

No. 618,505.

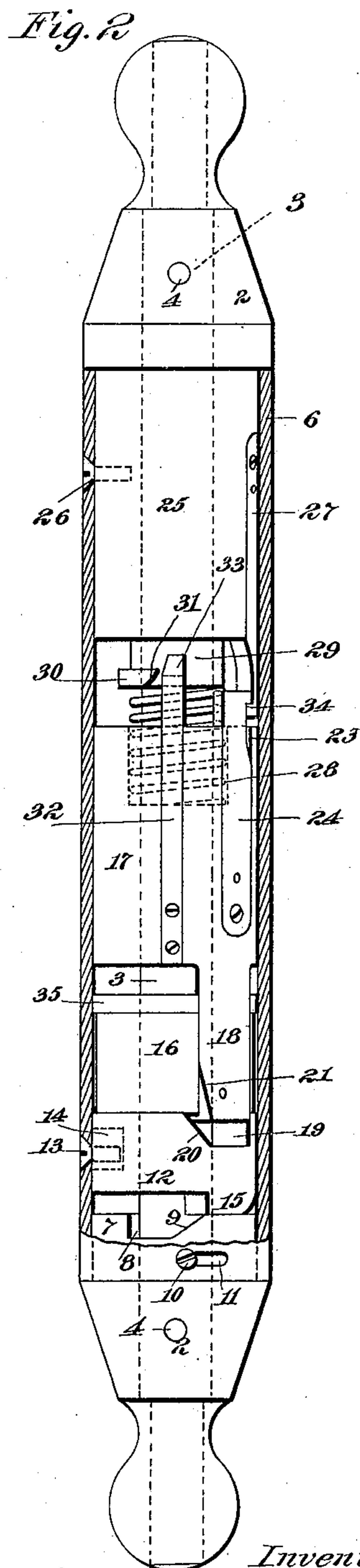
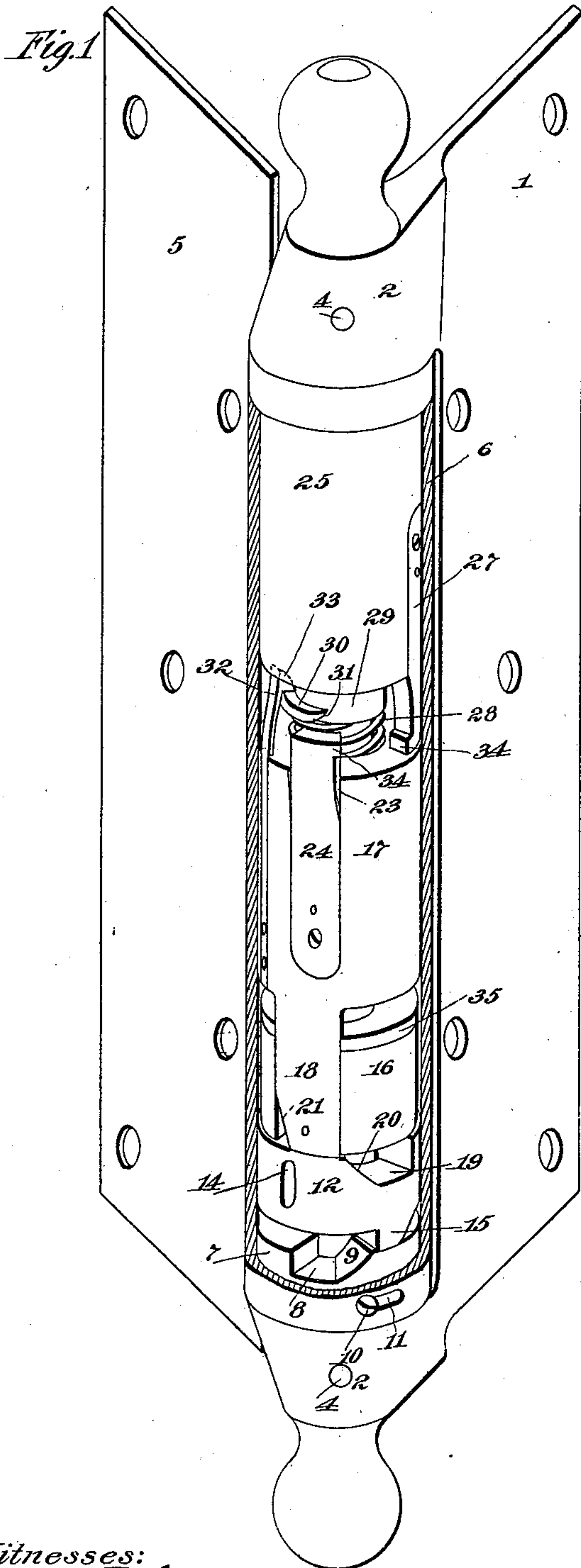
Patented Jan. 31, 1899.

C. F. HANINGTON.
DOOR CHECK.

(Application filed Mar. 26, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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C. F. HANINGTON.
DOOR CHECK.

(Application filed Mar. 26, 1898.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 3

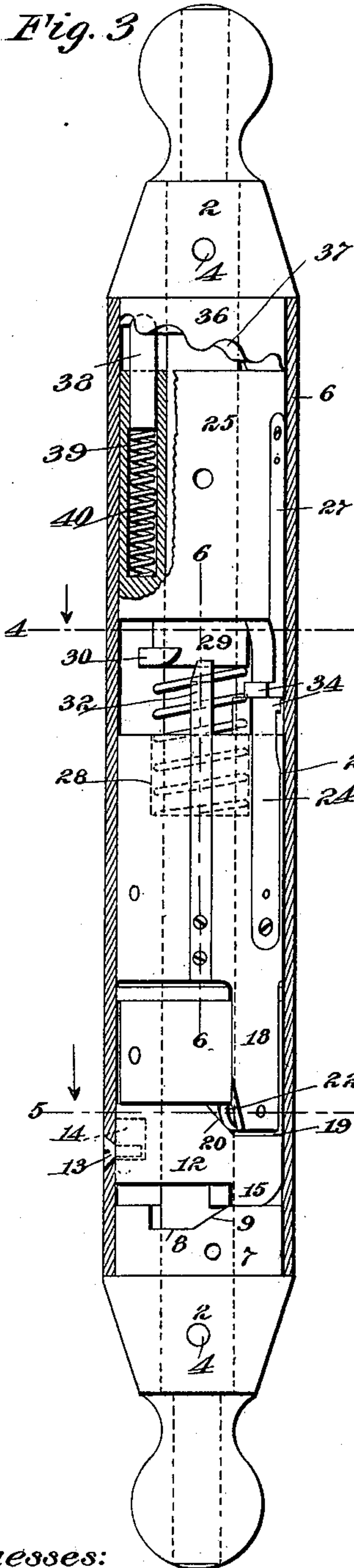


Fig. 7

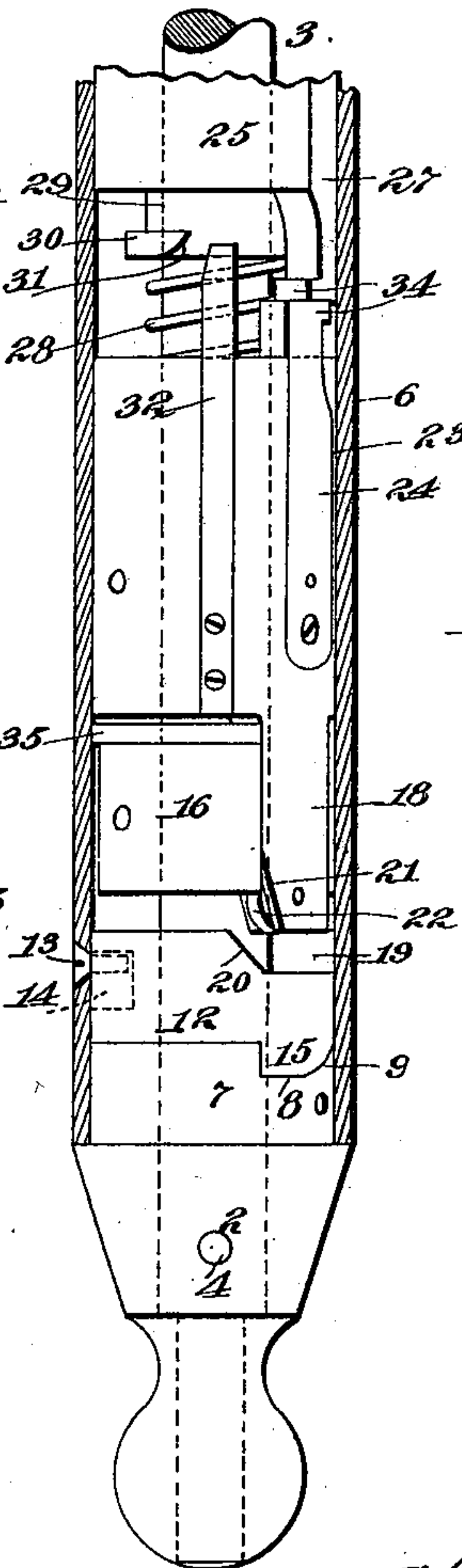


Fig. 4

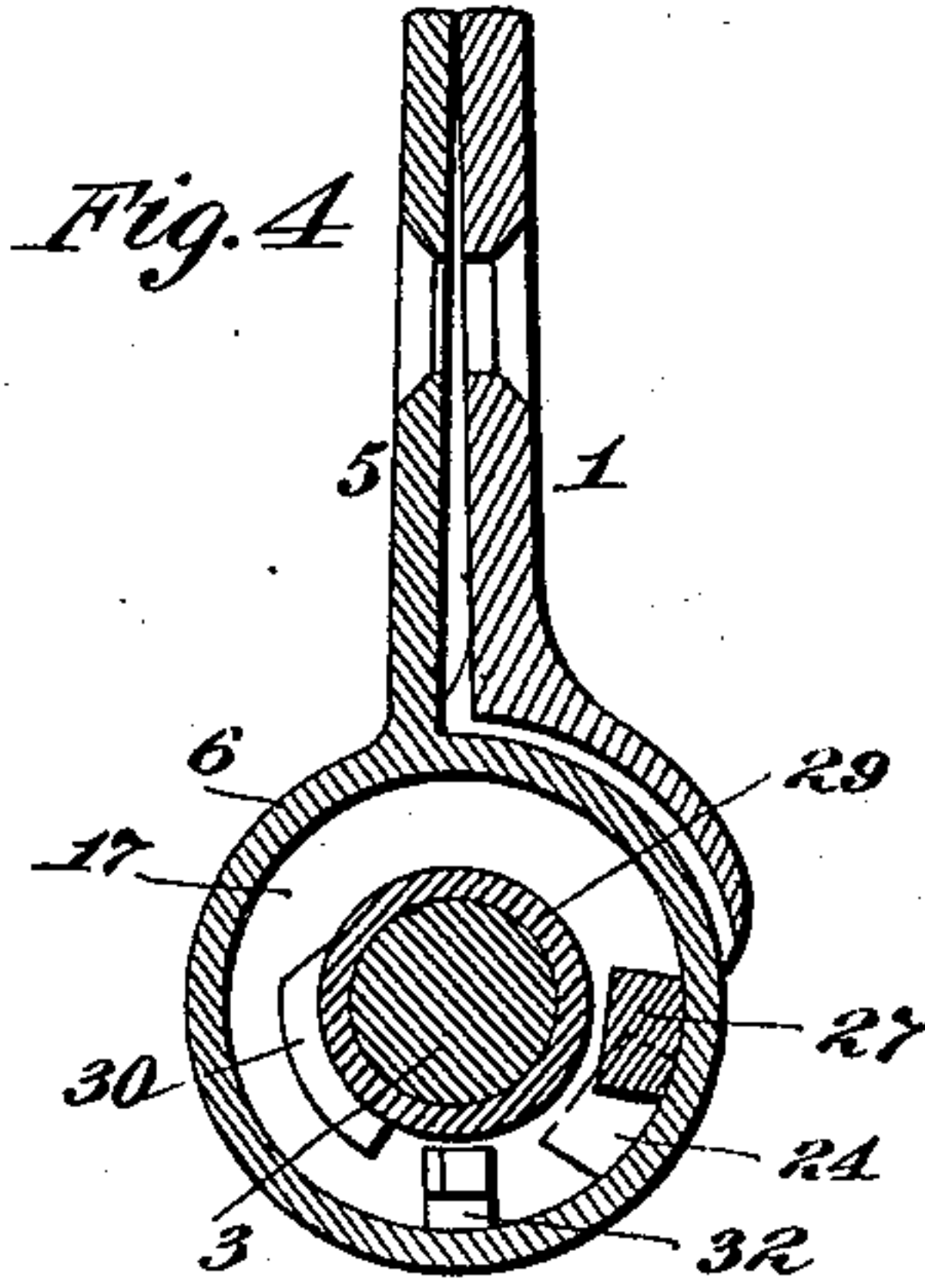


Fig. 5

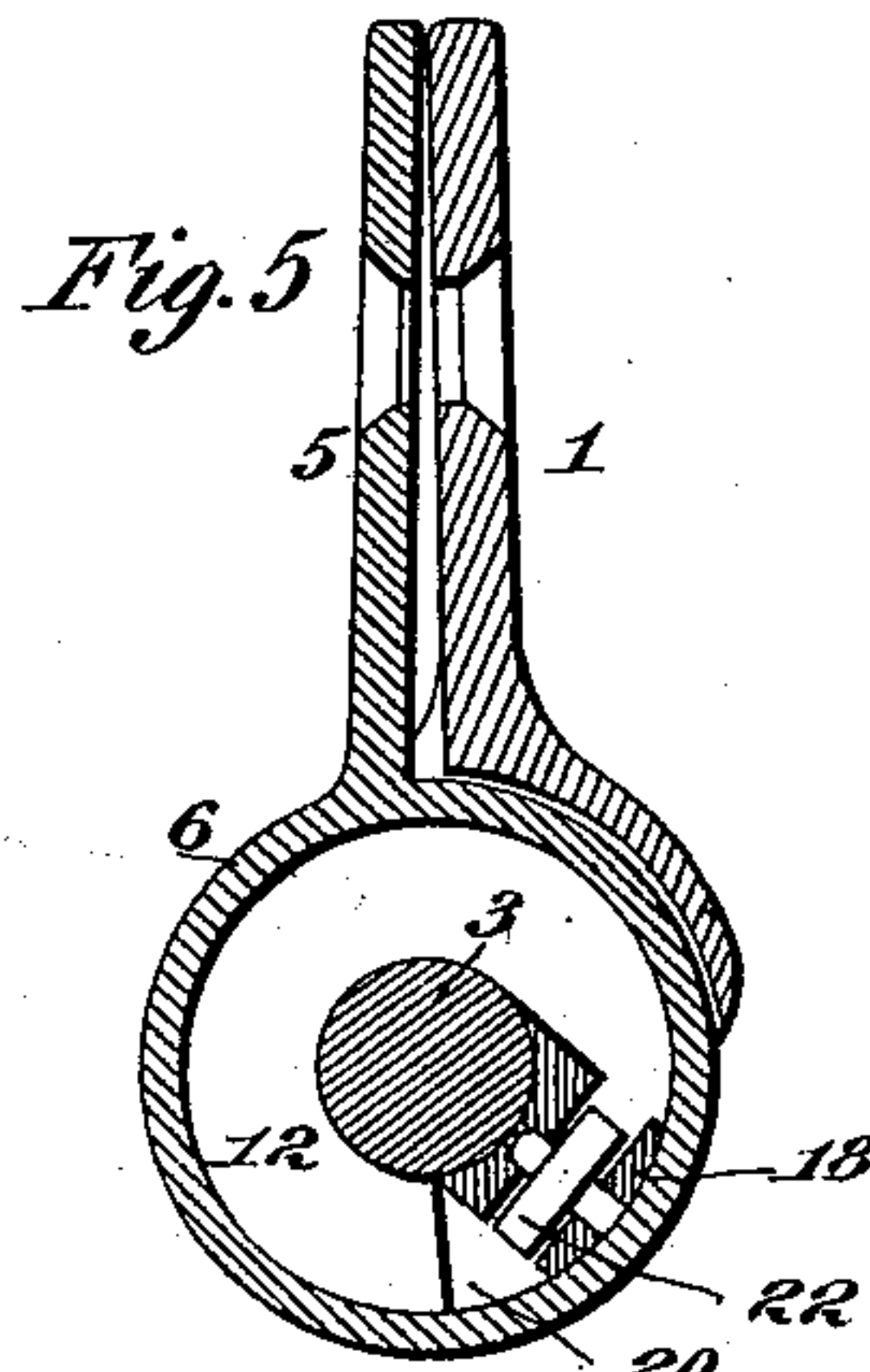
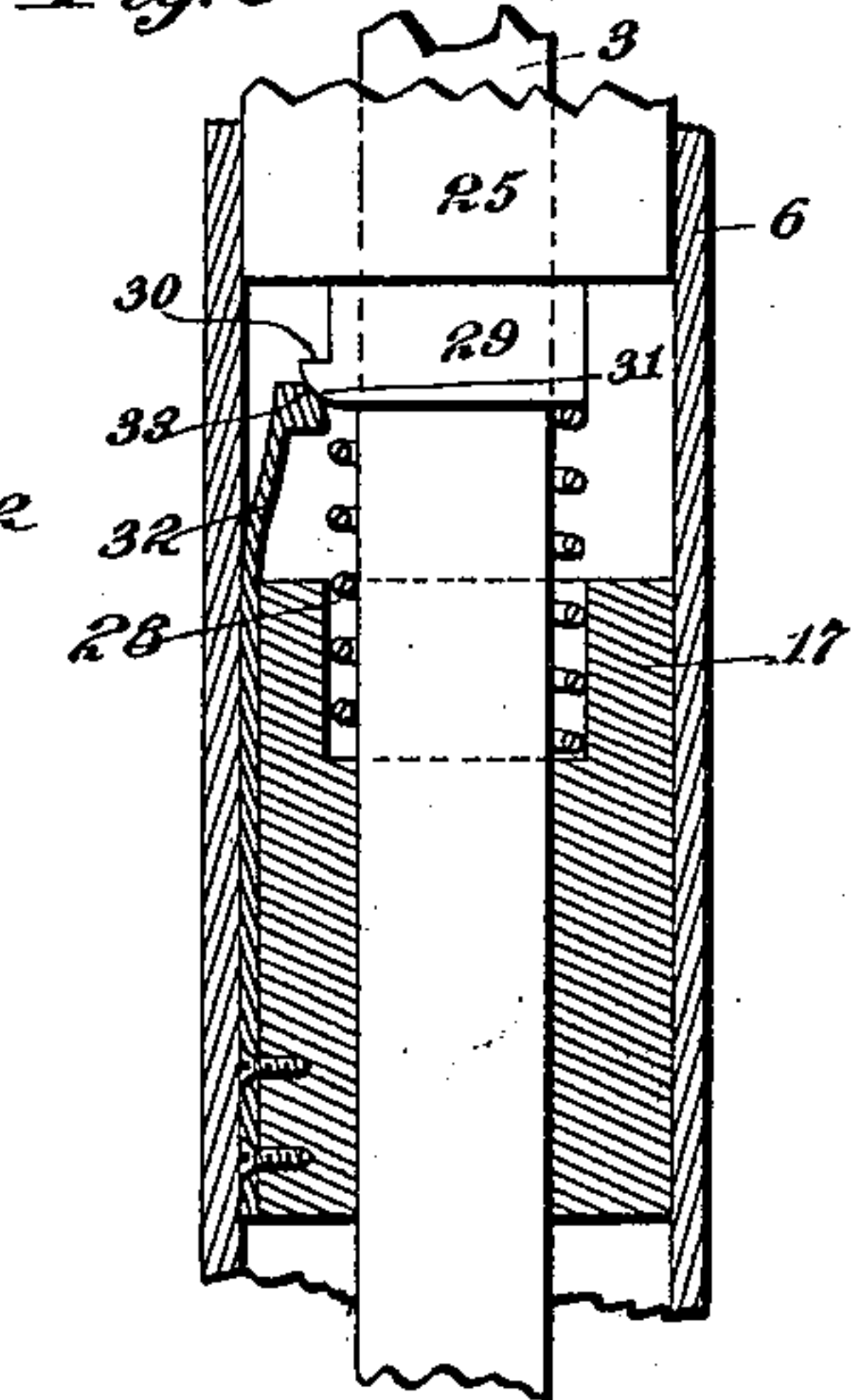


Fig. 6



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UNITED STATES PATENT OFFICE.

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DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 618,505, dated January 31, 1899.

Application filed March 26, 1898. Serial No. 675,253. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. HANINGTON, a citizen of the United States, residing at New York city, in the county and State of New York, have invented certain new and useful Improvements in Mechanical Door-Checks, of which the following is a specification.

My invention relates to various new and useful improvements in door-checks of the type wherein the checking effect is produced solely by mechanical means as distinguished from devices employing liquid or pneumatic cylinders.

The essential object of my invention is to produce a door-check which will be contained entirely within the barrel of the hinge, whereby I secure a neater, more compact, and more durable device than has heretofore been obtained and at the same time effectively protect the parts from dust and dirt.

My improved door-check is absolutely certain in its operation, serving, as is common, to arrest the movement of the door when near the closed position, irrespective of high velocities with which the door may be moved, and the checking action being always of an elastic character, so that the parts comprising the check or hinge are in no way strained.

My improved door-check, however, possesses an additional advantage, which, so far as I know, is entirely novel—namely, that when the door is closing very slowly, as when being moved slowly by hand, it will not be checked, but can be moved directly toward its closed position.

Broadly stated, my invention comprises a spring which is stationary with the pintle and a second spring having movement coincident with the movable leaf, combined with means by which the springs upon the closing of the door will engage together at the proper moment to elastically check the door, but which when the door has rebounded to a limited extent will allow the springs to be moved out of their normal planes, so as to clear each other and allow the door to be closed, it being understood that either the hinge having the check therein or the other hinge is provided with a closing-spring, or that a closing-spring suitably located at the side or top of the door is used, or that in some other way, immaterial

to the present invention, the door is arranged to have a tendency to close.

In what I consider the best type of my invention I mount within the extreme lower portion of the hinge-barrel surrounding the pintle a collar having a recess therein, one side of which is formed at an angle to constitute a cam, a small finger-piece projecting through a slot in the barrel being used for partially rotating said collar. Carried above this collar with the hinge-barrel will be a second collar, having a projection at its lower end which normally engages the recess in the bottom collar, so that the bottom faces of the two collars will be normally in engagement. The second collar referred to will be secured against movement concentric with the barrel, but will be free to move laterally with respect to the same in any suitable way, as by means of a pin engaging a slot in the collar. Mounted above the second collar and rigidly secured to the pintle will be a split collar, the bottom face of which will be separated from the upper face of the second collar for a distance at least equal to the depth of the lug on the bottom face of the second collar, as will be explained. Mounted upon the pintle and capable of lateral movement thereon is a sleeve having an integral arm which bears between the two adjacent faces of the split collar and carrying at its lower end a friction-roller which is capable of engaging a recess in the upper face of the second collar to allow the sleeve referred to to be moved downwardly into engagement with the upper face of the split collar or with a suitable buffer carried by said upper face. The sleeve referred to will carry a vertically-arranged leaf-spring, which will be very firmly supported in a channel cut in the sleeve, but free to yield slightly at its upper end. A spiral spring surrounding the pintle will tend to normally depress the sleeve. Carried within and rigidly secured to the barrel at its upper part will be a second sleeve, carrying a downwardly-extending vertically-arranged leaf-spring, the lower end of which will occupy a plane below the upper end of the first-mentioned spring, so that the two springs may engage together to check the door with an elastic effect. The friction between the two springs referred to

produced by the momentum of the door may be utilized to keep the springs in engagement, or the two springs may be provided with small overlapping lugs which engage together, but which will be disengaged when the door slightly rebounds to allow the first-mentioned sleeve to move downwardly and thereby carry the springs out of coincident planes, so that the door may close, the projection on the first-mentioned sleeve entering the recess on the second collar referred to. In order to maintain the engaging or checking springs in their normal planes until they are almost in contact with each other, I employ a spring trip or head normally engaging a shoulder, but being moved out of engagement therewith when the checking action requires to take place.

My invention in its preferred form will be more clearly understood from a reference to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of the improved hinge, the barrel being shown in section and illustrating the checking-springs out of engagement; Fig. 2, a front elevation of the hinge, showing the checking-springs in engagement; Fig. 3, a similar view showing the checking-springs out of engagement to allow for the closing of the door; Fig. 4, a section on the line 4 4 of Fig. 3; Fig. 5, a section on the line 5 5 of Fig. 3; Fig. 6, a section on the line 6 6 of Fig. 3, and Fig. 7 a vertical sectional view illustrating the checking-springs out of action.

In all of the above views corresponding parts are represented by the same numerals of reference.

1 represents the stationary leaf, secured to the frame of the door and carrying arms 2 2, which are secured to the pintle 3 by means of pins 4 in the usual way.

5 is the movable leaf, carried by the door and connected to the hinge-barrel 6. Mounted within the barrel 6 at its lower end and surrounding the pintle 3 is a collar 7, having a recess 8 therein. The forward end 9 of said recess is inclined, as shown, to form a cam-surface. The collar 7 may be moved with respect to the barrel 6 by means of the pin 10, working in a slot 11, formed in the barrel.

12 is a collar surrounding the pintle 3 and located immediately above the collar 7. The collar 12 is rotated with the barrel, but may be moved vertically with respect to the same by a screw 13, working in a slot 14. The collar 12 carries on its lower surface a lug 15, which normally rests upon the upper face of the collar 7, but which will enter the recess 8 in said collar, when the latter is partially rotated upon the pintle, by moving the pin 10 in the slot 11, as will be understood. By reversing the movement of said pin the collar 7 will move with respect to the collar 12, causing the latter to be elevated, for which purpose the forward face of the lug 15 is inclined to correspond with the surface 9 of the recess 8. A split collar 16 is mounted above the collar

12 and is pinned to the pintle, so as to be held stationary therewith. When the lug 15 is in engagement with the upper surface of the collar 7, the upper surface of the collar 12 may be and preferably is in engagement with the lower surface of the split collar 16.

17 is a sleeve mounted on the pintle and carrying an integral projection 18 at its lower end, working between the two portions of the split collar 16, as shown, so that the sleeve 17 will be held stationary with the pintle, but will be free to move vertically thereon.

The collar 12 is provided with a recess 19, the rear end of which constitutes a cam 20, said recess being so located that when the leaves have been moved together to almost close the door the said recess will be in a line immediately beneath the projection 18 to allow the said projection to enter said recess when the trip, to be explained, has operated.

In order that the return movement of the collar 12 with the hinge-barrel may elevate the sleeve 17, the rear face of the projection 18 is cut away at 21 to engage the cam 20, and to reduce friction between these parts I prefer to carry upon the lower end of said projection an antifriction-roller 22. The sleeve 17 is provided with a vertical keyway or slot 23 therein, in which is mounted a heavy leaf-spring 24, there being sufficient play in the upper part of the slot 23 to allow for the necessarily slight yielding of said spring. The barrel 6 carries within its upper end a sleeve 25, secured to said barrel in any suitable way by means of a screw 26. The sleeve 25 is provided with a vertical slot, in which is secured a second heavy leaf-spring 27, projecting below the lower face of said sleeve and with its lower end normally extending in a plane below the upper end of the spring 24, so that these springs may engage each other to check the door when desired. The sleeve 17 has a normal tendency to move downward, as by its weight or by a spiral spring 28, surrounding the pintle and mounted between the two sleeves 17 and 25. In order to keep the sleeve 17 normally elevated until an instant before the springs 24 and 27 are in engagement and to thereby prevent the projection 18 from moving downward into the recess 19 of the collar 12, any suitable tripping device may be employed.

In the drawings I have illustrated a convenient form of tripping device which may be used in connection with my invention; but it will be understood that many other devices may be used for the purpose. With the form of device shown the sleeve 25 is provided at its lower portion with a reduced cylindrical section 29, on which is formed or to which is secured a circular shoulder 30, having a flat upper face and a rounded or inclined lower forward section 31, as shown more particularly in Fig. 6.

32 is a spring-latch carried by the sleeve 17 and normally riding upon the upper flat surface of the shoulder 30. This latch is pro-

vided with a curved or inclined head 33, which is adapted to engage with the portion 31 of the shoulder 30 to permit the elevation of the latch and to allow it to reengage with the upper surface of said shoulder when the door is again opened, as will be explained. The two springs 24 and 27, when they have engaged together to check the door immediately before the closing thereof, may be held in that engagement entirely by their friction; but to secure absolute certainty of operation I prefer to form each of said springs at its extreme end with a small shoulder or lug 34, so that the two lugs will engage together positively, but upon the rebound taking place will be disengaged.

The operation of my improved check will be readily understood and is as follows: With the parts shown in Fig. 1 the check is operative and the door is closing. Further movement of the leaf 5 rotates the collar 12 to carry the recess 19 in line with the projection 18. This movement also rotates the sleeve 25 and causes the spring 27 to approach the spring 24. During this movement the shoulder 30 is moving beneath the head of the latch 32; but the engagement of said latch with the shoulder will prevent the spring 28 from forcing the sleeve 17 downward. When, however, the two springs 24 and 27 are almost in engagement with each other, the shoulder 30 will be moved from beneath the head of the latch 32, so that the sleeve 17 will tend to descend. An instant after the disengagement of the latch from the shoulder the springs 24 and 27 will engage, and the friction between them or the actual interlocking of the lugs or heads 34 will prevent the sleeve 17 from being moved downward. In engaging, the springs 24 and 27 will yield slightly to give to the checking action its necessarily elastic character. Upon the rebound taking place the leaf 5 returns slightly to disengage the springs 24 and 27, whereupon the spring 28 will force the sleeve 17 downward, the lower end of the projection 18 entering the recess 19, so as to carry the upper end of the spring 24 into a plane below that of the lower end of the spring 27. The door will then close by reason of the spring, weight, or other closing motor. When the door is opened, the leaf 5 will be moved in the reverse direction, partially rotating the collar 12 and causing the cam 20 to engage with the forward end of and elevate the projection 18 of the sleeve 17. This movement elevates the latch 32, and its inclined surface 33, engaging the corresponding surface 31 of the shoulder 30, will move the head of the latch 32 outward until it snaps into engagement with said shoulder, so that upon the closing of the door this engagement between the latch and shoulder will maintain the sleeve 17 in an elevated position until an instant before the checking-springs come into engagement.

The operations which have been explained assume that the velocity of the closing move-

ment of the door is such that the springs 24 and 27 are engaged together to check the door before the spring 28 has moved the sleeve 17 downward to clear the springs. When, however, the closing of the door is effected very slowly, and particularly when the heads or lugs 34 of the springs are not used, the spring 28 will move the sleeve 17 downward to clear the checking-springs before the said checking-springs engage each other, so that there will be no checking action. It will therefore be understood that with my invention I have produced a mechanical door-check comprising few parts, all capable of being made with machine-tools at the lowest cost, of great durability, and all the operative parts being contained within the hinge-barrel, whereby a much neater device will be obtained than any heretofore made and by which also the operative parts will be completely protected from dust, dirt, and moisture. It will also be understood that by my invention when the parts are properly constructed and the result is desired a checking action will not take place when the door is closed slowly. When it is desired to throw the checking device out of operation, the collar 7 will be moved by means of the pin 10 within the barrel 6 to allow the recess 8 to be brought in line with the lug or projection 15, whereupon the collar 12 will be moved downward to the position shown in Fig. 7. In this position it will be observed that the projection 18 will be located always above the recess 19 in the collar 12, and the opening movements of the door will not result in the elevation of the sleeve 17 to put the checking device in operation. It will be understood that the collar 7 may be dispensed with when it is not desired to throw the checking device out of action, in which case the collar 12 will be rigidly secured to the hinge-barrel at the lower part thereof, as will be understood. In order to prevent noise in the operation, I may interpose an elastic buffer 35 between the sleeve 17 and split collar 16, said buffer being preferably composed of a thin leather washer.

In some instances it may be desirable to provide means by which excessive velocities of the door in closing may be overcome, and in Fig. 3 I illustrate a device for accomplishing this end. A collar 36 is secured to the pintle within the extreme upper end of the barrel and is provided on its lower edge with an inclined cam-surface 37, having a series of projections, as shown. Working in engagement with this cam-surface is a spring-bolt 38, which fits within a recess 39 in the upper sleeve 25 and is normally pressed in engagement with the cam-surface 37 by means of a spring 40. It will be observed that when the door is opened the sleeve 25 in partially rotating will move the bolt 38 relatively to the stationary sleeve 36 to compress the spring 40. Upon the closing movements of the door the bolt 38 will, in engaging behind each of

the corrugations in the cam-surface, tend to give a slight checking action to the door to reduce the velocity thereof in closing. Manifestly the device which has been just described may be dispensed with, although in some instances and with heavy closing-springs it may be of advantage to use it.

While in order to secure the best result I prefer to employ two checking-springs 24 and 27, it is manifest that only a single spring may be used, a stationary checking element being employed in connection therewith in the same way in which the other spring is employed—that is to say, instead of using the spring 24, carried by the sleeve 17, the said sleeve may be provided with an integral upwardly-projecting lug occupying the same plane as the upper portion of the said spring and engaging the checking-spring 27 in the same way. It will also be obvious that instead of using a pair of checking-springs 24 and 27 which engage together, or by using a single one of said springs for engagement with a stationary or a non-elastic lug, as explained, it will be possible to provide the sleeves 17 and 25 with non-elastic interfering lugs which engage each other and to provide a checking spring or springs in connection with either or both of said sleeves, so that when said lugs come into engagement immediately before the closing of the door one or both of said sleeves will be moved slightly with respect to the pintle and against the effect of the checking-spring. I prefer, however, to use two checking-springs, since in that way the desired yielding effect may be obtained by the employment of very heavy and durable springs.

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

1. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, interfering projections carried by said sleeves entirely within the hinge-barrel and normally maintained in interfering planes, a tripping device for maintaining said projections in such normal planes and means for operating said tripping device immediately before the engagement of said projections to release the same, substantially as set forth.

2. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, interfering springs carried by said sleeves and normally maintained in interfering planes, and a tripping device for maintaining said springs in such normal planes and means for operating said tripping device immediately before the engagement of said springs to release the same, substantially as set forth.

3. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, two projections carried by said sleeves and arranged in normally-interfering planes, a shoulder carried by one of said

sleeves, and a spring-latch carried by the other of said sleeves for engaging said shoulder, substantially as set forth.

4. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, two projections carried by said sleeves and arranged in normally-interfering planes, a shoulder carried by one of said sleeves, a spring-latch carried by the other of said sleeves for engaging said shoulder, and means upon the opening of the door to engage said latch with said shoulder, substantially as set forth.

5. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, projections carried by said sleeves arranged in normally-interfering planes, and interlocking lugs or heads carried by said projections for engaging with each other before the door is completely closed so as to check the closing movement, and means for moving said interlocking lugs or heads out of engaging position after the door is closed and has rebounded to permit the final closing of the door, substantially as set forth.

6. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, elastic projections carried by said sleeves arranged in normally-interfering planes, and interlocking lugs or heads carried by said elastic projections for engaging with each other before the door is completely closed so as to check the closing movement, and means for moving said interlocking lugs or heads out of engaging position after the door is closed and has rebounded to permit the final closing of the door, substantially as set forth.

7. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, checking-springs carried by said sleeves and arranged in normally-interfering planes, a tripping device for maintaining the checking-springs in their normal planes until the said springs upon the closing operation are almost in engagement with each other, a projection carried by one of said sleeves, and a collar having a recess with which the said projection engages for resetting the tripping device, substantially as set forth.

8. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, checking-springs carried by said sleeves and arranged in normally-interfering planes, a shoulder carried by one of said sleeves, a spring-latch carried by the other of said sleeves for engaging said shoulder, a projection carried by one of said sleeves, and a collar having a cam-recess for engaging said projection, substantially as set forth.

9. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, checking-springs carried by said sleeves and arranged in normally-interfering planes, a shoulder carried by one of said sleeves, a spring-latch carried by the other of said sleeves for engaging said shoulder, a pro-

jection carried by one of said sleeves, a collar having a cam-recess for engaging said projection, and a friction-roller on said projection, substantially as set forth.

5 10. A door-check consisting of a hinge having in combination a stationary and a movable sleeve, checking-springs carried by said sleeves and arranged in normally-interfering planes, a shoulder carried by one of said
10 sleeves, a spring-latch carried by the other of said sleeves for engaging said shoulder, a projection carried by one of said sleeves, a collar having a cam-recess for engaging said projection, and an elastic buffer beneath the
15 movable sleeve, substantially as set forth.

11. A door-check consisting of a hinge having in combination interfering projections carried by the opposite parts of the hinge engaging with each other before the door is completely closed so as to check the closing move-

ment, means for moving said projections out of engaging position after the door is checked to permit the final closing of the door, and a movable collar for adjusting said interfering projections, whereby they will be always
25 maintained out of engagement when desired, substantially as set forth.

12. The combination of the hinge, the check carried thereby, a collar having an inclined cam-surface provided with corrugations connected to one element of the hinge, and a
30 spring-pressed bolt connected to the other element of the hinge and engaging said collar, substantially as set forth.

This specification signed and witnessed this
35 24th day of March, 1898.

CHARLES F. HANINGTON.

Witnesses:

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