

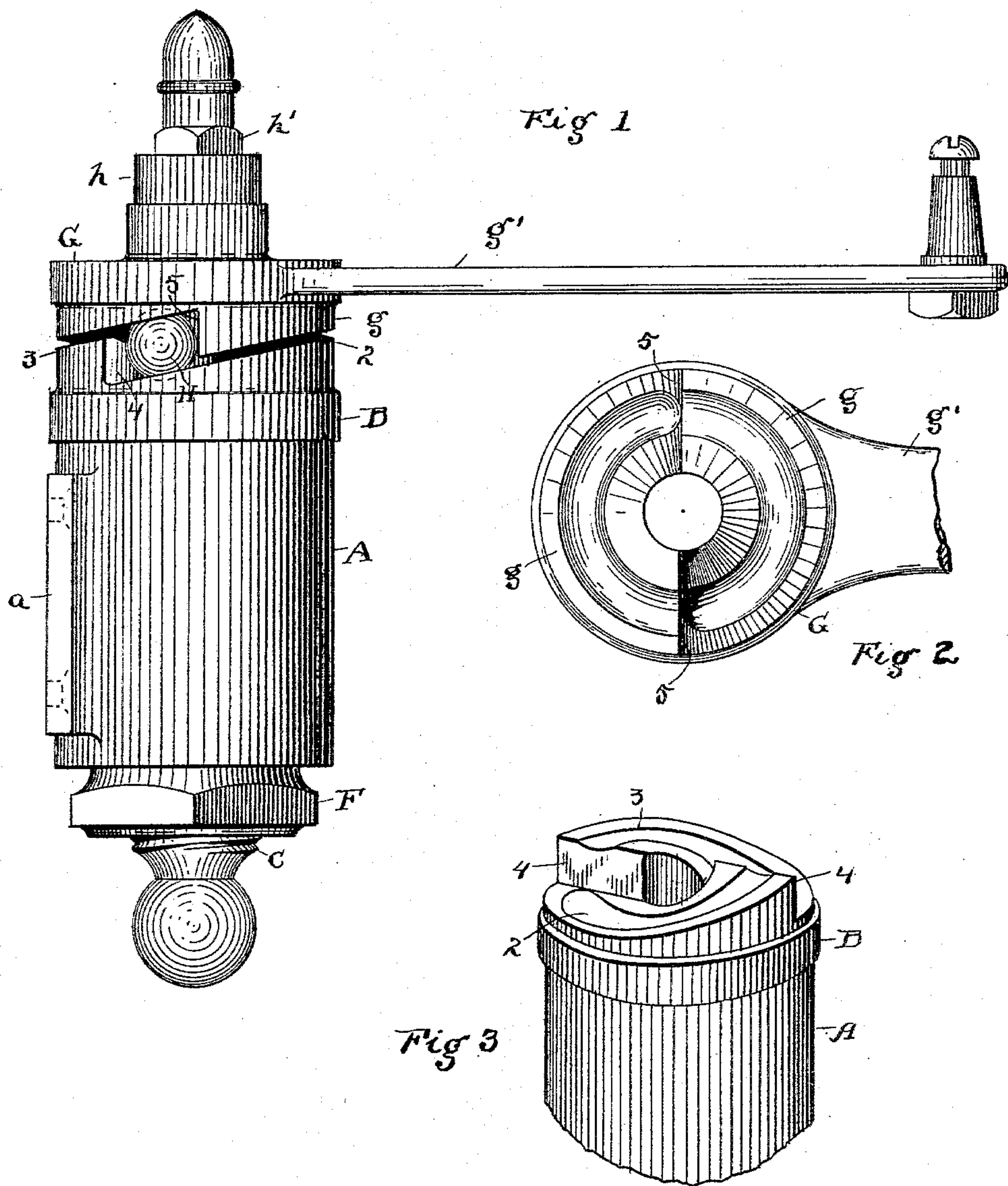
(No Model.)

2 Sheets—Sheet 1.

H. C. MONTGOMERY.
DOOR CLOSING DEVICE.

No. 490,032.

Patented Jan. 17, 1893.



Attest.

R. B. Moser.

N. L. McLane

By H. T. Fisher,
attorney

Inventor:
Harry C. Montgomery

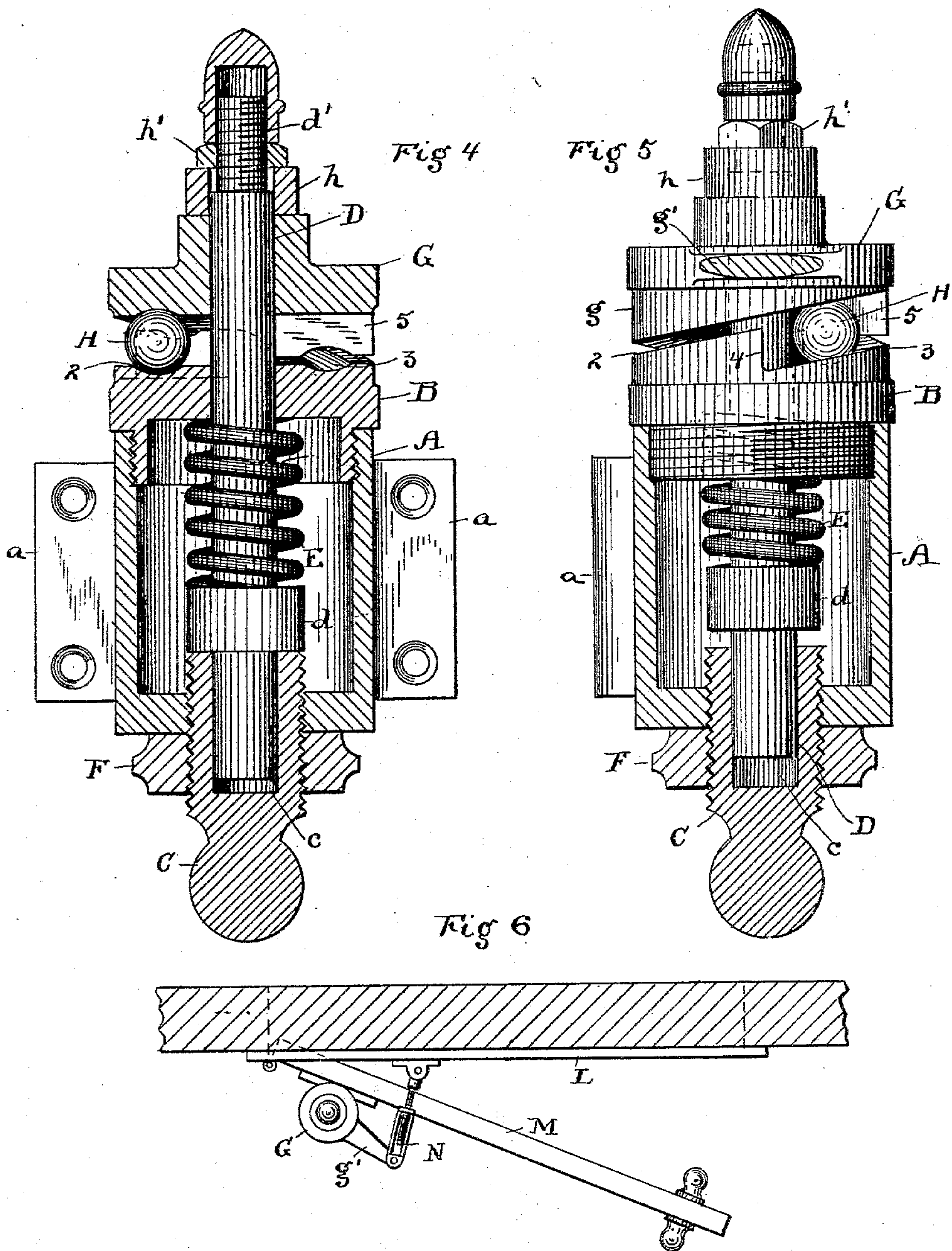
(No Model.)

2 Sheets—Sheet 2.

H. C. MONTGOMERY.
DOOR CLOSING DEVICE.

No. 490,032.

Patented Jan. 17, 1893.



Attest.
P. B. Moser
N. L. Milne

By H. J. Fisher
Attorney.

Inventor.
Harry C. Montgomery

UNITED STATES PATENT OFFICE.

HARRY C. MONTGOMERY, OF CLEVELAND, OHIO.

DOOR-CLOSING DEVICE.

SPECIFICATION forming part of Letters Patent No. 490,032, dated January 17, 1893.

Application filed June 30, 1892. Serial No. 438,629. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. MONTGOMERY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Door-Closing Devices; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to door closing devices, and the object of the invention is to provide a device which will gradually and effectually close a door without jar or noise, and which is simple and durable and requires no attention to keep it in repair and good working condition.

To these ends the invention consists in a device provided with inclined ball bearings, a retracting spring and other parts, all combined and operating, substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings Figure 1 is a side elevation of my improved device. Fig. 2 is a bottom view of the upper movable member of the device, showing the face of the inclined ball bearings, and Fig. 3 is a perspective view of the upper part of the lower section or member of the device. Fig. 4 is a vertical central sectional elevation of my improved device, and Fig. 5 is a vertical central sectional view of the lower portion of the device, and a side elevation of the upper portion. In this view the parts are positioned as when the door is partly opened, while in Fig. 5 they are as they appear when the door is closed. Fig. 6 is a view looking down on a door that is partly open and has my improved closing device attached thereto.

The invention comprises a barrel, A, which constitutes what may be termed the body of the device, upon the back of which is a flange or flanges *a*, integral therewith and through which the barrel is secured to the door. This barrel is provided with a cap, B, threaded so as to screw into the said barrel and overlapping the top of the barrel, and forming a cover therefor, and at the bottom is an externally threaded plug, C, screwed into the barrel and provided with a central cavity *c* of sufficient depth to provide a bearing for the lower end of the centrally arranged spindle D. This

spindle D rests in the said plug at its lower end and passes through the cap or cover B and projects above the same as shown to connect the other operating parts. On the said spindle, near its lower end is a collar *d*, which, in this instance, is shown as adapted normally to rest upon the plug C, and thus serve to stop or limit the downward movement of the said spindle. In operation the spindle has a longitudinal movement, or is raised and lowered, more or less, as the door is opened more or less, by the anti-friction balls rolling up or down on the inclined planes or tracks provided therefor, as hereinafter described. The collar *d* also forms the lower bearing or support for the spring E, which is coiled about the spindle D between said collar and the cap B, and the said cap forms its upper bearing. Tension is produced upon said spring by means of the plug C, which may be screwed into the barrel to greater or less depth, according to the tension desired. In forcing the spindle up to tighten the spring the plug bears against collar *d*, and when the required tension is obtained the nut F on the said plug C is tightened and said plug is thereby held in a fixed position. Obviously, when the parts are in their normal position, say as shown in Fig. 4, the end of the spindle might rest on the bottom of the cavity *c* instead of the collar *d* supporting the spindle on the end of the plug, as here shown, and any suitable means for holding the spring other than the collar *d*, might be adopted.

On the upper or outer surface of the cap B are two inclined concentric bearings or tracks 2 and 3, each bearing extending half way around the said cap or cover and terminating at its upper and deeper portion in an abrupt shoulder 4, from the base of which shoulder the next bearing or cam begins. The corresponding surface of the upper member or section G of the device has bearings or cams *g* corresponding to those on the lower section, and each of said bearings or cams has a slight groove or channel in which the anti friction balls, H, are adapted to turn and travel. Two of these balls are used, and when the device is at rest the said balls occupy the space between the right-angled shoulders 4 and 5 of the cams or bearings, as shown in Fig. 1.

A collar *h*, and a tightening nut, *h'*, on the

upper end of the spindle D serve to confine the upper member G in working position. A threaded cap is here shown as surmounting the spindle, and serving to cover and ornament the projecting end of the spindle. A threaded extremity d' terminates within the sleeve or collar h , and when the plug C is tightened to increase tension on spring E the nut h is run down a corresponding distance to tighten the member G upon the parts beneath. The collar h is of such depth as to take up or accommodate any adjustment of the spindle that may be needed to tighten the spring. If the collar h were not used the nut h' would bear directly upon part G, and the threaded end d' would extend down into said part G more or less, and this would not be desirable. The part G has an arm g' integral therewith and through which said part is held when the lower part fixed to the door is turned. This arm g' is connected with the door casing or frame L above the door M, by suitable link connections, N, said connections being adjustable in length so as to adapt the device to its proper position on the door. When the door closes the collar d seats itself noiselessly before actual closing occurs, and the spring tension continues until the door is pushed shut. But in this operation there is no violence or noise, and especially is there no very stiff spring resistance to overcome in opening the door. The inclined ball bearings render the turning of the parts so easy that a comparatively light spring will do the work with them. Two or more of the inclined bearings can be used, and a ball for each set of bearings. These bearings may be more or less inclined than here shown, but the relative inclination shown is believed to be best for all purposes. The spring is of suitable tempered steel,

and may have any desired strength. Its action is direct upon its bearings and pulls down upon the upper section through the spindle, and is not torsional or by twist or strain of the spring.

Having thus described my invention, what I claim as new, and desire to secure by Letters-Patent, is:

1. A door closing device consisting of two sections having opposed inclined parallel bearings, in combination with an anti-friction ball between each set of inclined bearings, said sections constructed to be connected with the door and the door casing respectively, and a spring pressed spindle uniting said sections, substantially as described.

2. The base section having a cap with inclined concentric bearings on its top and an adjustable plug in the bottom of said section, in combination with a top section having inclined bearings matching those on the lower section, anti-friction balls between said sections, a spindle connecting said sections and resting on the said plug, and a spring to draw said sections together, substantially as described.

3. In a door closing device, the two opposed sections having inclined bearings and anti-friction balls, in combination with the spindle connecting said parts, the spring bearing said spindle down, and the adjustable support for the lower end of the said spindle, whereby the tension of the said spring may be varied, substantially as described.

Witness my hand to the foregoing specification.

HARRY C. MONTGOMERY.

Witnesses:

H. T. FISHER,

NELLIE L. McLANE.