(No Model.) 2 Sheets—Sheet 1.

G. W. WRIGHT.

DOOR CLOSER.

No. 581,972. Patented May 4, 1897.

Fig 1

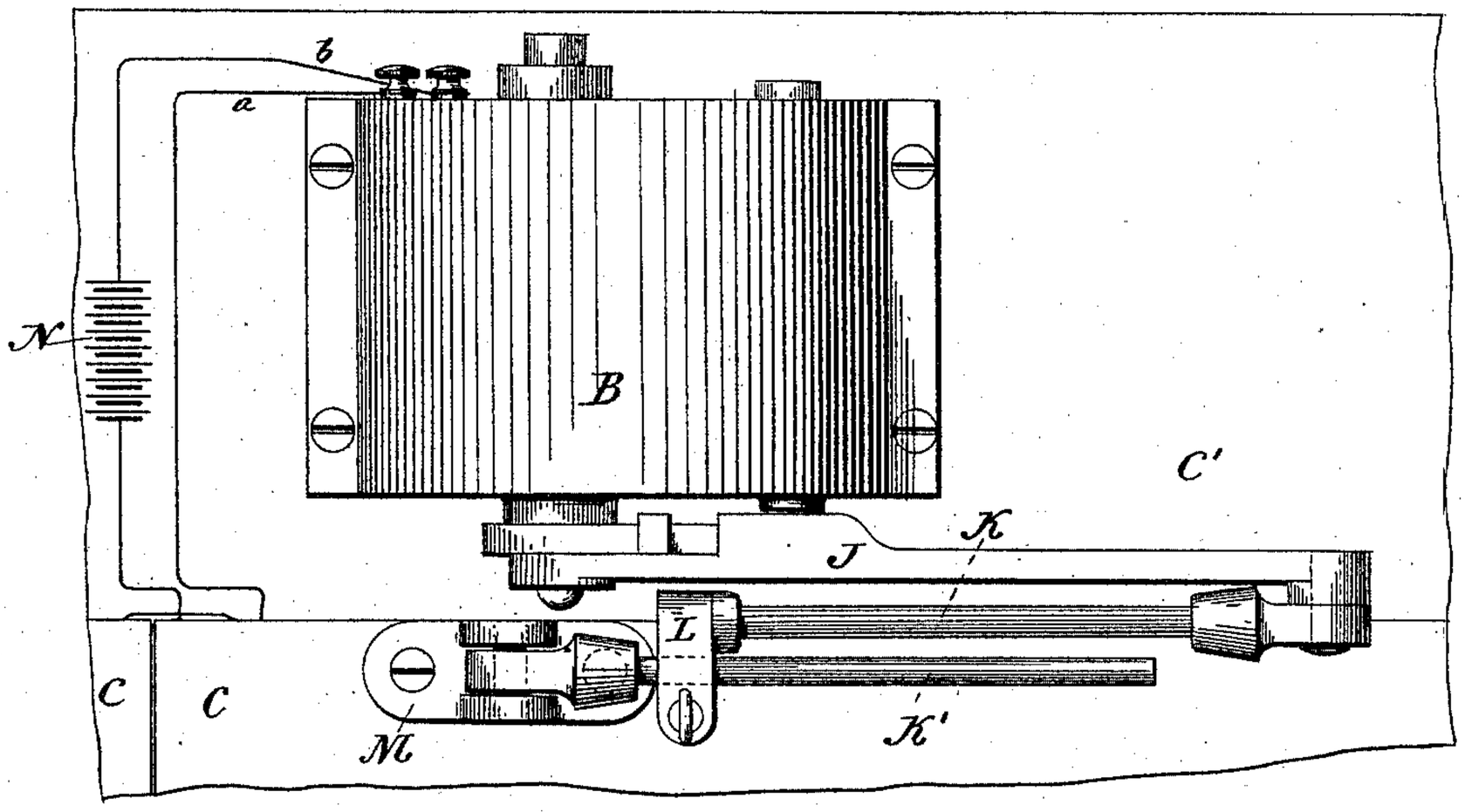
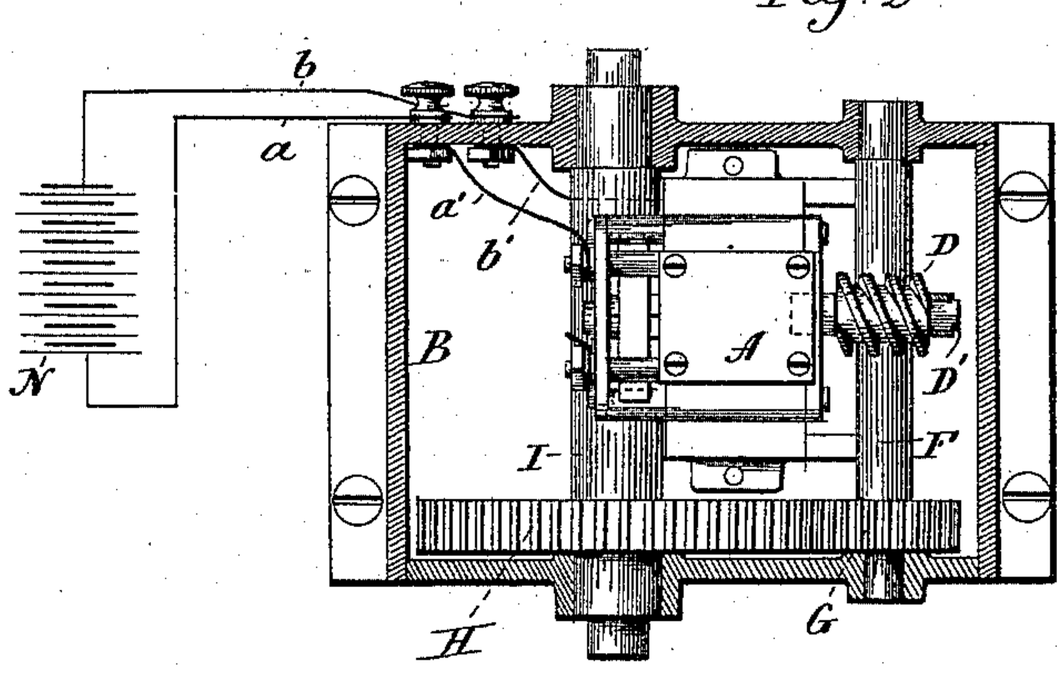


Fig. 2



Witnesses
J. H. Shumway.
Lillian D. Kelsey.

Granville W. Wright.
Inventor.
By attys
Earle Seymour

(No Model.) 2 Sheets—Sheet 2.

G. W. WRIGHT.

DOOR CLOSER.

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Fig. 3

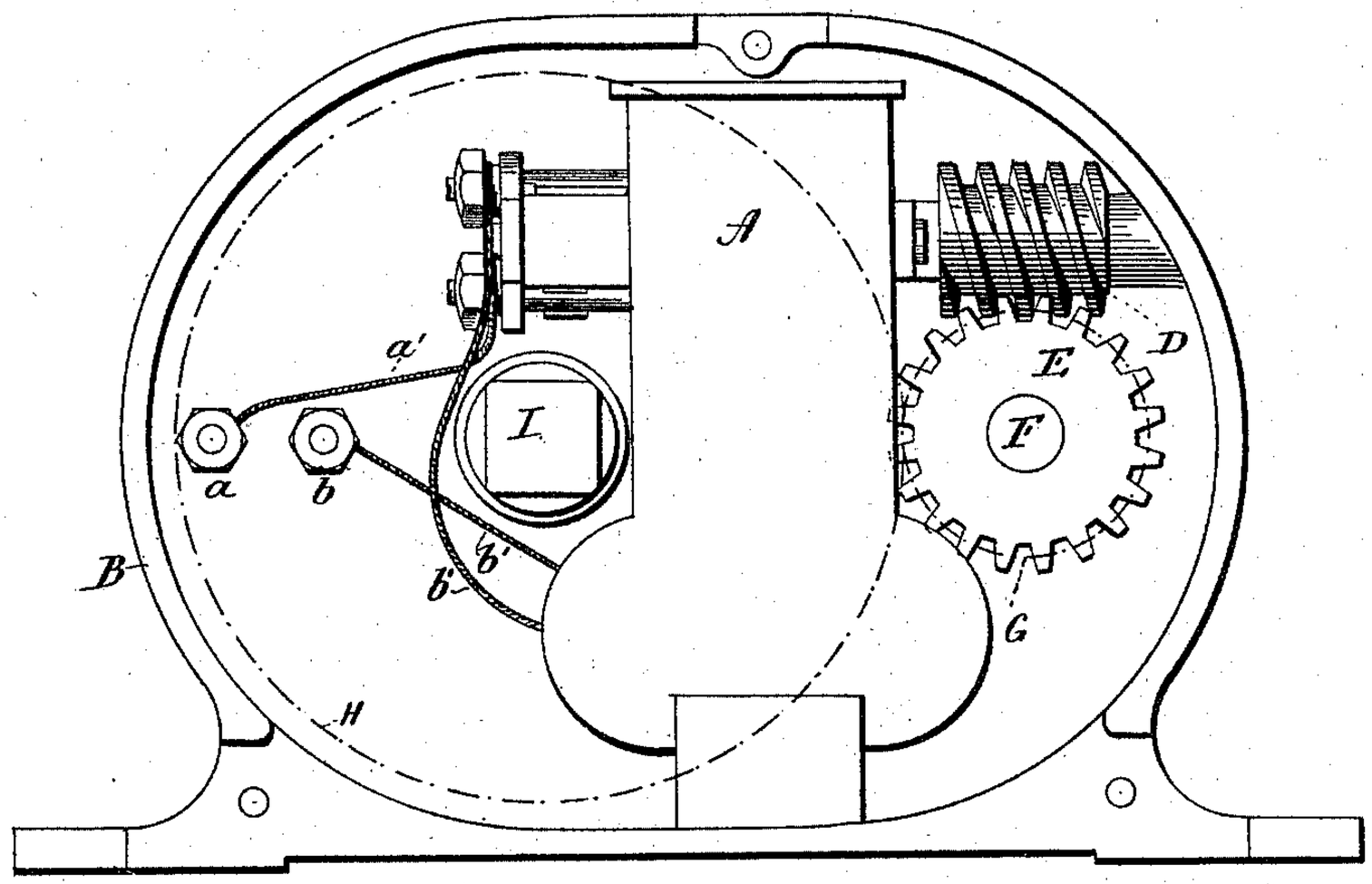


Fig. 4

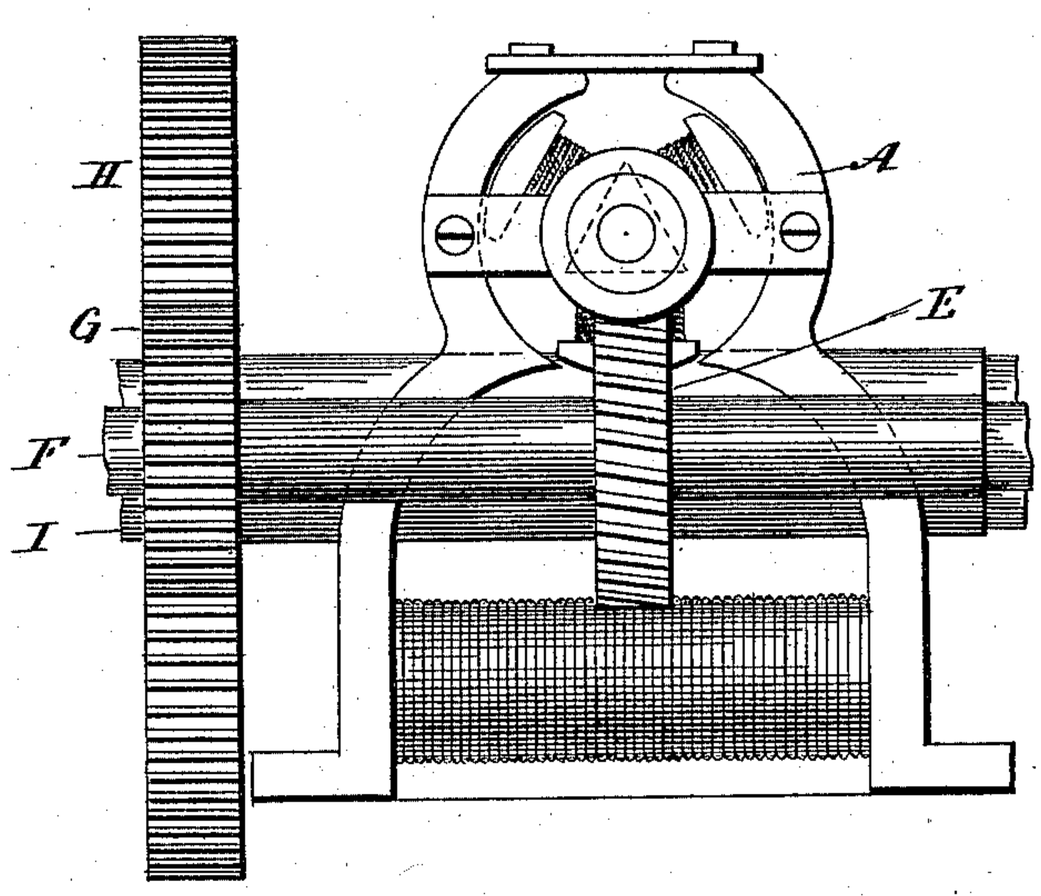
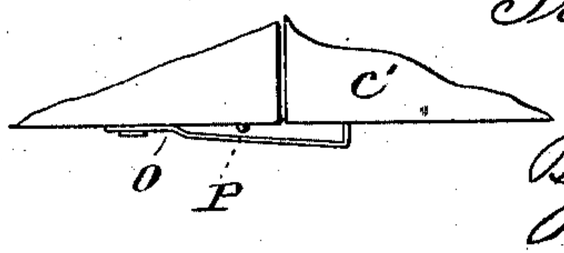


Fig. 5



Witnesses.
J. H. Shumway.
Lillian D. Kelley

Granville W. Wright.
Inventor.
By Atty's.
Earle & Seymour

UNITED STATES PATENT OFFICE.

GRANVILLE W. WRIGHT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE SARGENT & COMPANY, OF SAME PLACE.

DOOR-CLOSER.

SPECIFICATION forming part of Letters Patent No. 581,972, dated May 4, 1897.

Application filed March 20, 1893. Serial No. 466,806. (No model.)

To all whom it may concern:

Be it known that I, GRANVILLE W. WRIGHT, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Door-Closing Devices; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of one form which a door-closing device constructed in accordance with my invention may assume, showing it applied to a door; Fig. 2, a detached plan view of the motor and operating-train, a portion of the case inclosing the same being broken away; Fig. 3, a similar view in side elevation with one side of the case removed; Fig. 4, a detached end view of the motor and the operating-train; Fig. 5, an illustrative view showing one form of circuit-closer which I may employ.

My invention relates to an improved device for closing doors, the object being to produce a simple and effective device operated by electricity and dispensing with the use of the spring ordinarily employed for the purpose.

With this end in view my invention consists in the combination, with an electric circuit, of an electric motor located in the said circuit and comprising a rotary armature, an operating-train of gearing connected directly with the said armature and set in revolution thereby, operating connections positively connecting the said train and the door or the door-casing, according as the train and motor are located upon the casing or upon the door, the said connections comprising two levers having their adjacent ends pivotally connected together, and the end of one lever being connected with one of the shafts of the said operating-train, and a circuit-closer located in the said circuit and constructed and adapted to be automatically controlled in operation by the movement of the door, and whereby any acceleration in the closing movement of the door is checked and controlled by the increased resistance which the armature meets according as the rapidity of its rotation is increased by such movement of the door.

In carrying out my invention I employ, as herein shown, a small electric motor A, of ordinary construction, the same being located within a case B, adapted to be attached either to a door C or to a door-casing C′ and applied, as shown in Fig. 1 of the drawings, to the latter. The operating-train of gearing driven by the said motor may be of any suitable construction and arrangement. It comprises, as herein shown, a worm D, mounted upon a worm-shaft D′, the inner end of which is attached to the revolving armature of the motor A aforesaid. The said worm D is meshed into by a worm-gear E, mounted upon the main driving-shaft F, the ends of which are journaled in the said case B. A driving-pinion S, mounted upon the said main driving-shaft F, meshes into a large wheel H, mounted upon a secondary shaft I, which is also journaled at its ends in the said case B and corresponds to the spring-actuated shaft or spring-arbor of an ordinary door-check. The operating connections between the operating-train of gearing and the door C, if the case B is attached to the door-casing C′, as shown, or between the train and the door-casing, if the case B is attached to the door, may be of any suitable construction, and are connected at one end with a projecting outer end of the secondary shaft or some other member of the operating-train. As herein shown, the said operating connections consist of an arm J, attached at its inner end to the outer end of the said shaft H and having its outer end pivotally connected with an adjustable connecting-arm, composed of two members K and K′, of which the former is provided with a clamp L, adapted to be secured in any desired position upon the latter, which is pivotally connected with the door C by means of an ordinary plate M, fixed thereto; but the operating connections thus described may be replaced by any other suitable devices without departing from my invention.

The motor A, before mentioned, is located in the circuit of a battery N, the said circuit also containing a circuit-closer, which may

be of any approved construction and arranged to operate at any suitable time. As herein shown, it consists of a spring-plate O, attached to the edge of the door and arranged to project sufficiently beyond the same to engage with the door-casing C′, so that when the door is closed the outer end of the spring will engage with the casing and be lifted away from a contact-point P set into the door; but just as soon as the door is opened the said spring will recover and engage with the contact-point P and thus close a circuit through the motor. As soon as the circuit is closed through the motor the same will be started and the train actuated. Under this arrangement, then, the door must be opened against the force of the motor, the train being driven backward; but so soon as the door has been opened and pressure upon it has been released the motor will at once begin to drive the train in the opposite direction, whereby the secondary shaft of the train will be rotated and the operating connections between the shaft and the door operated to close or "wind up" the door, the motor and train taking the place of the spring ordinarily employed. The motor and operating-train will be constructed with reference to the weight of the door and to closing the same at a suitable speed. It will be noted that the resistance of the armature to rotation developed by increasing its speed will always operate as a check, preventing the door from being accelerated unduly in its closing movement. The fact that the faster the armature of an electric motor is rotated the greater will be the electrical resistance to its rotation, which will require proportional additional power, is well known and understood by electricians and those familiar with that art, and is thought not to require a theoretical exposition here.

Instead of closing the circuit through the battery when the door is opened the circuit-closer may be arranged to close the circuit at any other time and place which will bring the motor and operating-train into action for closing the door.

It will be seen that by means of my invention I dispense with the heavy spring ordinarily employed for closing the door and employ a device, namely, an electric motor, which is in itself a check, inasmuch as an increased rate in the rotation of its armature is met by increased resistance to the rotation thereof.

I would have it understood, in view of the foregoing suggestions, that I do not limit myself to the exact construction herein shown and described, but hold myself at liberty to make such changes and alterations therein as fairly fall within the spirit and scope of my invention. Thus I might dispense with the circuit-closer and operate the device on a closed circuit, though an open circuit will be preferable. If desired, I may apply the device to a door swinging both ways, so that the motor and the train would be reversed for positively closing the door from either direction.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with an electric circuit, of an electric motor located in the said circuit, and comprising a rotary armature, an operating-train of gearing connected directly with the said armature and set in revolution thereby, operating connections positively connecting the said train and the door or the door-casing according as the train and motor are located upon the casing or upon the door, the said connections comprising two levers having their adjacent ends pivotally connected together, and the end of one lever being connected with one of the shafts of the said operating-train, and a circuit-closer located in the said circuit, and constructed and adapted to be automatically controlled in operation by the movement of the door, and whereby any acceleration in the closing movement of the door is checked and controlled by the increased resistance which the armature meets according as the rapidity of its rotation is increased by such movement of the door.

2. The combination with an electric circuit, of an electric motor located in the said circuit, and comprising a rotary armature; an operating-train of gearing connected directly with the said armature and set in revolution thereby; and operating connections positively connecting the said train and the door or the door-casing according as the train and motor are located upon the casing or upon the door, the said connections comprising two levers having their adjacent ends pivotally connected together, and the end of one lever being connected with one of the shafts of the said operating-train, and whereby any acceleration in the closing movement of the door is checked and controlled by the increased resistance which the armature meets according as the rapidity of its rotation is increased by such movement of the door.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GRANVILLE W. WRIGHT.

Witnesses:
WILLIAM T. COOKE,
CHARLES L. BALDWIN.