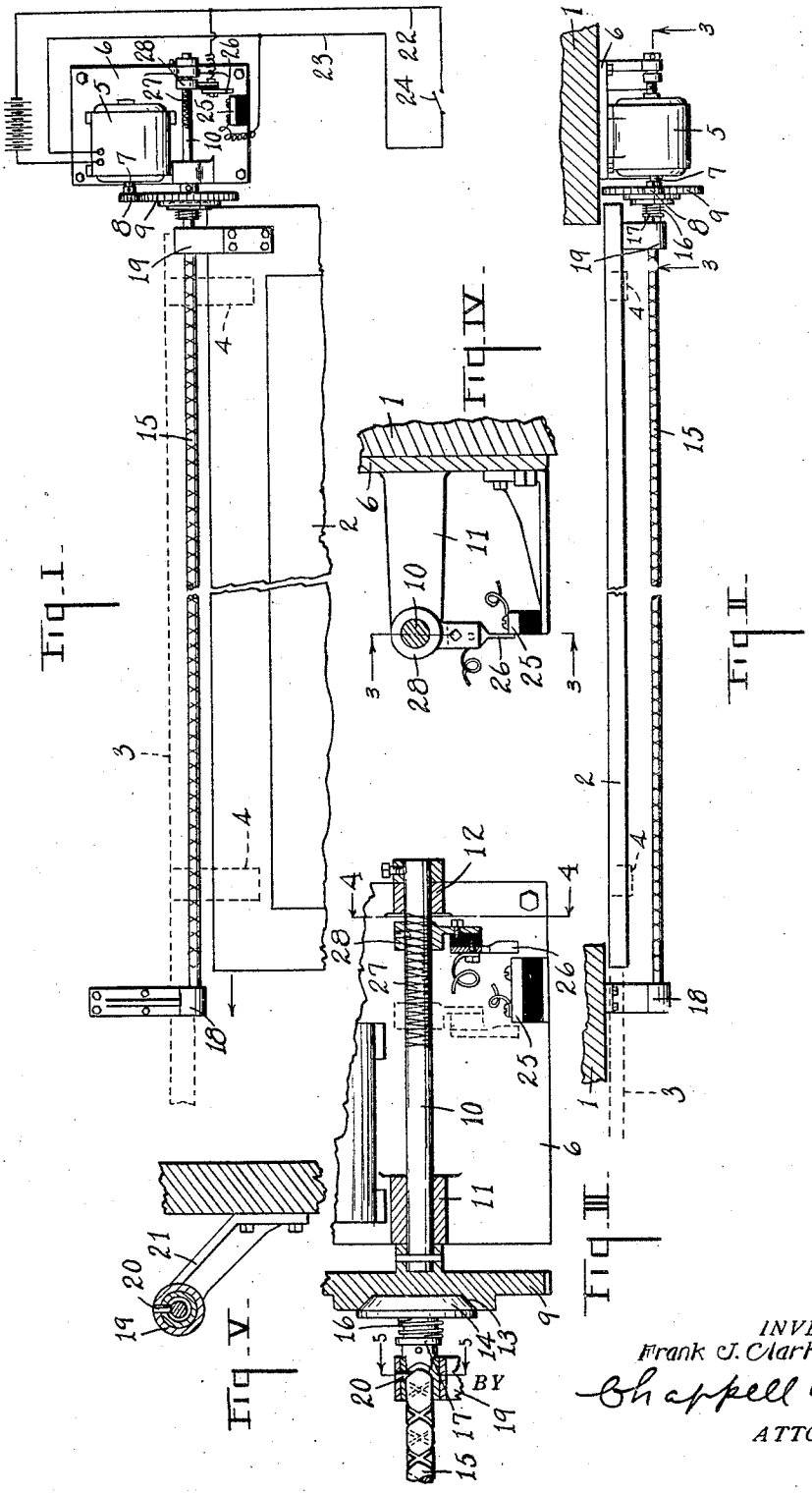


Fig. I.

Fig. IV.

Fig. II.

Fig. V.

Fig. III.

INVENTOR
Frank J. Clark
BY
Chappell & Earl
ATTORNEYS

Dec. 25, 1928. 1,696,344

F. J. CLARK

DOOR OPERATING MECHANISM

Filed Oct. 27, 1925 3 Sheets-Sheet 2

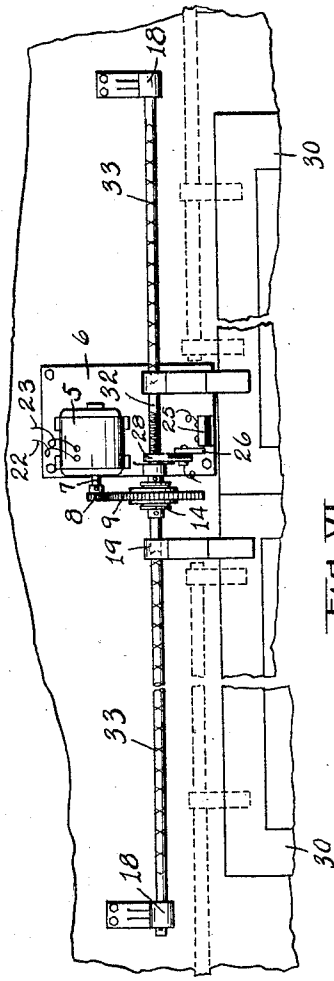


Fig. VI.

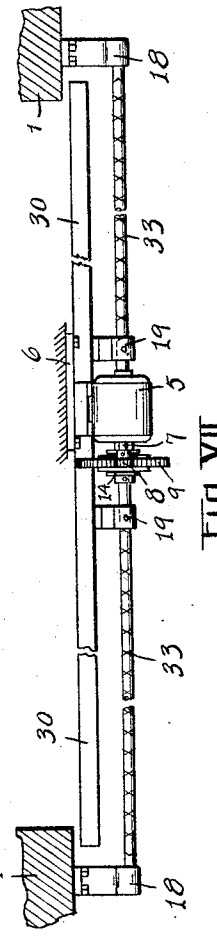


Fig. VII.

INVENTOR
Frank J. Clark

BY Chappell & Earl
ATTORNEYS

Dec. 25, 1928. 1,696,344

F. J. CLARK

DOOR OPERATING MECHANISM

Filed Oct. 27, 1925 3 Sheets-Sheet 3

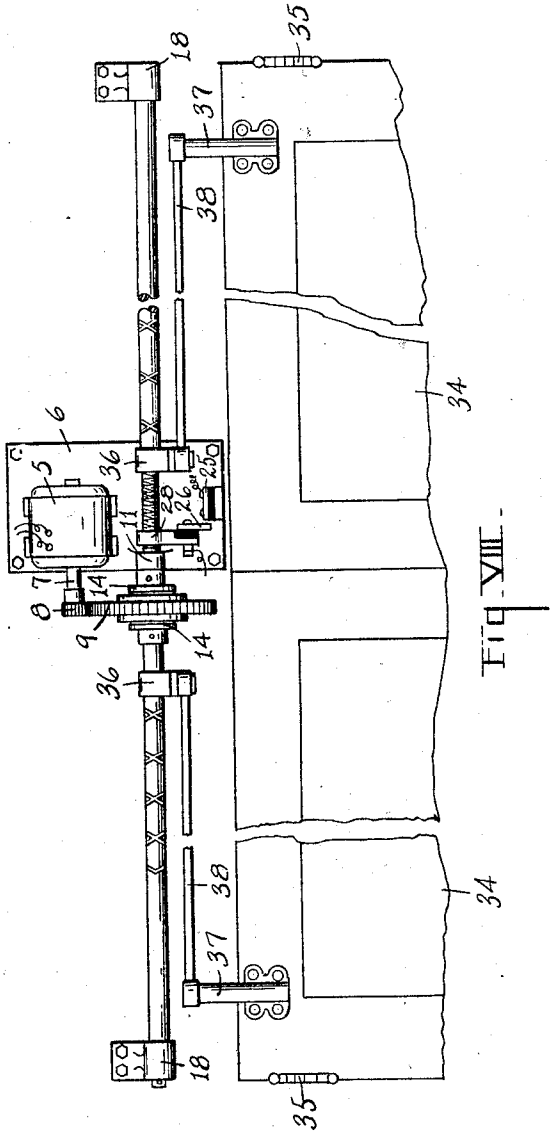


Fig. VIII.

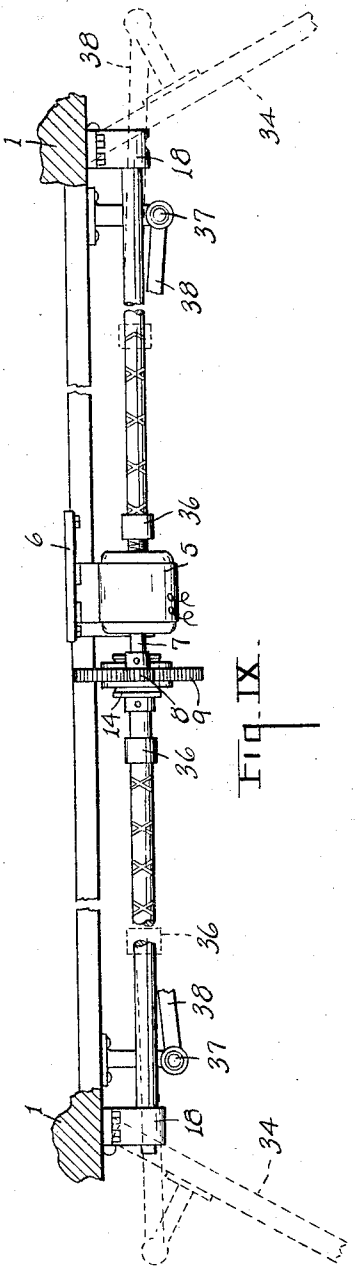


Fig. IX.

INVENTOR
Frank J. Clark

BY Chappell & Earl
ATTORNEYS

Patented Dec. 25, 1928. 1,696,344

UNITED STATES PATENT OFFICE.

FRANK J. CLARK, OF BATTLE CREEK, MICHIGAN.

DOOR-OPERATING MECHANISM.

Application filed October 27, 1925. Serial No. 65,158.

This invention relates to improvements in door operating mechanisms.

The main objects of this invention are:

First, to provide an improved door operating mechanism for garage doors and other heavy doors which can be effectively operated with a motor of small horsepower.

Second, to provide an improved door operating mechanism which automatically stops the doors and the motor when the doors are fully opened or closed, and which may be started to open or close the doors by means of a switch at a remote station.

Third, to provide an improved door operating mechanim which is simple and durable in structure.

Objects pertaining to details and economies of construction and operation of my improvements will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claim.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this application, in which:

Fig. I is a fragmentary side elevation of a structure embodying my improved door operating mechanism.

Fig. II is a fragmentary plan view.

Fig. III is an enlarged detail view partially in section on a line corresponding to line 3—3 of Figs. II and IV.

Fig. IV is a detail section on a line corresponding to line 4—4 of Fig. III.

Fig. V is a detail section on a line corresponding to line 5—5 of Fig. III.

Fig. VI is a fragmentary elevation of a modified form of my invention showing an adaptation to a double sliding door.

Fig. VII is a fragmentary plan view of the embodiment shown in Fig. VI.

Fig. VIII is a fragmentary elevation showing an embodiment of my invention adapted to swinging doors.

Fig. IX is a fragmentary plan view, the doors being shown in open position by dotted lines and in closed position by full lines.

In the drawing the sectional views are taken looking in the direction of the little arrows at the ends of the section lines and similar numerals of reference indicate similar parts throughout the several views.

Referring to the drawing, 1, 1 represent parts of the door casing, 2 the door and 3 the track from which the door is suspended by means of the hangers 4. The motor 5 and certain other parts are mounted upon a base plate 6 adapted to be secured to the door casing or wall adjacent the door to be operated as is illustrated in the drawing.

The motor shaft 7 is provided with a pinion 8 meshing with a gear 9 on the driving shaft 10 which is disposed at the side of the motor, the shaft being supported by bearings 11 and 12 on the base plate 6. The gear 9 has a driving friction clutch member 13 on its face coacting with the driven friction clutch member 14 on the traversing or reversely threaded driven shaft 15.

The clutch member 14 is yieldingly supported by means of the coiled spring 16, the outer end of which engages the collar 17 on the shaft 15 and the inner end engaging the clutch member which is splined to the shaft 15. The shaft 15 is supported at its outer end by the hanger 18.

The traversing member 19 has a pawl 20 coacting with the threads of the traversing shaft. The traversing member also has an arm 21 which is connected to the door 2 to be operated. It will be understood that the continuous rotation of the traversing shaft in one direction will open and close the door.

To control the motor I provide a running switch which stops the motor when the traversing member 19 is at the ends of its travel thereby stopping the door either in the open or closed position.

The supply circuit wiring for the motor is indicated by the numerals 22 and 23, the station or starting switch being shown conventionally at 24. The running switch comprises a relatively fixed contact 25 and a coacting movable contact 26, the movable contact being driven by the reversely threaded portion 27 of the shaft 10 coacting with the traversing member 28. The stroke or travel of the traversing member 28 is such that the switch member 26 passes out of contact with the member 25 at each end

of the stroke so that it is necessary to close the circuit by means of the control or starting switch, in order to start the motor, this switch being held closed until the running switch becomes effective

In the modification shown in Figs. VI and VII I show my improvements adapted to a pair of sliding doors 30, the driving shaft 32, corresponding to the driving shaft 10 of the embodiment shown in Fig. I, being extended and provided with a reversely threaded door operating portion 33. The operating mechanism for the doors is substantially the same as that described for the single door operating mechanism of Fig. I.

In the modification shown in Figs. VIII and IX, I show my improvements as embodied in or adapted to swinging doors 34 which are hinged at 35. This mechanism is substantially that of the embodiment shown in Figs. VI and VII except that the traversing members 36 are connected to the upwardly projecting arms 37 on the doors by means of the links 38.

My improved door operating mechanism is quite simple and economical in structure and is at the same time strong and durable. Further, a motor of relatively small horsepower may be effectively used. But comparatively slight changes are required to adapt my improvements to single or double sliding doors or swinging doors, thereby resulting in further economy.

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

In a door operating mechanism, the combination with a motor, of a driving shaft having a reversely threaded part, driving connections for said driving shaft to said motor including a gear on said driving shaft provided with a driving clutch member, a reversely threaded driven shaft disposed in alinement with said driving shaft and provided with a yieldingly supported driven clutch member coacting with said driving clutch member, a traversing member on said driven shaft adapted to be connected to the door to be operated and provided with a pawl coacting with said driven shaft, a starting switch, a running switch comprising coacting relatively fixed and movable members, and actuating means for said movable member including a traversing member on said reversely threaded portion of said driving shaft, the stroke of said traversing member being such as to open the running switch at each end of its travel.

In witness whereof I have hereunto set my hand.

FRANK J. CLARK.