Nov. 20, 1928. 1,692,541

H. H. BLISS ET AL

DOOR OPENER AND CLOSER

Filed Feb. 19, 1927 2 Sheets-Sheet 1

Fig. 1.

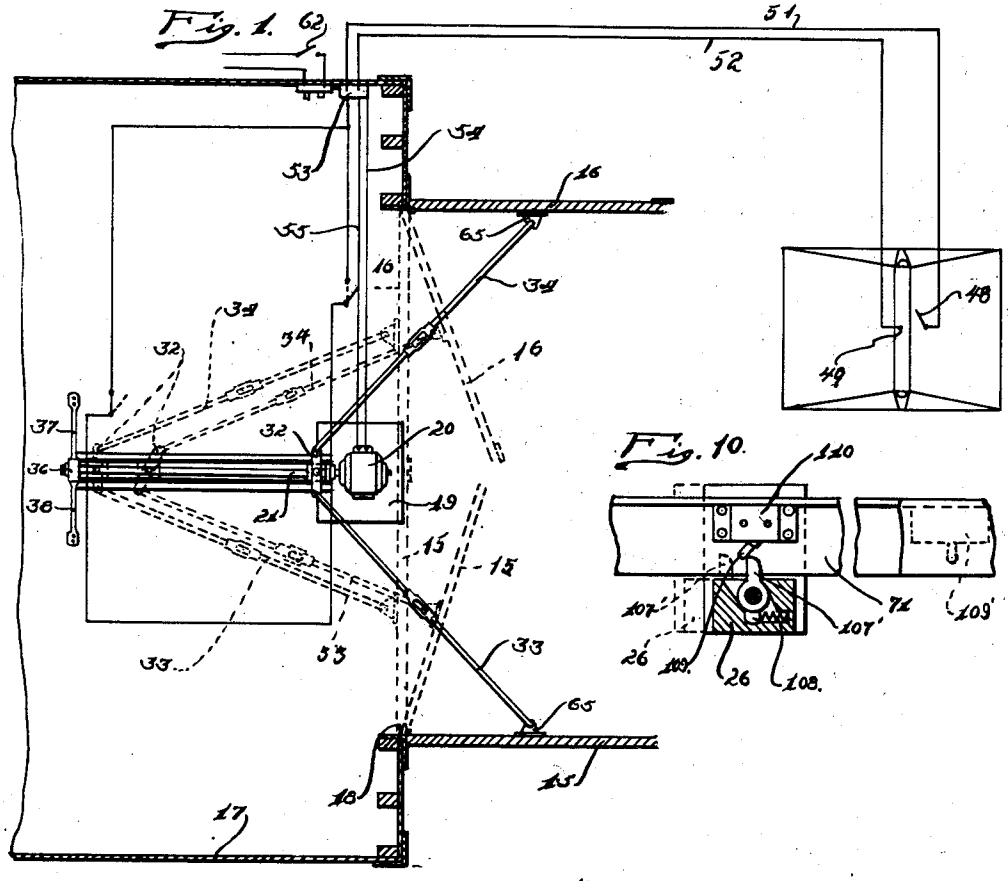


Fig. 10.

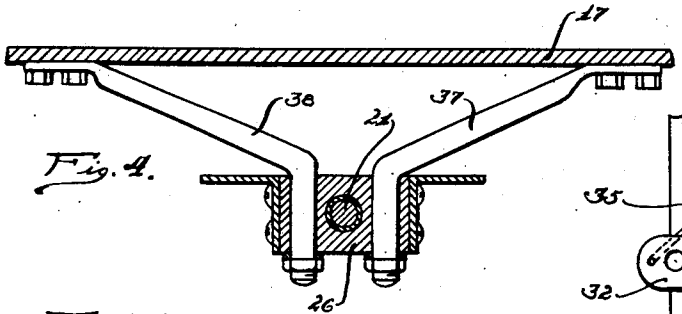


Fig. 4.

Fig. 5.

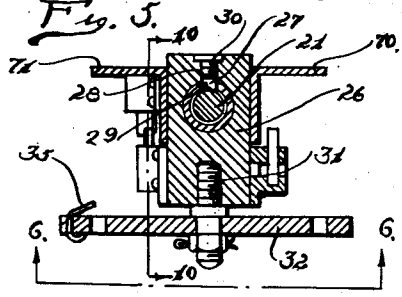
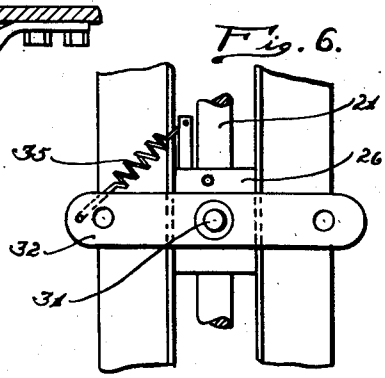


Fig. 6.



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Fig. 2.

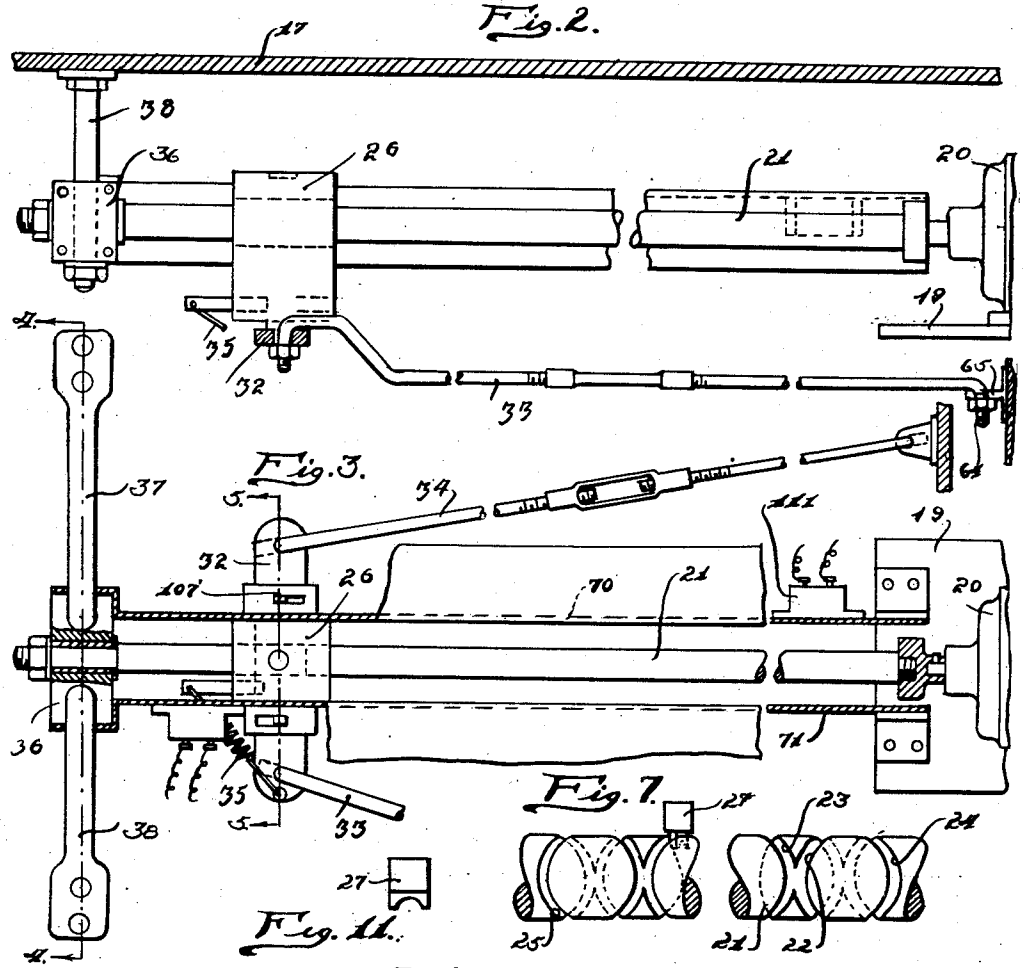


Fig. 3.

Fig. 11.

Fig. 7.

Fig. 9.

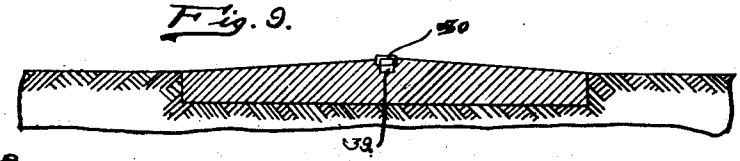
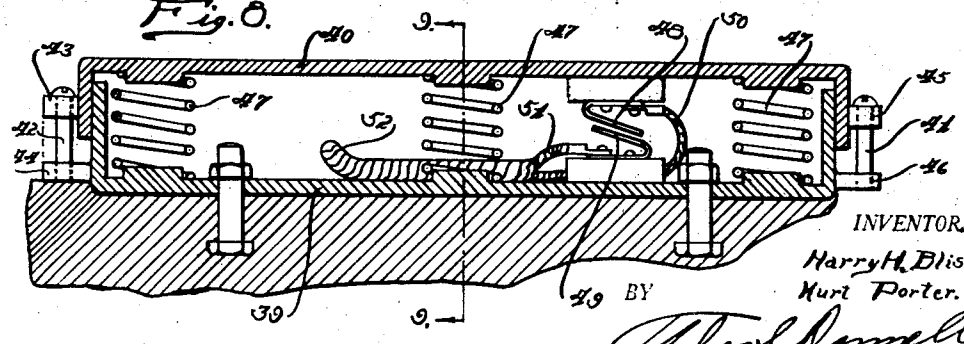


Fig. 8.



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UNITED STATES PATENT OFFICE.

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DOOR OPENER AND CLOSER.

Application filed February 19, 1927. Serial No. 169,442.

Our invention relates to a new and useful improvement in a door opener and closer adapted for opening and closing doors of various types, and particularly of a swinging type.

It is an object of the present invention to provide an automatic means for opening and closing a door, so constructed and arranged that the door may be opened and closed under the power of electrically operated motor, the motor rotating in one direction for both the closing and the opening operation.

Another object of the invention is the provision of an automatically operated mechanism whereby upon approach of a vehicle to the door an electrical contact will be established to set in operation the opening mechanism so that the door may be automatically opened.

Another object of the invention is the provision in a mechanism of this class of a contact positioned in the path of the vehicles and enclosed in a water proof casing.

Another object of the invention is the provision of a threaded member rotatable, and having mounted thereon a carriage adapted for axial movement upon rotation of said threaded member, the direction of rotation depending upon the end of the threaded member from which the carriage originally begins its movement.

Another object of the invention is the provision in a mechanism of this class of a means whereby a pair of swinging doors may be opened, one preceding the other slightly, and whereby, upon closing, the reverse operation will be effected.

Other objects will appear hereinafter.

The invention consists in the combination and arrangement of parts hereinafter described and claimed.

The invention will be best understood by a reference to the accompanying drawings which form a part of this specification and in which—

Fig. 1 is a top plan view of the invention showing it applied to a door.

Fig. 2 is a fragmentary side elevational view of the invention.

Fig. 3 is a fragmentary top plan view of the invention.

Fig. 4 is a view taken on line 4—4 of Fig. 3.

Fig. 5 is a view taken on line 5—5 of Fig. 3.

Fig. 6 is a fragmentary view taken on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary elevational view of the threaded member used in the invention.

Fig. 8 is a sectional view through the contact housing used in the invention.

Fig. 9 is a sectional view taken on line 9—9 of Fig. 8.

Fig. 10 is an enlarged side elevational view with parts shown in section taken on line 10—10 of Fig. 5.

Fig. 11 is an enlarged side elevational view of the tooth used in the invention.

The invention may be, by a slight modification, adapted for opening and closing doors of various types, but in the drawing, is illustrated as adapted for operating swinging doors 15 and 16 which are mounted on the building 17 having the door opening 18 formed therein. Mounted in the building 17 above the upper edge of the door opening 18 is a platform 19 upon which is positioned an electric motor 20 adapted for rotating the threaded member 21. As shown in Fig. 7, this threaded member 21 is provided with right handed threads 22 and left handed threads 23, at the opposite ends of the member 21 being peripheral grooves 24 and 25. A carriage is adapted for axial movement of the member 21, the member 21 being projected through the carriage 26. A tooth 27 is positioned in an opening 28 communicating with the bore 29 through which the member 21 is projected, this tooth 27 being held in position by means of the plug 30, the tooth riding in the threads 22 and 23, so as to effect axial movement of the carriage 26 on the threaded member 21. Pivotally attached by the stud 31 to the carriage 26 is a link 32, to one end of which is attached the operating rod 33, and to the other end of which is attached the operating rod 34, the opposite end of this operating rod 34 being pivotally attached to the door 16, and the opposite end of the operating rod 33 being pivotally attached to the door 15, a turn buckle being interposed in each of these rods for the necessary or desirable adjustment. Attached to one end of the link 32 is a coil spring 35, the other end of which is attached to the carriage 26, so as to normally retain the link 32 at an inclination to the axis of the threaded member 21, as shown in Fig. 1.

The rear end of the threaded member 21 is journalled in a block 36 which is attached to the building 17 by means of the braces 37 and 38.

Positioned in a suitable location in the driveway approaching the building 17 is a boxlike housing 39 having a cover 40 overlapping it and guided in position by means of the studs 41 and 42 which project through lugs 43 and 44 and 45 and 46, the cover 40 being slidable relatively to the boxlike housing 39, suitable coil springs 47 serving to retain the cover 40 in an elevated position, so that the contact 48 will not normally be in engagement with the contact 49. The contact 48 is connected to the wire 50 and the contact 49 to the wire 51, so that when these contacts are closed, a circuit through the cable 52 will be closed to operate a magnetic switch 53 mounted in the building 17. When these contacts 48 and 49 are brought into engagement the magnetic switch 53 will be closed, controlling, through the wires 54 and 55, the circuit to the motor 20, so that the motor will be set in operation. When the doors are in closed position and the contacts 48 and 49 are brought into engagement with each the tooth 27 will be in engagement in the peripheral groove 25, so that as the threaded member 21 is rotated by the motor 20, the carriage will move outwardly into the position shown in full lines in Fig. 1 to open the door. As these swingingly mounted doors are generally cut on a bevel at their edges, one overlapping the other, the door 16 will move outwardly ahead of the door 15, this being effected on account of the inclined relation of the link 32 to the axis of the threaded member 21, the spring 35 effecting this. As the carriage block 26 moves outwardly and the door 16 moves to its fully opened position, the carriage block will continue to move until the door 15 arrives at its fully opened position thus bringing the link 32 at right angles to the longitudinal axis of the member 21 against the tension of the spring 35. The reverse operation will be effected in closing the doors, the door 15 moving to fully closed position and the carriage continuing to move until the door 16 is brought to its fully closed position and the link 32 brought to extend at right angles to the axis of the member 21. Angle irons 70 and 71 extend parallel to the member 21 at opposite sides thereof and are secured at one end to the block 26 and at their other end to the platform 19.

In closing the doors, as the carriage block 26 moves inwardly and the doors arrive at approximately their fully closed position, a pivotally mounted dog 107 normally spring-held by the spring 108 in upright position on the carriage 26 will engage an arm 109 which serves to operate the switch 110 which is mounted on the angle iron 71 so as to operate the circuit breaker or magnetic switch 53 so as to break the circuit through the wire 55 to the motor 20 thus causing the motor to cease its operation and continuing the rotation of the threaded member 21 but sufficient to carry the tooth 27 into engagement with the peripheral groove 25. When contacts 48 and 49 are again brought into engagement the magnetic switch 53 will be operated to again set the motor 20 into rotation and from the groove 25 the tooth 27 will ride into reverse threads 22 to cause a forward movement of the carriage 26. This forward movement will continue until the doors 15 and 16 are in approximately fully opened position when a dog 107′ will engage the arm 109′ of the switch 111 thus causing through the magnetic switch 53 a cut-out or a breaking of the circuit leading to the motor 20. The member 21 will continue to rotate until the carriage has moved to that position when the tooth 27 will engage in the groove 24.

When desired, the circuit to the electric magnetic switch 53 may be closed by a suitable hand operated switch 62 so that a person entering the building may, by closing the switch 62, effect an opening of the doors. It is evident then that, after the vehicle has been removed from the building and driven over the cover 40, that the doors will automatically close.

It is thus seen that we have provided a mechanism whereby the motor continues to rotate in a single direction and effects an opening and a closing of the doors. The simplicity of this structure is believed to be recognized, as well as its durability and economy of manufacture.

The entire structure is enclosed in either the building 17 or a water proof housing, so that inoperativeness of the device through action of the elements thereon is reduced to a minimum.

As shown in Fig. 1 the arms 33 and 34 are offset as at 63, these arms being angularly turned as at 64 to engage in a suitable eyelet 65 mounted upon the door, so that should the device become inoperative for any reason, it may be easily and quickly detached from the door so that the doors may be opened and closed manually.

While we have illustrated and described the preferred form of structure, we do not wish to limit ourselves to the precise details of structure shown, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claim.

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

In a door opener of the class described, a rotatable member; an electrically operated motor for rotating said member; a carriage on said rotatable member movable axially thereof upon rotation thereof; a pair of supporting members in spaced relation and extending parallel to, at opposite sides of, said threaded member, said carriage extending between and above and below said supporting members; a switch mounted on the outer face

of each of said supporting members, adjacent one end of one of said supporting members, and adjacent the other end of the other of said supporting members; a downwardly projecting rockable arm on each of said switches; a pair of rockable dogs mounted on said carriage below said supporting members and at the outer sides thereof; and a spring for normally retaining said dogs in upwardly extended position, said dogs engaging said arms upon movement of said carriage past said switches, the engagement of said dogs, upon movement of said carriage in one direction, effecting a rocking of said switch arms to control the circuit to said motor, said dogs being oppositely faced.

In testimony whereof we have signed the foregoing specification.

HARRY HILL BLISS.
KURT PORTER.