S. A. TEEL.

DOOR OPENING AND CLOSING MECHANISM.

APPLICATION FILED MAR. 15, 1919.

1,315,053. Patented Sept. 2, 1919.

Fig. 1.

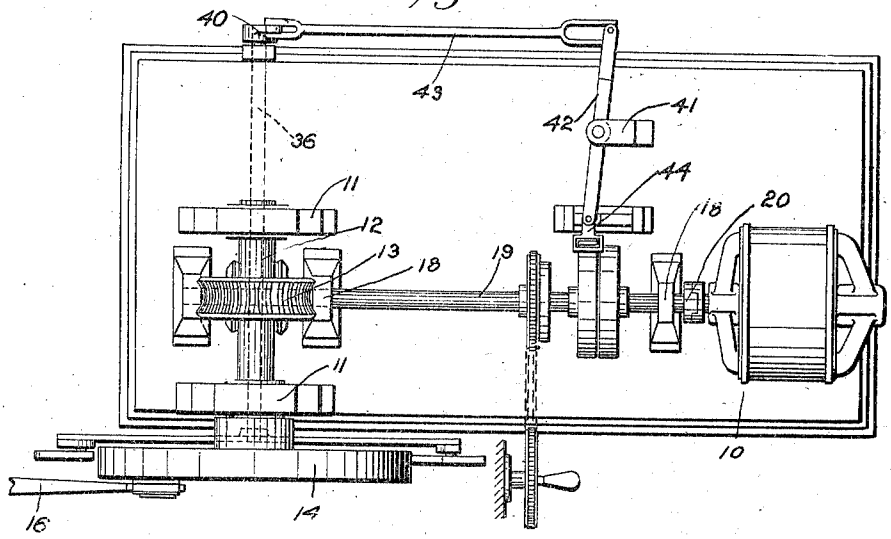


Fig. 2.

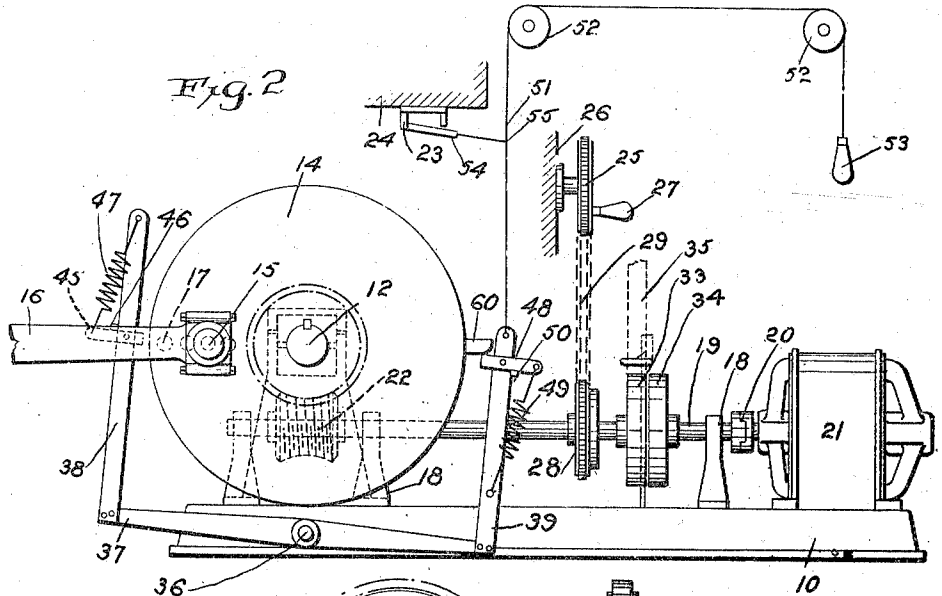


Fig. 3.

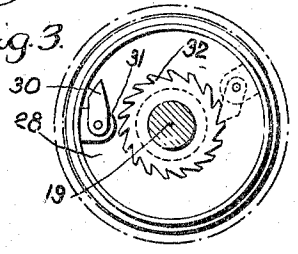
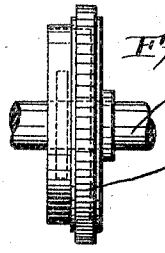


Fig. 4.



WITNESSES

Geo. A. Senior

INVENTOR

S. A. TEEL

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

STEWARD ALLEN TEEL, OF BANGOR, PENNSYLVANIA.

DOOR OPENING AND CLOSING MECHANISM.

1,315,053. Specification of Letters Patent. Patented Sept. 2, 1919.

Application filed March 15, 1919. Serial No. 282,817.

To all whom it may concern:

Be it known that I, STEWARD A. TEEL, a citizen of the United States, and a resident of Bangor, in the county of Northampton and State of Pennsylvania, have invented a new and Improved Door Opening and Closing Mechanism, of which the following is a full, clear, and exact description.

The present invention relates to means for opening and closing heavy swinging doors, and pertains more particularly to power actuated devices therefor.

The primary object of the present invention is to provide a mechanical means for accomplishing the above operation.

A further object of the invention is to provide an electric motor for operating said mechanical means.

A further object of the invention is to provide means for automatically controlling the circuit of the electric motor.

A still further object of the invention is to provide a power actuated means for operating said mechanism means.

With the above and other objects in view, reference is had to the accompanying drawings in which—

Figure 1 is a top plan view;

Fig. 2 is a side elevation;

Fig. 3 is a detail view in elevation;

Fig. 4 is an edge view of the device shown in Fig. 3.

Referring more particularly to the drawings, the device comprises a base 10, on which in mounted, near one end, a plurality of bearings 11. Mounted for rotation in said bearings, is a shaft 12, and carried by said shaft intermediate of its ends, is a worm gear 13. Mounted on the outer end of said shaft 12, is a rotating member 14, and pivotally connected thereto, as at 15, is a crank arm 16. The rotating member 14 is provided with a plurality of spaced openings 17, by means of which the crank arm 16 may be adjustably connected therewith.

Extending longitudinally of the base 10 and mounted in bearings 18, is a shaft 19, and connected to one end of said shaft 19, by a clutch 20, is an electric motor 21. The other end of the shaft 19 carries a worm gear 22, which is adapted to mesh with the worm gear 13 heretofore mentioned for the purpose of driving the shaft 12 upon rotation of the shaft 19. The electric motor 21 is supplied with current in any desired manner, and said current is controlled by means of an electric switch 23, which is carried by any suitable support 24.

The reference character 25 designates a toothed hand wheel 25, which is suitably carried by a support 26, said hand wheel being provided with an operating handle 27.

Mounted on the shaft 19, is a sprocket wheel 28, and passing around the sprocket wheel 28 and the hand wheel 25, is a chain 29. As shown in Figs. 3 and 4, this sprocket wheel 28 is provided on its inner face with a pawl or dog 30, which is pivotally secured to a bracket or the like 31. Secured to the shaft 19, is a toothed wheel 32, with which the dog or pawl 30 is adapted to engage in a manner to be hereinafter described.

The reference characters 33 and 34 designate two belt pulleys, the belt pulley 33 being loosely mounted on the shaft 19, and the belt pulley 34 being secured thereto. A belt 35 passes around the loose pulley 33 and extends to any suitable power-delivering device not shown and not forming a part of the present invention.

Pivotally secured as at 36, to the base 10, is a rocking lever 37, and projecting upwardly from opposite ends of said rocking lever 37, are arms 38 and 39. The shaft 36 on which the rocking lever 37 is mounted extends transversely of the base 10, and connected to the opposite end from that on which the rocking lever 37 is secured, is a crank 40. Pivotally secured in a bracket 41, is a lever 42, which extends transversely of the base 10, said lever 42 being connected with the crank 40, by means of a link 43. The inner end of the pivoted lever 42 is provided with a suitable belt-shifting element 44, and said belt-shifting element 44 is adapted to move the belt 35 to either of the belt pulleys 33 or 34 in a manner to be hereinafter described.

The vertically-extending arm 38 is provided near its upper end, with a pivoted dog 45, the vertical swinging movement of which is limited by means of a suitable stop 46, and said dog 45 is maintained in position at right angles to the arm 38 by means of a coil spring 47 with adjustable tension. The vertically-extending arm 39 is likewise provided with a pivoted dog 48, which is maintained at right angles thereto by means of a coil spring 49, the downward movement of its outer end being limited by means of a stop 50.

Extending from the upper end of the vertically-extending arm 39, is a rope or cable 51, which extends over pulleys 52, and is provided with an operating handle 53. The switch 23 is formed with a pivoted member 54, and said pivoted member 54 is connected with the rope or cable 51, as at 55.

The operation of the device is as follows: The crank arm 16 is connected at its free end with the door to be operated, and serves to swing the same about its hinges upon rotation of the member 14. Rotation of the motor 14 is set up in the following manner: The operating handle 53 is grasped and pulled downwardly, which action closes the switch 23 in the circuit to the motor 21. If the clutch 20 is engaged, as shown, a rotation of the armature of the motor 21 sets up a rotation of the shaft 19, and through the medium of the worm gears 22 and 13, the member 14 will be rotated. This rotation of the member 14, through the medium of the crank arm 16, serves to open or close the door, as the case may be.

It will be noted that when the handle 53 is pulled to close the switch 23, the rocking lever 37 is moved to a position opposite to that shown in Fig. 2. That is, the vertically-extending arm 39 will be moved vertically, the dog 48 passing by the projecting finger 60, which is carried by the rotating member 14. Immediately the dog passes by the projecting finger 60, the spring 49 returns the dog to the position shown in Fig. 2.

As the member 14 rotates, the projecting finger engages the inner end of the dog 45, thus moving the rocking lever to lift the vertically-extending arm 39 to the position shown in Fig. 2, which action opens the circuit by operation of the switch 23, and the motor stops with the parts in the position shown in Fig. 2.

If it be desired to use the power-actuating mechanism hereinafter mentioned, the handle 53 is grasped and pulled downwardly, which moves the rocking lever 37, and through the medium of the shaft 36, link 43, and pivoted lever 42, the belt-shifting mechanism is actuated and the belt 35 is moved from the loose pulley 33 to the fixed pulley 34, which action sets up a rotation of the shaft 19 and a consequent movement of the rotating member 14. As the member 14 rotates to a point where its projecting finger 60 engages the inner end of the pivoted dog 45, the shaft 36 will be rocked again to operate the belt-shifting mechanism and move the belt 35 from the fixed pulley 34 to the loose pulley 33.

If it is desired to operate the device by hand, the operating handle 27 of the hand wheel 25 is grasped and said hand wheel is rotated. Through the medium of the chain 29, the sprocket wheel 28 will be rotated and the dog 30 will fall into engagement with the toothed wheel 32, which, as before stated, is secured to the shaft 19. Upon continued movement of the hand wheel 25, after the dog 30 has been engaged with the toothed wheel 32, the shaft 19 and the member 14 will be rotated in the manner heretofore described.

It will be noted that when the device is operated by hand, the projecting finger 60 of the member 14 is free to pass by the pivoted dogs 45 and 48, without setting up any operation of the shaft 36, thereby causing the switch-operating mechanism of the electric motor and the belt-shifting mechanism of the power actuated device to remain at rest.

From the foregoing, it will be seen that the present invention provides means for operating large and heavy swinging doors, and that after the mechanism has been set into operation for the purpose of opening the doors, the bringing of the several parts of the operating mechanism to rest is automatically accomplished.

Having thus described the invention, what is claimed as new is:

1. A device of the character described comprising a base, a motor mounted on said base, a shaft rotatably mounted on said base and adapted to be operatively connected with said motor, a rotating member adapted to be operated by said shaft, door-operating means pivotally connected to said rotating member, a rocking beam mounted on the base, a right-angular arm carried by each end of said rocking beam, a switch for controlling the supply of current to the motor, means connected with one of said right-angular arms and to said switch for operating the latter, and means carried by each of said right-angular arms for engagement with a pawl carried by the rotating member for operating said current controlling means upon rotation of the rotary member.

2. A device of the character described comprising a base, a motor carried by the base, a rotating member driven by said motor, means for controlling the supply of current to said motor, a rocking lever pivotally mounted on said base, a vertical lever extending from each end of the rocking lever and embracing the rotating member, means connecting one of said vertical levers with the current-controlling means, and resilient means carried by each of said vertical levers and adapted to be engaged by a pawl rigidly carried by the rotating member to move the rocking lever about its pivot for operating the current-controlling means of the motor.

STEWARD ALLEN TEEL.