

(No Model.)

H. W. LARSSON.
DOOR SPRING OR CHECK.

No. 527,753.

Patented Oct. 16, 1894.

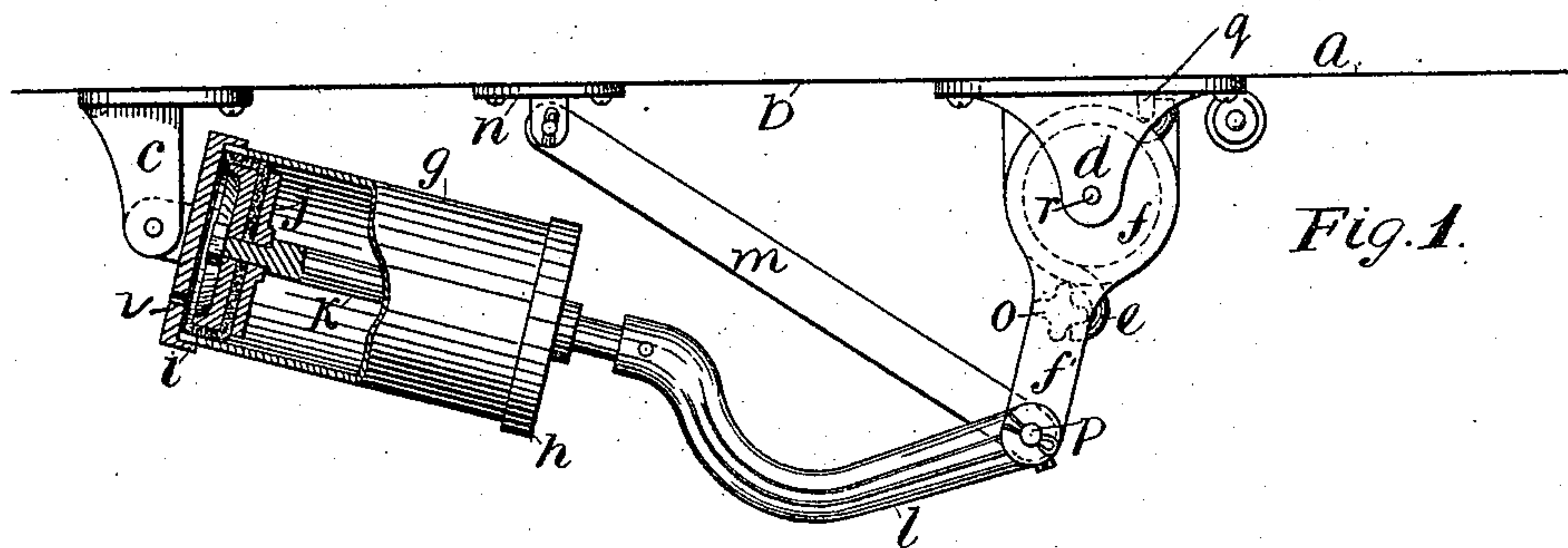


Fig. 1.

Fig. 2.

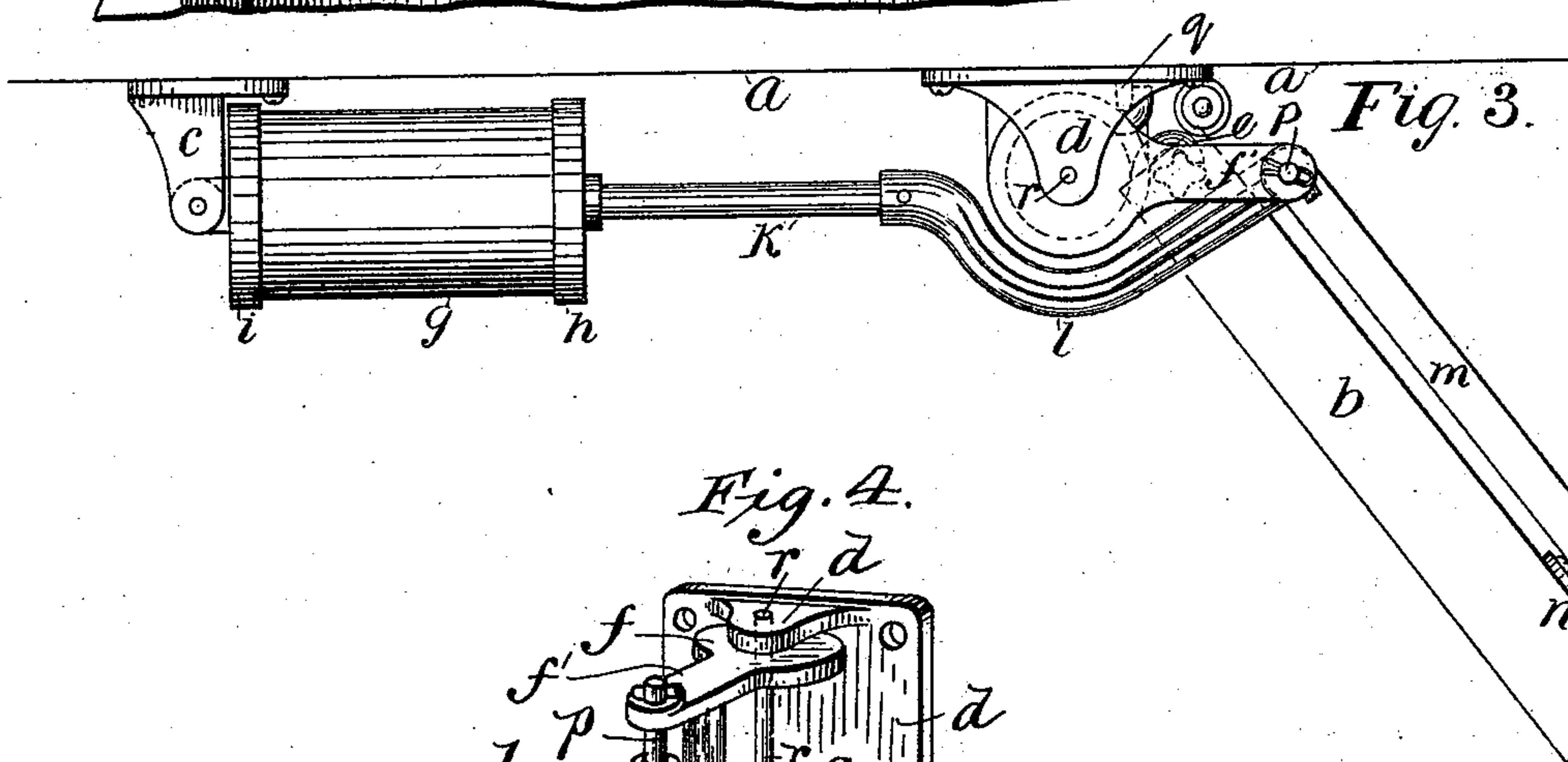
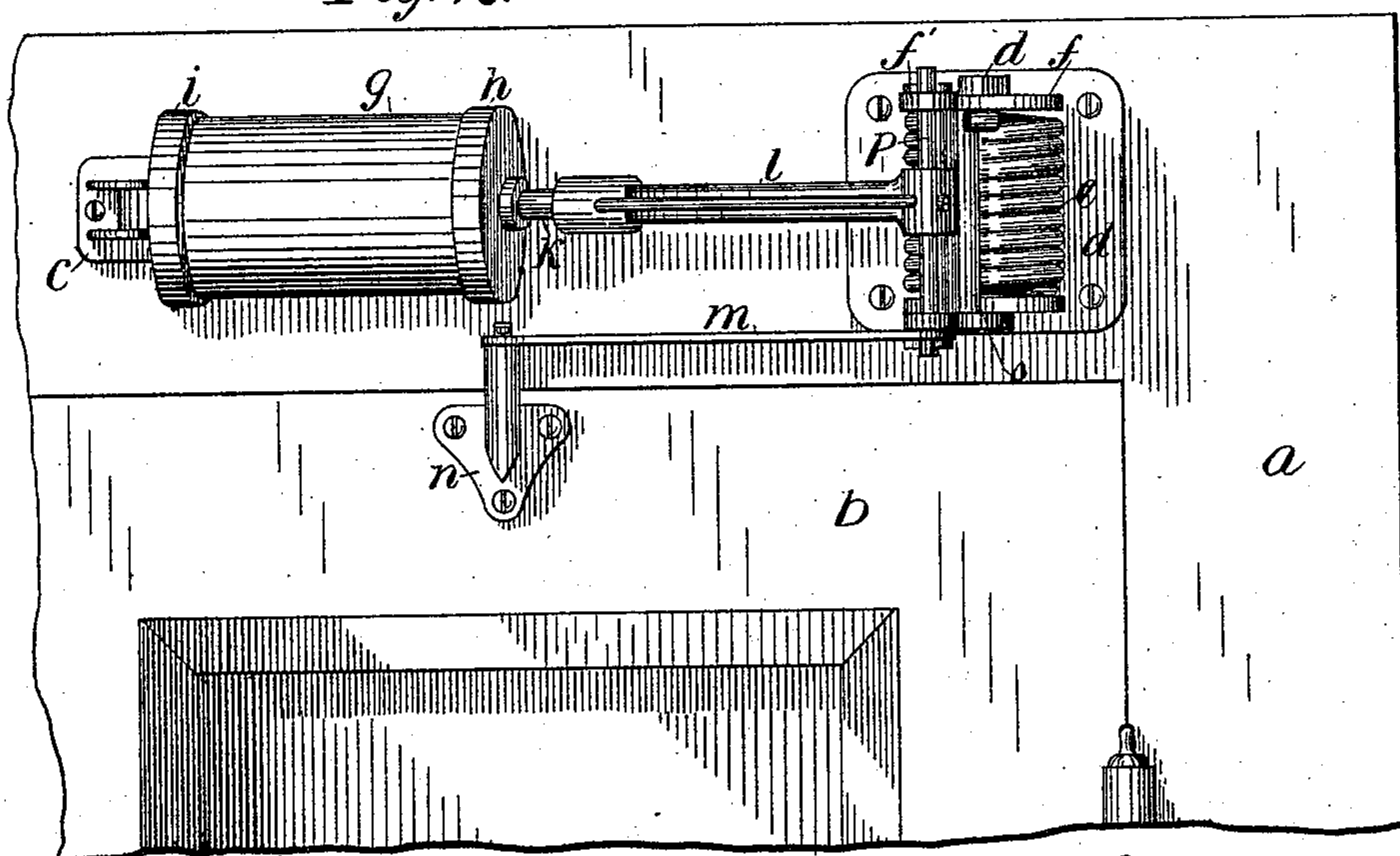
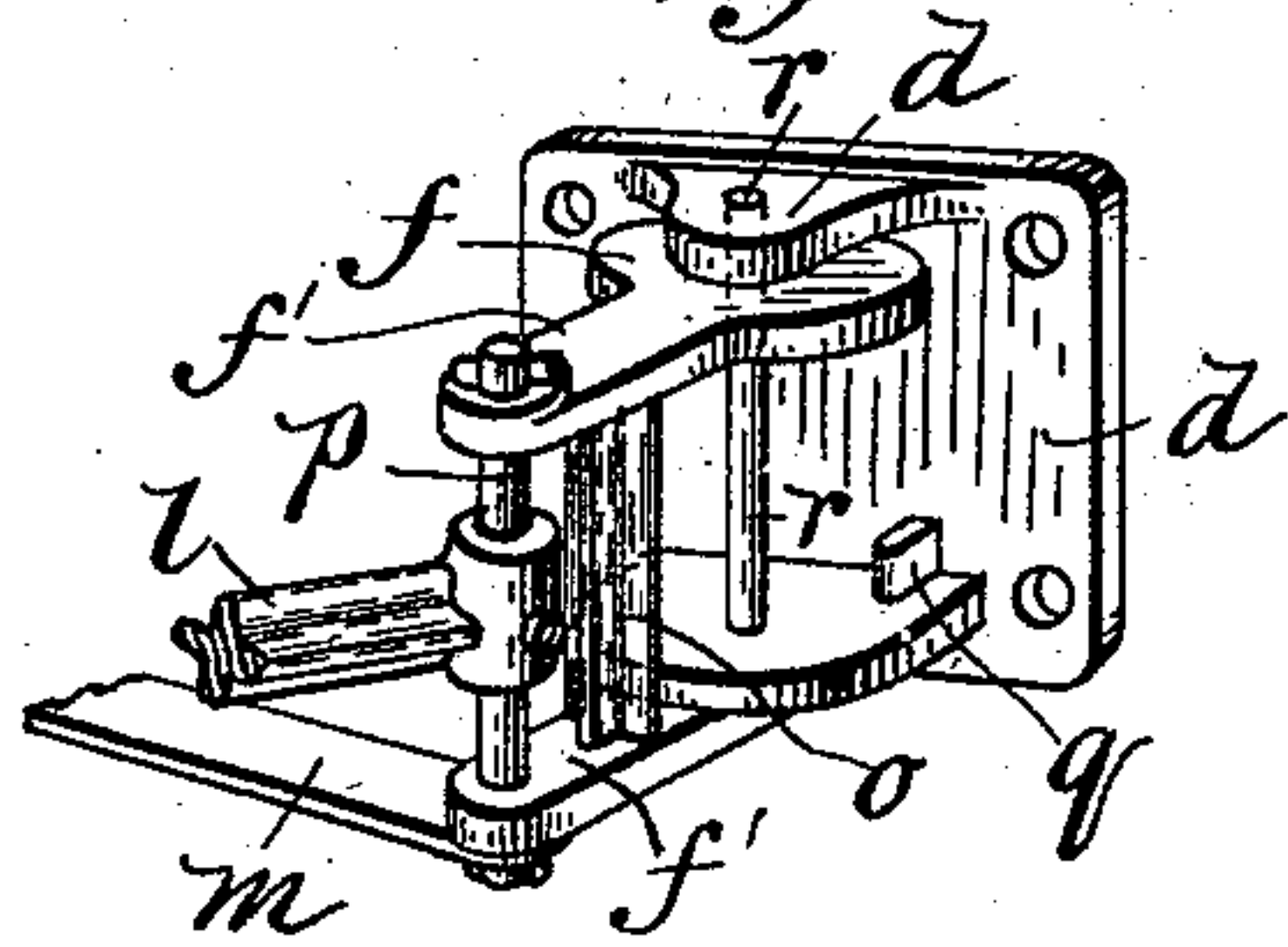


Fig. 3.

Fig. 4.



Witnesses
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DOOR SPRING OR CHECK.

SPECIFICATION forming part of Letters Patent No. 527,753, dated October 16, 1894.

Application filed July 13, 1893. Serial No. 480,429. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. LARSSON, a citizen of the United States of America, residing in Springfield, Hampden county, Massachusetts, have invented new and useful Improvements in Door Springs or Checks, of which the following is a specification, reference being had to the accompanying drawings and letters of reference marked thereon.

10 In the drawings like letters of reference indicate like parts.

Figure 1 is a plan view of my improved device showing the door closed, a part of the cylinder being broken away. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view showing the door open, and Fig. 4 is a detail view of the spring supporting frame *f*.

In detail *a* indicates the frame; *b*, the door; *c*, a cylinder supporting bracket mounted on the frame; *d*, a spring supporting bracket also mounted on the frame; *e*, spring; *f*, plates; *f'*, spring-arms; *g*, cylinder barrel; *h i*, cylinder heads; *j*, piston; *k*, piston rod; *l*, curved extension of piston rod; *m*, connecting rod; *n*, a bracket mounted on the door and having one end of the connecting rod *m* pivotally attached thereto; *o*, a cross bar extending between the arms *f'*; *p*, a pin or pivot between the arms *f* and having the piston rod extension *l* and the connecting rod *m* mounted thereon.

The object of my invention is to provide a simple, easily operative and inexpensive device for closing doors gradually; and I accomplish this object by the construction herein set out.

The construction and operation of my device are as follows: A suitable spring supporting bracket *d* is mounted upon the door frame, which bracket is provided with two wings projecting therefrom. Mounted adjacent to said wings and preferably next their inner faces are two plates *f* provided with extended arms *f'* and having a bar *o* extending from plate to plate and preferably made integral therewith. A central pivot pin *r* serves to pivotally connect the plates *f* with the bracket *d* and prevents lateral movement while permitting free rotary movement of the plates.

A coil spring *e* is mounted between the plates *f* and one end of the spring engages a

lug *q* on the bracket *d* while the opposite end engages the cross-bar *o*, the tension of the spring operating to cause the plates *f* to rotate on the pivot in a direction to carry the projected arms of the plates normally toward the cylinder. The connecting rod *m* is connected with one of the projected arms *f'* preferably by providing one end of this rod with an opening and passing the pin *p* through the same. This attachment I prefer to make adjacent the outer face of the plate, and the rod *p* is made of sufficient length to pass through the arms *f'* and the rod *m*.

A bracket *n* is mounted upon the door and the connecting rod pivotally connected therewith, so that the expansion of the spring to relieve its tension will through the operation of the connecting rod *m* operate to turn the door upon its hinges and close the same.

For a check to prevent the too rapid closing of the door, I provide an air-cushion, employing for that purpose a cylinder barrel *g* provided with suitable heads, the head *h* being provided with an opening for the passage of the piston rod *k* and the head *i* being closed except for an air vent *v*, the latter head being pivotally mounted on a bracket *c* which bracket is secured to the door casing.

The pivotal rod *p* is preferably of the same size throughout and is unobstructed between the plates, so that the height of the cylinder may be varied if desired.

The device may be used alike on either a right or left hand door as the connecting rod may be attached with equal ease at either side of the spring bracket *d*.

In some cases I may attach one of the arms *f'* at the outer face of one of the bracket wings and the other at the inner face of the other wing, the result being the same in any event. I attach the parts in such position as may appear most convenient for the place where the device is to be employed.

The curved extension of the piston rod enables me to carry the pivotal point of the connecting rod *m*, through which pivotal point and along which rod the force of the spring is transmitted to the door, past the center or pivotal line of the hinge, thus so changing the location of the fulcrum point that the power of the spring will be exerted to hold the door on a dead center, since the power of

the spring transmitted along the link m passes almost through the vertical pivotal line of the door. When however the door is moved a trifle to carry the pivotal point beyond the center line then the spring has sufficient power to operate upon the door, and the leverage increases as the door approaches a closed position, because the line of transmission of force along the link m becomes more remote from the pivotal axis of the door, and therefore the leverage of such force about such pivotal axis reaches its maximum, and thus the greatest force is exerted at the time when the spring is weakest and when the greatest power is desired. It is also to be observed that while the length of the piston rod is such compared with the length of the arms f' and the distance between the brackets that the piston will be at right angles to the arms when the door is closed, the length of the arms f' , constituting the lever through which the force of the spring is transmitted to the door, is approximately equal to the play of the piston. Hence the plates f and piston rod are approximately in a vertical plane with each other when the door is opened to its full extent. In this position the resistance of the cylinder has its minimum effect. In fact it is of zero value, and increases as the door swings round until it reaches its maximum as the door closes. The utility of this arrangement is apparent as it results in economy of time in starting the door to close, with the minimum of concussion, when it is actually closed.

35 Having, therefore, described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. The combination of a door and frame therefor, brackets on the frame above the door, a cylinder pivoted on one bracket, a lever pivoted on the other bracket, a link connecting the end of said lever to the door and a spring for actuating said lever to close the door, and a piston working in the cylinder pivoted at its outer end to the end of the lever, the distance between the brackets, the lengths of the lever and piston and the play of the piston in the cylinder being so proportioned that the piston is in line with the lever at one end of its play and at right angles thereto at the other end, substantially as described.

2. The combination of a spring supporting bracket a spring mounted therein, a spring lever pivotally mounted in said bracket, the latter comprising two pivotally mounted arms f' rigidly connected, a rod p extending from arm to arm and being of the same diameter throughout, a suitable check mechanism connected with said pin p by a rod l which at its connecting point with the pin is of less width than the space between the two arms f' whereby the relative position of the several parts may be varied substantially as and for the purposes stated.

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Witnesses:

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