

No. 658,668.

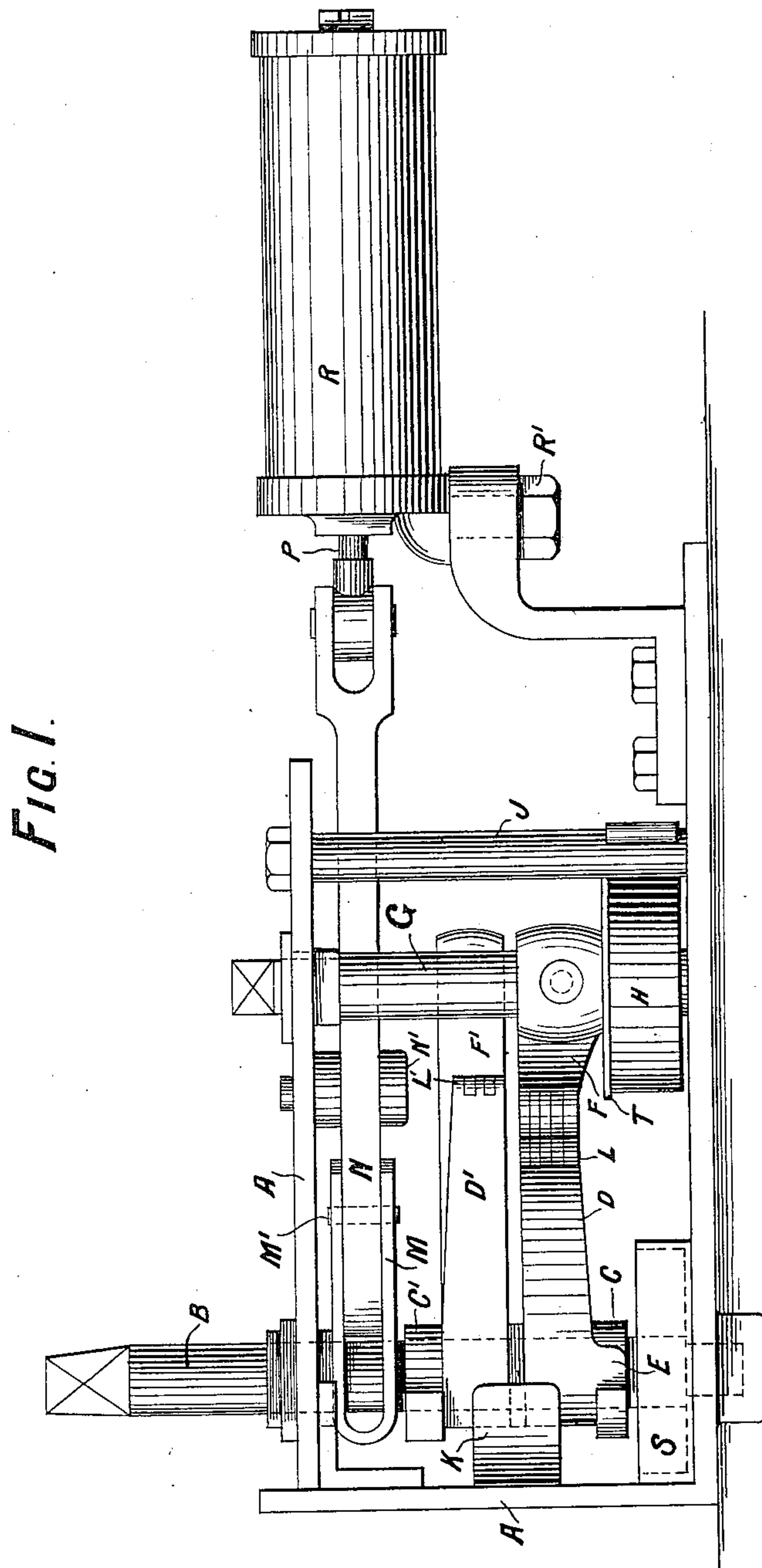
Patented Sept. 25. 1900.

**D. MORGAN.**  
**DOOR CLOSER AND CHECK.**

(Application filed Oct. 30, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:

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Inventor:

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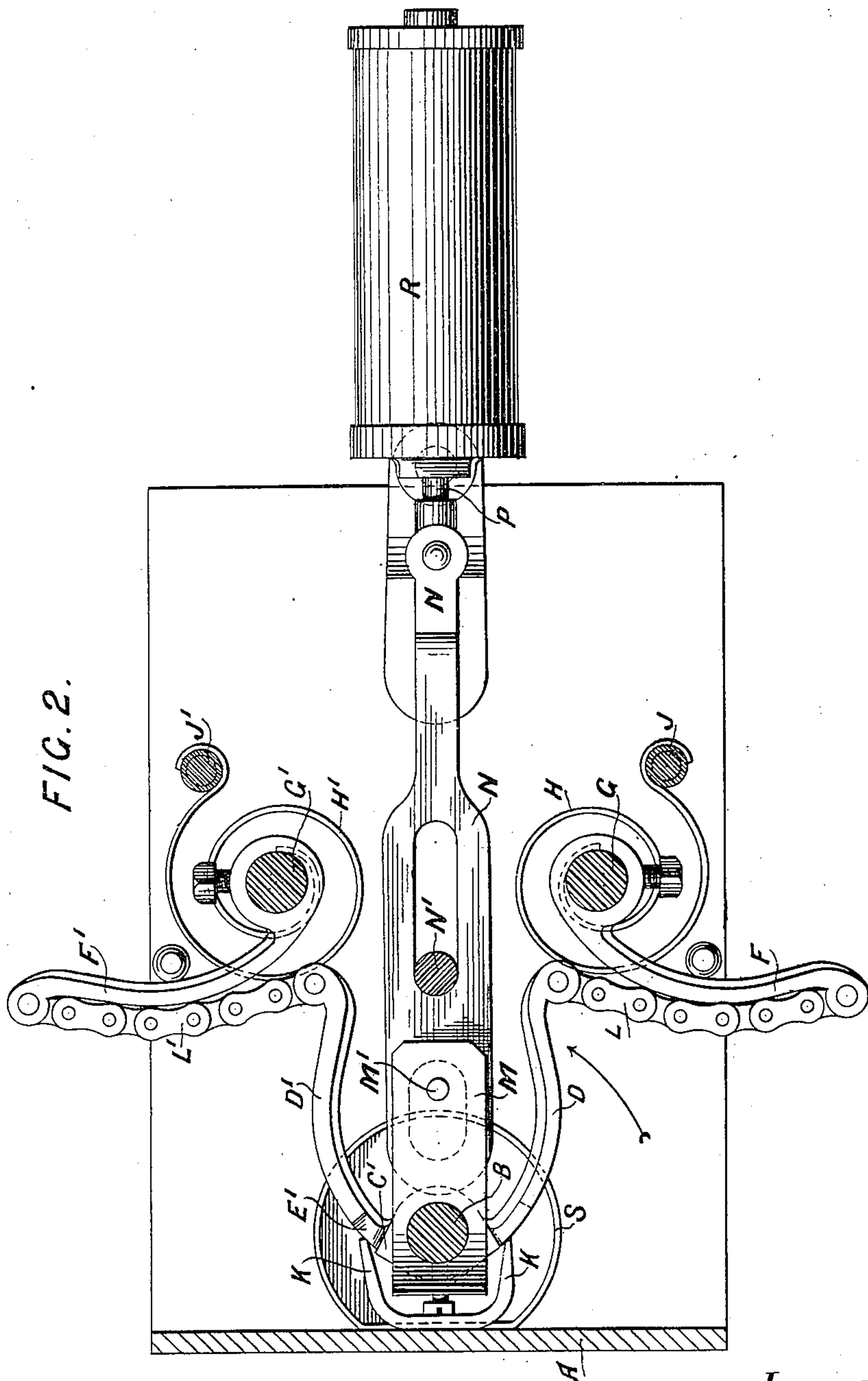
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Witnesses:

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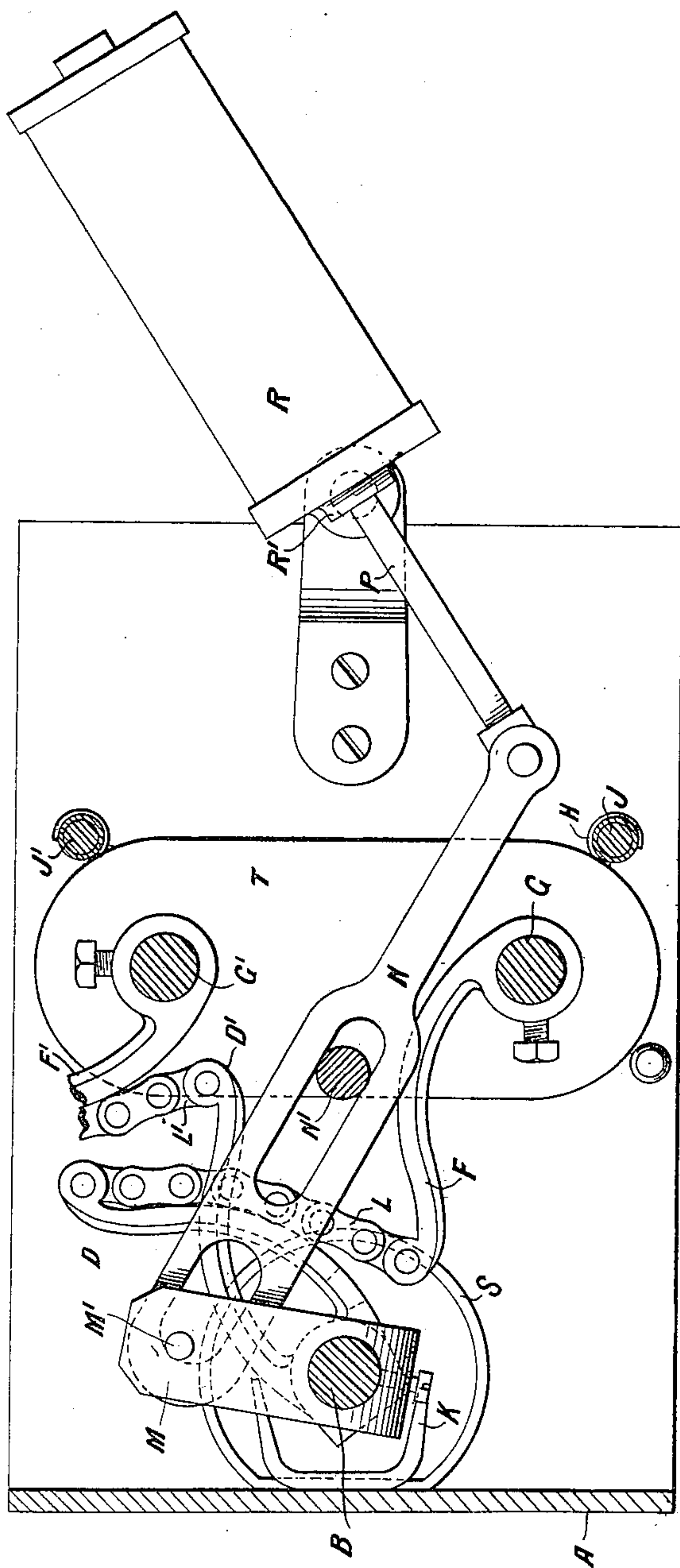
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3 Sheets—Sheet 3.

FIG. 3.



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# UNITED STATES PATENT OFFICE.

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## DOOR CLOSER AND CHECK.

SPECIFICATION forming part of Letters Patent No. 658,668, dated September 25, 1900.

Application filed October 30, 1899. Serial No. 735,188. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID MORGAN, residing at Bristol, England, have invented certain new and useful Improvements in Door Closers and Checks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

10 This invention refers to an improved apparatus for automatically closing doors, gates, casements, and the like, the principal objects being to provide an improved apparatus of simple construction not readily liable to get  
15 out of order and wherein the accumulated force of the spring or springs obtained or increased by the opening of the door is transmitted for the purpose of closing the door in such manner that a more equal force is applied than heretofore throughout the whole  
20 travel of the said door during the closure.

I will describe my invention with reference to the accompanying drawings, whereon—

25 Figure 1 is a side elevation, and Fig. 2 a section plan, of my improved apparatus adapted to close the door, which is capable of being opened in two opposite directions, the apparatus being shown in the position which it would occupy when the door is closed; and  
30 Fig. 3 is a sectional plan view showing the position of the mechanism when the door is opened.

According to my invention I provide a frame or casing A, which is to be located in a recess beneath the bottom of the door. This  
35 casing carries bearings to support a vertical spindle B, which is fitted immediately beneath the axis upon which the door hinges, and the upper end of the spindle B is squared and  
40 takes into a bracket-piece in the bottom of the door, and may, in fact, form the lower center, upon which the door pivots.

Upon the spindle B there is securely fixed a collar C, above which and loose upon the  
45 spindle B is a curved arm D, having a projection E, against which a projection on the collar C acts in order to turn the arm D when the spindle B is itself turned.

50 The outer end of the lever-arm D is pivoted to one end of a chain L, the other end of which is pivoted to a second lever-arm F, which

latter is fixed upon a vertical spindle G. This spindle G is arranged vertically, has bearings in the upper and lower parts of the casing A, and has fixed to itself one end of a coiled  
55 spring H, the other end being fixed to a stationary pillar J. K is a fixed stop, its office being to allow the arm D, Fig. 2, to move only in the direction of the arrow. By this mechanism when the door is moved and the spindle B is turned in the direction of the arrow,  
60 Fig. 2, bringing the parts into the position shown at Fig. 3, it will be observed that the spindle G will have been slightly turned, and consequently the tension of the spring H has  
65 been increased. Upon the door so opened being released from control the tension of the spring will bring the parts back into the position shown at Fig. 2 and the door will be  
70 closed.

Such are the principal elements of my door-closing mechanism; but as the above described only act to close the door when opened in one direction I provide a similar set of  
75 mechanism to close the door when opened in the opposite direction, if so required. To this end I loosely mount upon the spindle B a second lever-arm D', connected by chain L' to lever-arm F', fixed upon spindle G', controlled  
80 by a second spring H', secured to said spindle and the other end secured to a second pillar J', this set of mechanism being brought into action by a collar C', fixed on the spindle B, the collar having a projecting part  
85 which acts against a projection E' on the arm D'. In this manner when the door is opened in one direction one of the springs H is brought into action, while the opposite set of mechanism and spring H' remains at rest, and  
90 vice versa.

When it is desired that the motion of the door shall diminish in speed as the act of closing finishes, I provide a brake constructed as follows: Upon the spindle B, I fix a crank-arm  
95 M, the pin M' of which passes through a slot in one end of a lever N, the latter turning on a fixed pin N', carried by the casing A, the pin N' passing through a slot in the lever N. The opposite end of the lever N is pivoted to the head of a piston-rod P, the piston of which  
100 works in a cylinder R. This cylinder R is provided with a small air-escape passage, and



the cylinder itself turns on a pivot R', carried by a bracket from the casing. By this arrangement, the door having been opened, the piston-rod drawn out, and the mechanism, for example, in the position shown at Fig. 3, the door will automatically close and pass through a portion of its course before any inward thrust is given to the piston-rod P; but toward the finish of the closure of the door the mechanism will force in the piston-rod, and a braking action will thereby be produced.

In the drawings, S is an oil-cup to lubricate the lower end of the spindle B, and T is a cover-plate for the springs, which plate has been removed at Fig. 2. The lever-arms F and F' are fixed to the spindles G G' by set-screws, and the latter spindles have squared ends, so that by releasing the set-screws the springs may be tightened when required.

It will be obvious from an inspection of the drawings that while the spring H is constantly increasing in strength during the motion of opening the door this increasing strength will be neutralized by the gradual loss in leverage which occurs as the door is opened, due to the changing positions of the levers D and F relatively to each other. Referring particularly to Figs. 2 and 3, in Fig. 2 the levers are shown at rest in their normal positions as the door is closed. It will be seen that the lever-arm F has a short leverage upon the spring-spindle G and the spring is at a comparatively-low tension at the same time the lever-arm D is acting at approximately its full length. As the force actuating these lever-arms in opening the door is applied through the spindle B the lever-arm D, acting at full length, reduces the moment of force around the spindle B to a predetermined extent. This reduced force is transmitted by the chain L to the lever-arm F', which, being secured upon the spring-spindle G, transmits the power from said spindle B thereto. Thus it will be seen that while the lever-arms occupy a position of least leverage upon the spindle G the spring at this moment is at its lowest tension, or assuming the door to be closing the force will be applied by the spring H (at a comparatively-low tension) to the spindle G, which in turn imparts its force to the lever F. As the force is in closing the

door applied by the spindle G this lever F, acting with a short resistance-arm, will exert its greatest force upon the chain L, connected to the end of the lever-arm D. As this lever-arm is acting at its greatest leverage and the lever-arm F is also acting with its greatest leverage upon the door-spindle B the decreased power of the spring H will be compensated for and the effect of the force exerted by the spring H upon the spindle B will be substantially constant.

The second set of mechanism consisting of the arms D' F', &c., is only fitted when it is required that the closure of the door shall be effected in both directions; but where the door closes in one direction only one set of mechanism is required and the arm D may be fixed to the spindle B.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an apparatus for closing doors and the like, the combination with a frame, of a spindle mounted therein adapted to be attached to the door or other device, a lever-arm loosely mounted upon said spindle, means carried by said spindle for rotating said lever-arm, and means for applying a constant resilient resistance to the movement of said lever-arm in one direction, substantially as described.

2. In an apparatus for closing doors and the like, the combination with a frame, of a spindle mounted in said frame, adapted to be attached to the door or other device, a lever-arm loosely mounted upon said spindle, a collar rigidly mounted upon said spindle, said collar being provided with a lug adapted to engage with a lug upon said lever-arm, a spring-spindle mounted in said frame, a spring mounted upon said spindle, a curved lever-arm rigidly mounted upon said spring-spindle, and a chain or the like connecting the free ends of said lever-arms, substantially as described.

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Witnesses:

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