No. 754,690. PATENTED MAR. 15, 1904.

W. PELZER.

DOOR CHECK AND CLOSER.

APPLICATION FILED JULY 17, 1896.

NO MODEL. 2 SHEETS—SHEET 1.

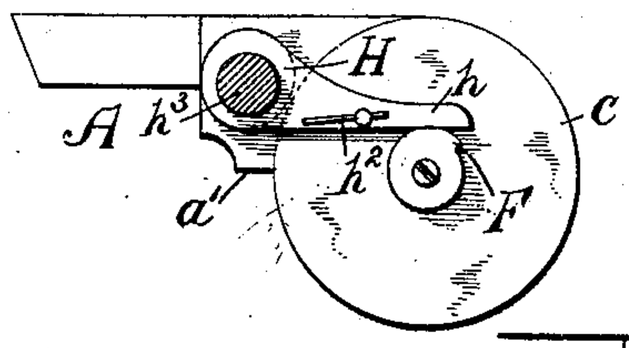


Fig. 2

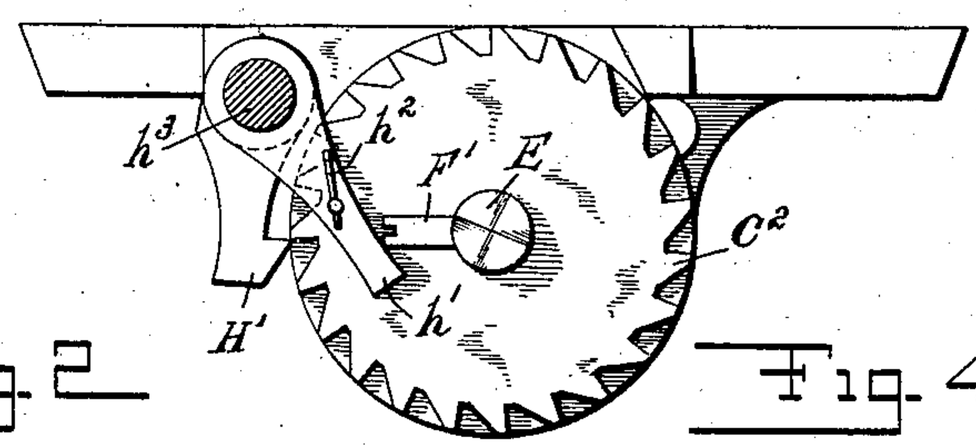


Fig. 4

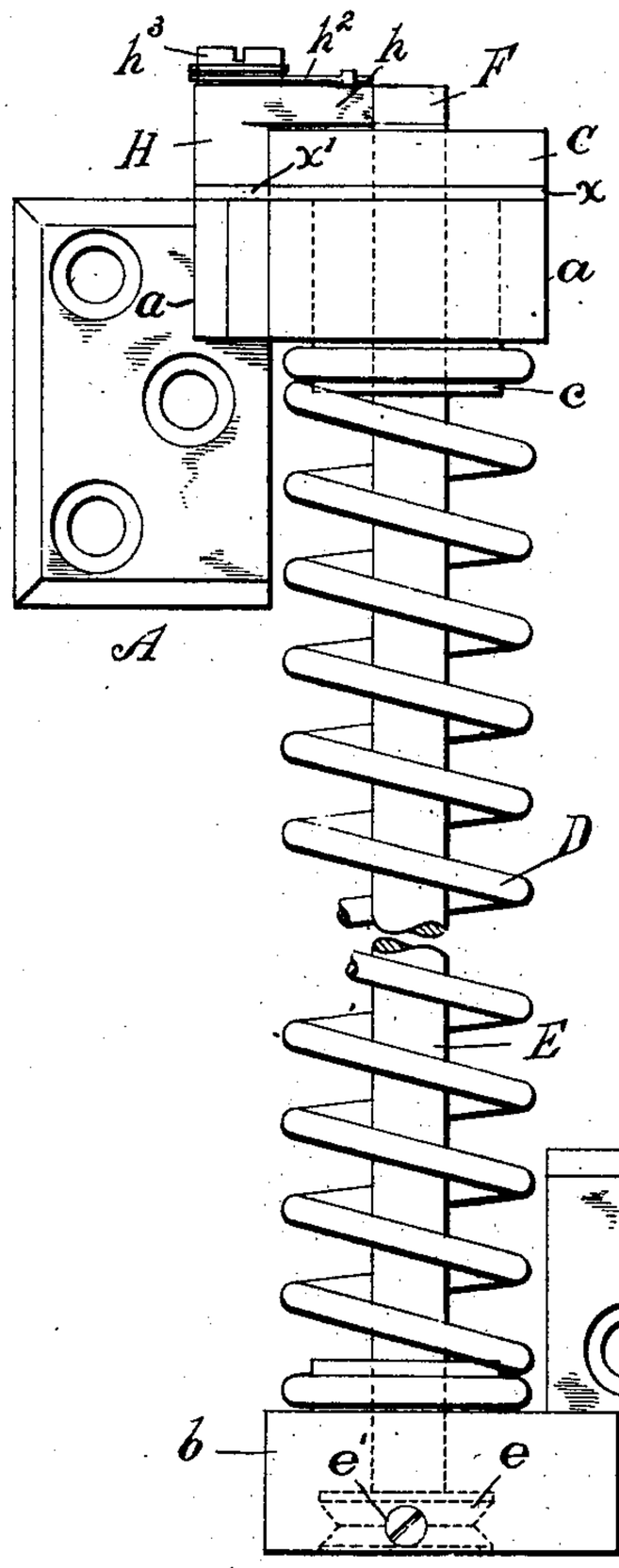


Fig. 1

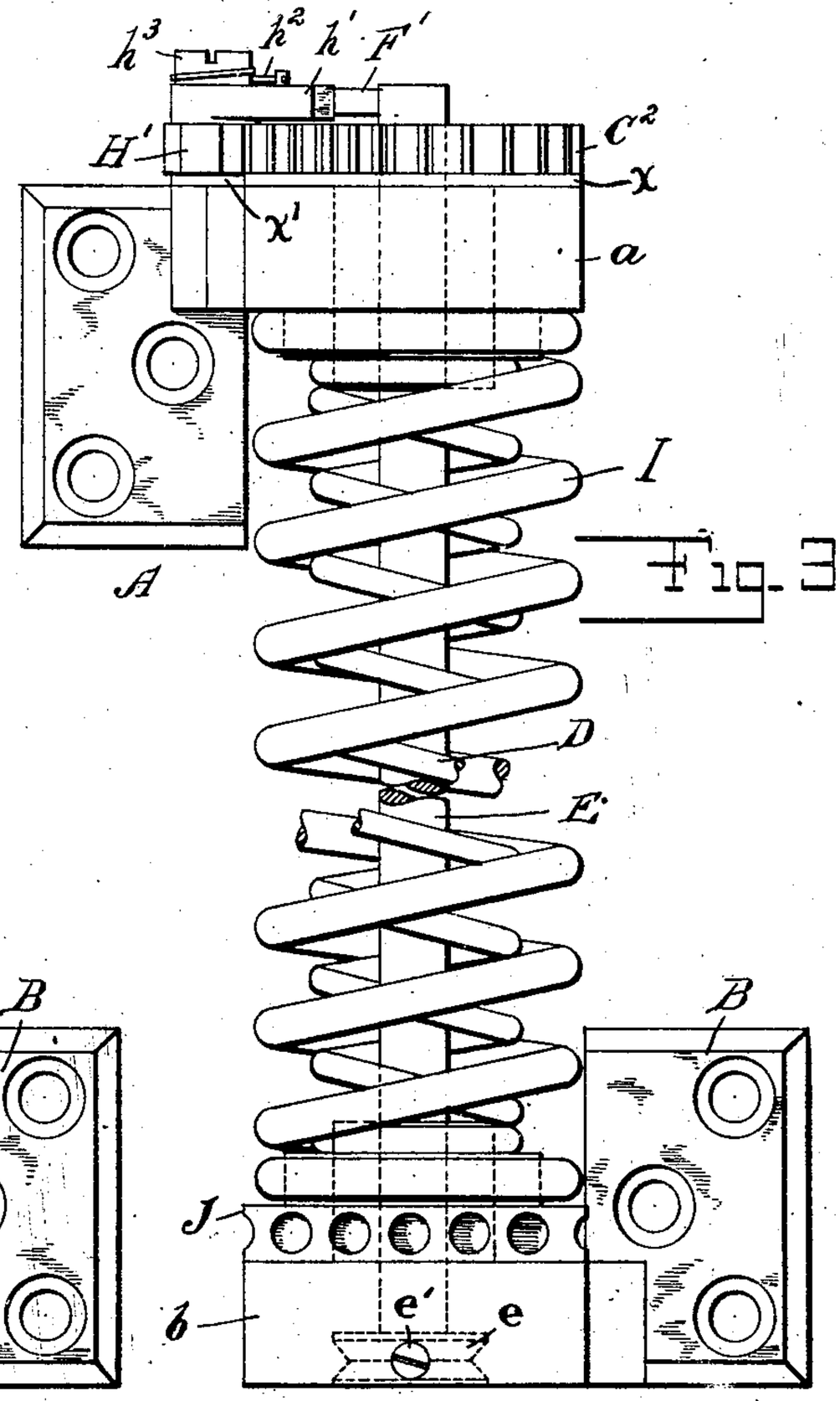


Fig. 3

WITNESSES:

Fredk C. Fischer.

INVENTOR

William Pelzer

No. 754,690. PATENTED MAR. 15, 1904.

W. PELZER.

DOOR CHECK AND CLOSER.

APPLICATION FILED JULY 17, 1896.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 6

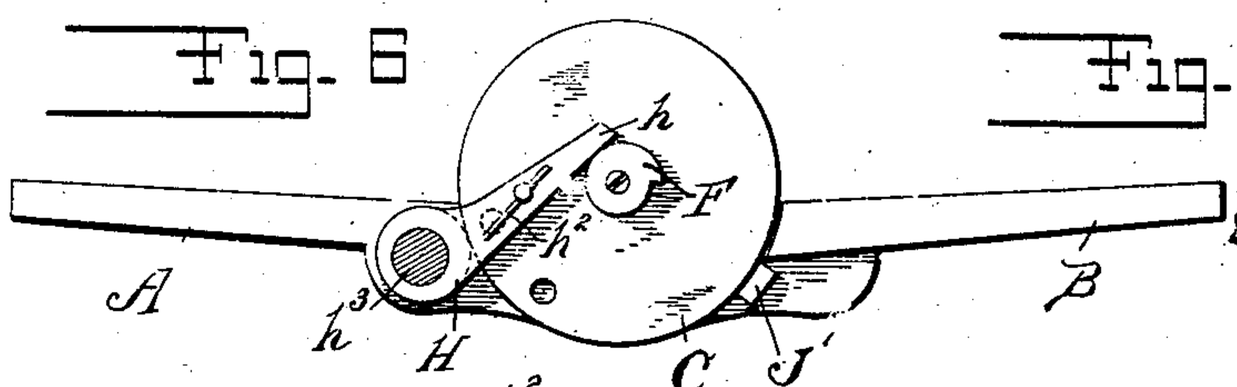


Fig. 9

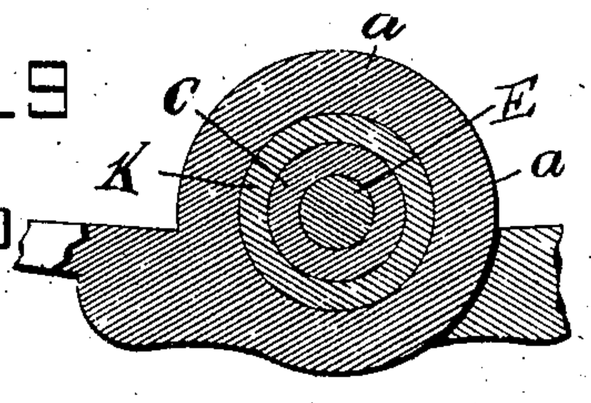
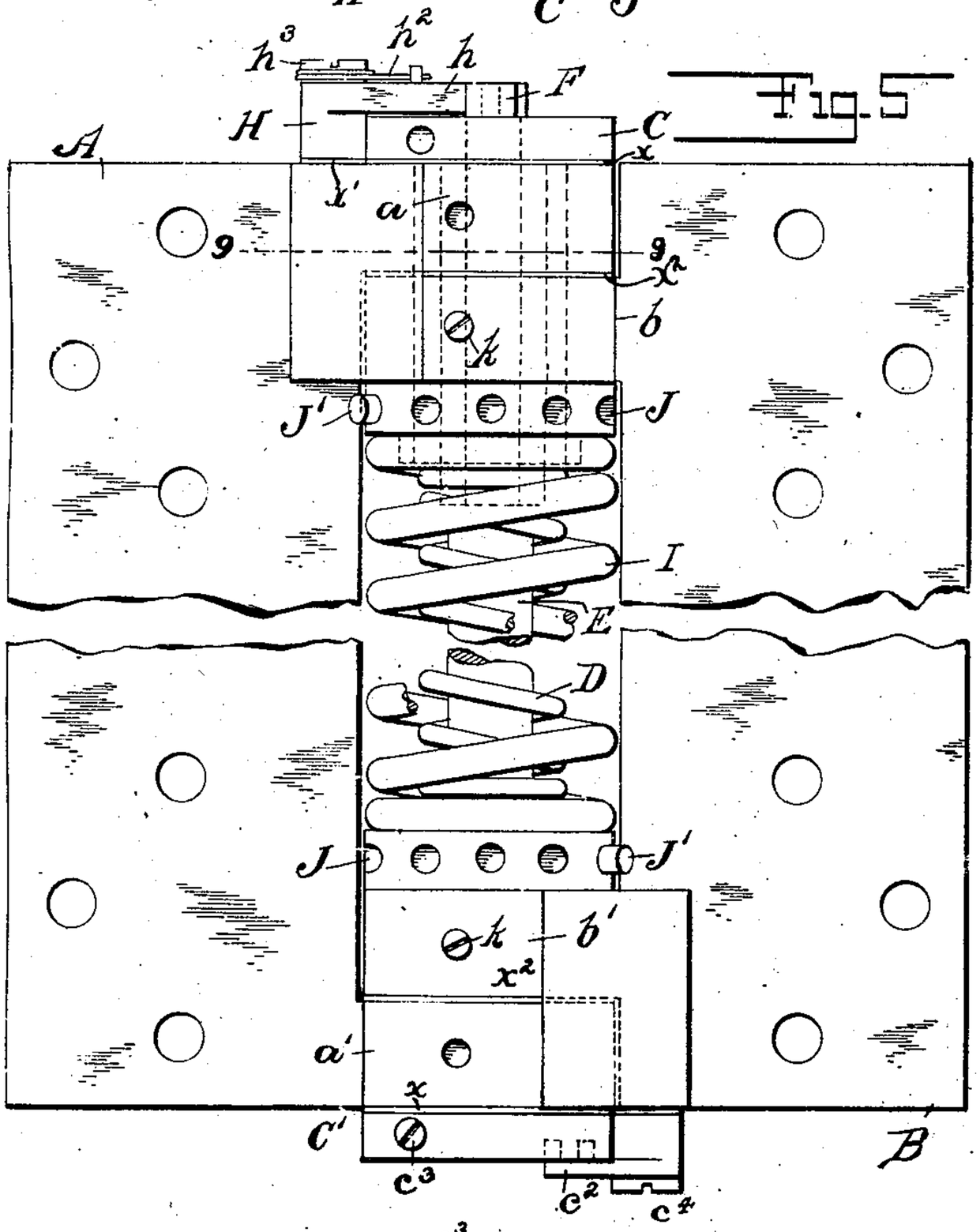


Fig. 5



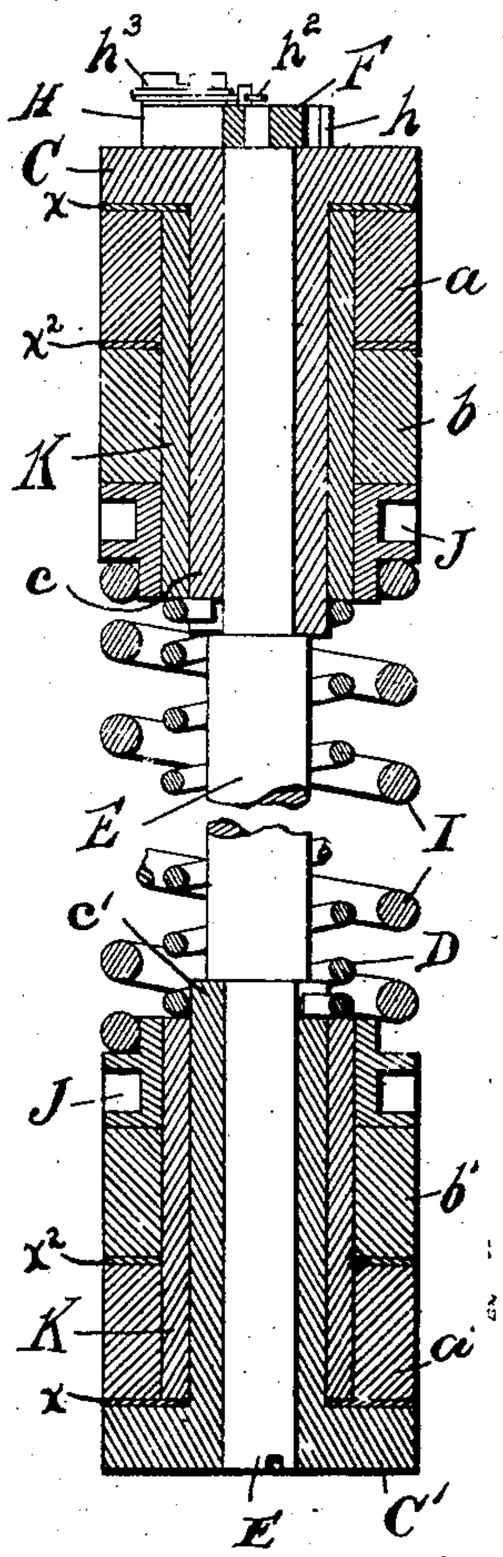


Fig. 8

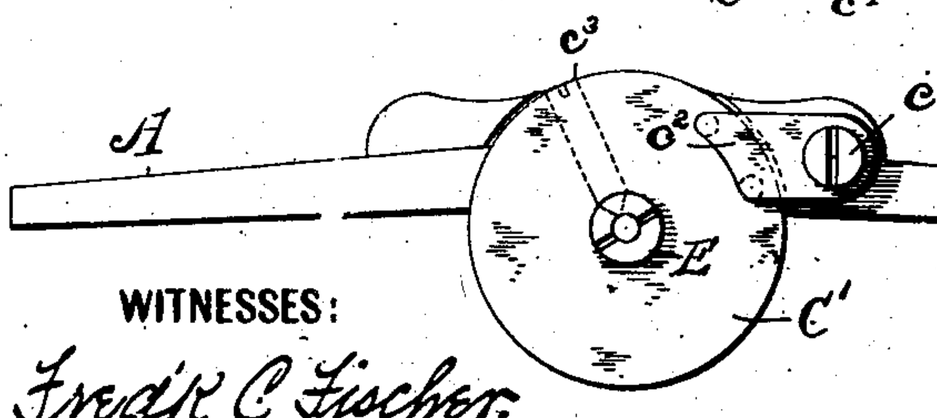


Fig. 7

WITNESSES:

Fredk C Fischer.

INVENTOR

William Pelzer

No. 754,690. Patented March 15, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM PELZER, OF NEW YORK, N. Y.

DOOR CHECK AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 754,690, dated March 15, 1904.

Application filed July 17, 1896. Serial No. 599,554. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM PELZER, a citizen of the United States, residing in the borough of Manhattan, in the city of New York, in the county and State of New York, have invented a certain new and useful Improvement in Door Closers and Checks, of which the following is a specification.

The main object of my invention is to provide a mechanical door-check, as distinguished from one in which the check is produced through the agency of a fluid, and one in which the retarding or checking device is preferably thrown out of retarding or checking action at a predetermined point to permit the door-closer to complete the closing of the door after the desired check is produced and without having to overcome any further resistance in the retarding or checking device.

A further object of my invention is to provide a combined door closing and checking device in which the retarding or checking device will preferably have the characteristics just stated; and a still further object of my invention is to combine such a device in a hinge, whereby a combined spring-hinge and door-check is produced.

In carrying my invention into effect I preferably employ a retarding or checking device which may be gradually loaded or brought to an increased tension to gradually retard or check the closing movement of the door, and to accomplish this I preferably employ a mechanical device, such as a spring. By gradually loading the retarding or checking device the parts are not subjected to severe strains, as is the case where the closing of the door is suddenly checked.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is an elevation showing my improved check in its simplest form; Fig. 2, a top view of the same; Fig. 3, an elevation showing my invention in its second form—that is, as a combined check and closer; Fig. 4, a top view of the same; Fig. 5, an elevation showing my invention in its third form—that is, as a combined spring hinge and check; Figs. 6 and 7, top and bottom views, respectively, of the form shown in Fig. 5. Fig. 8 is a longitudinal section of the hinge shown in Fig. 5, and Fig. 5 is a cross-section on the line 9 9 of Fig. 5.

Referring to Fig. 1, A and B are two leaves adapted to be secured to the door and casing, respectively. The leaf A has a knuckle or head *a*, through which passes the shank *c* of a disk C. To the end of the shank *c* is secured one end of a coiled spring D, the other end of which is secured to a reduced portion of the knuckle or head *b* on leaf B. Passing centrally through head *b* and the shank *c* is a rod E, having a grooved head *e* at its lower end which is seated in a recess in the head *b*, and this head is held against rotation by a set-screw *e'*. The upper end of the rod carries a cam F. A finger *h*, constructed integrally with a cam H, engages with the cam F, and the cam H is carried by a screw h^3, screwing into a shoulder *a'* on leaf A. A light spring h^2 is coiled around the head of screw h^3, and the free end passes through a pin on finger *h* and tends to hold cam H in contact with the disk C; but in the position shown, which is the closed position of the door, the cam F, engaging with finger *h*, holds cam H out of engagement with the disk. The head *e* is provided with a slot for a screw-driver, whereby the head and the rod may be turned to adjust the position of cam F relative to finger *h*, the relative positions of which determine the point at which the retarding or checking device is thrown out of checking action to permit the door-closer to complete the closure of the door. Washers *x* and *x'*, of vulcanized fiber or other suitable material, are provided between disk C and head *a* and between cam H and shoulder *a'* to reduce friction.

The device thus far described embodies my invention in its simplest form—that is, a mechanical door-check (independent of a closing device) and means for throwing the checking device out of action at a predetermined point. It will be understood that with this simple form of door-check the door-closing device will be an independent device, such as a spring or weight.

The operation of the device just described

is as follows: In opening the door to which the leaf A is secured the head *a* is rotated on shank *c*, which carries cam H with it, shank *c* and disk C being held against rotation by spring D. This movement causes finger *h* to move away from cam F and permits spring h^2 to throw cam H into engagement with disk C. At the beginning of the closing movement of the door the backward movement of leaf A produces a slight rolling action between cam H and disk C, which causes the cam to firmly grip the disk and rotate it on rod E, which movement places spring D under tension, and the degree of tension will depend upon the distance the door is opened. Spring D will be of such size or tension that when the door is within a few inches of the closing-point the tension will almost be equal to the pressure of the closing-spring or other device, and the momentum of the door having been gradually decreased almost to the stopping-point it will be seen that the door will close without the objectionable slam. At this point, in order to insure the closure of the door against draft, friction, &c., I preferably place spring D out of retarding or checking action, so as to permit the closing-spring or other device, which has now almost reached its point of minimum pressure, to effect the closure without having to overcome the full resistance of the checking device. This, as above stated, is done by finger *h* engaging cam F, which causes the finger to move outward from the center and slightly rotate cam H on its pivot. This releases the grip of cam H on disk C and permits spring D to assume its normal condition.

In Figs. 3 and 4 I have shown this form of checking device combined in the same structure with a door-closing spring. In this form the head *a* has a reduced portion to which the door-closing spring I is secured. The other end of this spring is secured to a tension-adjusting ring J, which is sleeved on the reduced portion of head *b*, to which the lower end of the retarding or checking spring D is secured. In this illustration I have shown a different form of gripping device for placing spring D under tension, although the form shown in Fig. 2 may be employed. Instead of disk C a ratchet-wheel C^2 is shown, and with which a pawl H′ engages to place the retarding or checking spring under increased tension. The pawl has a finger *h*′, which engages with a pin F′ on rod E to throw spring D out of retarding or checking action. A cam may be employed instead of the pin, as in Fig. 2. This modified form of gripping device is not so good as that of Fig. 2, for the reason that there is a varying amount of lost motion in operation due to the ratchet and pawl; but this lost motion can be reduced by providing a larger number of teeth on the disk. The form of gripping device shown in Fig. 2 is preferable in this respect, since it grips immediately as the door starts its closing movement, and the applicaton of the ratchet and pawl to the form of device shown in Fig. 3 is merely for the purpose of illustrating a modified gripping device and not as being of any special adaptability or superiority over the cam-gripping device in a combined closer and check.

The operation of the door-check shown in Fig. 3 is exactly the same as that of Fig. 1, and the opening of the door places spring I under increased tension, as in an ordinary door-spring or spring-hinge.

In Figs. 5 to 9 the constructions of Figs. 1 and 3 are embodied in a hinge. A and B are the two leaves, having knuckles *a a*′ and *b b*′, respectively, and washers x^2, of vulcanized fiber or other suitable material, are preferably placed between knuckles *a b* and *a*′ *b*′. The pintle is preferably made in two tubular sections K, one section for each pair of knuckles *a b* and *a*′ *b*′, and I provide set-screws *k* for securing the pintle-sections to the knuckles of the leaf which is secured to the door-casing. As shown, the pintle-sections are secured to knuckles *b b*′. The closing-spring I is secured to two adjusting-rings J, which have their bearings on the pintle-sections. The rings are held to the adjusted positions by pins J′, which bear against the hinge-leaves. The retarding or checking spring is secured to two shanks *c* and *c*′ on disks C and C′. To retard or check the closing movement, the disk C is gripped by the cam H during the closing movement, as above described, and the spring D is thrown out of retarding or checking action by cam F and finger *h*. To permit the placing of spring D under tension, the lower disk C′ is held against rotation by a locking-plate c^2, carried by a screw c^4, and having two pins which enter holes in the disk. To hold cam F in its adjusted position, a set-screw c^3 is provided, which binds the rod E to disk C′. The position of cam F is adjusted by disengaging set-screw c^3 from rod E and turning rod E in either direction by a screw-driver, the end of the rod being slotted for that purpose. (See Fig. 7.)

It is preferable to have the gripping-cam H carried by the movable or door leaf. As shown, the cam or dog H is carried by leaf A. When it is desired to employ the same hinge for a door where leaf A is stationary and the leaf B will be the movable or door leaf, the positions of the gripping-cam H and the locking-plate c^2 are changed, so that disk C is held stationary by means of plate c^2 and disk C′ becomes the movable disk to be gripped by the cam in placing spring D under tension. The set-screws *k* are removed from knuckles *b b*′ and inserted in holes in knuckles *a* and *a*′ to hold the pintle-sections stationary with the knuckles *a* and *a*′, and the set-screw c^3 is re-

moved and inserted in the hole in disk C to bind the rod E to that disk, and the cam F is removed to the lower end of rod E, which is slotted, as shown in Fig. 7, at both ends for adjustment. Thus the same hinge may be utilized as a right or left hand one by simply exchanging the positions of a few parts. The object in having the pintle-sections stationary is to reduce the friction on the shanks *c* and *c'* and to prevent the rotation of the shanks with the opening movement of the door, which might happen if the tubular pintle-sections K were loose or secured to the moving knuckles of the hinge. To place the closing-spring I out of action, either or both pins J' are removed, so that the spring cannot be placed under tension with the opening movement of the door. To place the checking-spring D entirely out of action, either cam H or plate c^2, or both, are removed.

The operation of the hinge will be readily understood from the foregoing description. Ordinarily in using the checking-hinge two such hinges will be employed in place of the common plain or spring hinges, although a plain hinge and one of my improved hinges may be employed together, if desired; or, if desired, one hinge may be a checking-hinge embodying the features of Fig. 1 and the other may be a spring-hinge. Also, if desired, two hinges, as shown in Fig. 5, may be employed together, one having the closing-spring out of operative connection and the other having the checking-spring out of operative connection, or only one might have its checking-spring in operative connection and both have their closing-springs in operative connection, or both might have their checking springs in operative connection and only one have its closing-spring in operative connection, according to the draft, weight of door, and other conditions that may be met with in practice.

From the foregoing it will be seen that the hinge of Fig. 5 may be operated either as a simple hinge, a spring-hinge, a combined hinge and check, or a combined spring-hinge and check. The device of Fig. 1 is intended to be employed in conjunction with either plain hinges (in which case an extra closing-spring will be employed) or with ordinary spring-hinges. The device of Fig. 3 may be employed in conjunction with either plain hinges or ordinary spring-hinges.

It will be understood that I do not limit my invention to the precise features of construction illustrated and described, since the same may be modified without departing from the spirit of my invention. For instance, the checking device need not be a gradual loading device where severe strains might not occur—as, for instance, in very light doors—and the check might be quite abrupt and be produced near the end of the closing movement—that is to say, the gripping device need not necessarily grip the disk C immediately upon the starting of the closing movement, but may be arranged to grip at any point in the closing movement, and under such conditions the normal tension of the checking-spring would be greater than when the gripping device engaged immediately.

What I claim is—

1. In a door-check, the combination with a mechanical device for retarding or checking the closing movement of a door, of means for throwing said device out of retarding or checking action at a predetermined point in the closing movement, substantially as set forth.

2. In a door-check, the combination with a mechanical device for gradually retarding or checking the closing movement of a door, of means for throwing said device out of retarding or checking action at a predetermined point in the closing movement, substantially as set forth.

3. In a door-check, the combination with a spring for retarding or checking the closing movement of a door, of a device coöperating with said spring during the closing movement to effect the retarding or checking action, and means for throwing said device out of operative engagement with said spring at a predetermined point, substantially as set forth.

4. In a combined door closer and check, the combination with means for closing the door, of a mechanical device for retarding or checking the closing movement, and means for throwing said device out of retarding or checking action at a predetermined point in the closing movement, substantially as set forth.

5. In a combined door closer and check, the combination with means for closing the door, of a mechanical device for gradually retarding or checking the closing movement, and means for throwing said device out of retarding or checking action at a predetermined point in the closing movement, substantially as set forth.

6. In a combined door closer and check, the combination of a closing-spring, a retarding or checking spring, a device coöperating with the latter spring during the closing movement to effect the retarding or checking action, and means for throwing said device and spring out of operative relation at a predetermined point, substantially as set forth.

7. In a combined hinge and door-check, the combination with the hinge-leaves and knuckles, of a mechanical device for gradually retarding or checking the closing movement, substantially as set forth.

8. In a combined hinge and door-check, the combination with the hinge-leaves and knuckles, of a mechanical device for retarding or checking the closing movement, and means

for throwing said device out of retarding or checking action at a predetermined point, substantially as set forth.

9. In a combined hinge and door-check, the combination with the hinge-leaves and knuckles, of a spring carried by the hinge, and means whereby said spring is placed under tension for retarding or checking the closing movement, substantially as set forth.

10. In a combined hinge and door-check, the combination with the hinge-leaves and knuckles, of a spring carried by the hinge, a device coöperating with said spring for retarding or checking the closing movement, and means for throwing said device and spring out of operative relation at a predetermined point, substantially as set forth.

11. In a combined spring-hinge and door-check, the combination with the hinge-leaves and knuckles, of a closing-spring carried by the hinge, and a mechanical device operatively connected with the hinge for gradually retarding or checking the closing movement, substantially as set forth.

12. In a combined spring-hinge and door-check, the combination with the hinge-leaves and knuckles, of a closing-spring carried by the hinge, a mechanical device operatively connected with the hinge for retarding or checking the closing movement, and means for throwing said device out of retarding or checking action at a predetermined point, substantially as set forth.

13. In a door-hinge, the combination with the leaves and knuckles, of two springs carried thereby, one being operatively connected with the hinge elements to effect the closing movement and the other being operatively connected with the hinge elements to retard or check the closing movement, substantially as set forth.

14. In a door-hinge, the combination with the leaves and knuckles, of two springs carried thereby, one being operatively connected with the hinge elements to effect the closing movement and the other being operatively connected with the hinge elements to retard or check the closing movement, and means for throwing the latter spring out of retarding or checking action at a predetermined point, substantially as set forth.

15. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, a retarding or checking spring also carried thereby, a device carried by the hinge and to which the latter spring is secured, and means coöperating with said device during the closing movement to effect the retarding or checking action, substantially as set forth.

16. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, a retarding or checking spring also carried thereby, a device carried by the hinge and to which the latter spring is secured, means coöperating with said device during the closing movement to effect the retarding or checking action, and means for throwing the retarding or checking mechanism out of operative relation at a predetermined point, substantially as set forth.

17. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, a retarding or checking spring also carried thereby, a disk carried by the hinge and to which the latter spring is secured, and a cam coöperating with said disk during the closing movement to effect the retarding or checking action, substantially as set forth.

18. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, a retarding or checking spring also carried thereby, a disk carried by the hinge and to which the latter spring is secured, a cam coöperating with said disk during the closing movement to effect the retarding or checking action, and means for throwing said cam out of operative engagement with the said disk at a predetermined point, substantially as set forth.

19. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, a retarding or checking spring also carried thereby, two devices carried by the hinge and to which the latter spring is secured, means for locking one of said devices to one side of the hinge, and means coöperating with the other one of said devices during the closing movement and whereby the retarding or checking action is effected, substantially as set forth.

20. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, a retarding or checking spring also carried thereby, two devices carried by the hinge and to which the latter spring is secured, means for locking one of said devices to one side of the hinge, means coöperating with the other one of said devices during the closing movement, whereby the retarding or checking action is effected, and means for throwing the retarding or checking mechanism out of operative relation at a predetermined point, substantially as set forth.

21. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, two disks carried by the hinge and to which the latter spring is secured, a device for locking one of said disks to one side of the hinge, and a cam coöperating with the other disk during the closing movement and whereby the retarding or checking action is effected, substantially as set forth.

22. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, two disks carried by the hinge and to which the latter spring is secured, a de-

vice for locking one of said disks to one side of the hinge, a cam coöperating with the other disk during the closing movement and whereby the retarding or checking action is effected, and means for throwing the retarding or checking mechanism out of operative relation at a predetermined point, substantially as set forth.

23. In a door-hinge, the combination with the leaves and knuckles, of tubular pintle-sections for the knuckles, collars sleeved on the inner ends of said pintle-sections, a closing-spring connected with said collars, two disks having shanks extending through the pintle-sections, a retarding or checking spring secured to said shanks, a device for locking one of said disks to one side of the hinge, and a cam coöperating with the other disk during the closing movement and whereby the retarding or checking action is effected, substantially as set forth.

24. In a door-hinge, the combination with the leaves and knuckles, of tubular pintle-sections for the knuckles, collars sleeved on the inner ends of said pintle-sections, a closing-spring connected with said collars, two disks having shanks extending through the pintle-sections, a retarding or checking spring secured to said shanks, a device for locking one of said disks to one side of the hinge, a cam coöperating with the other disk during the closing movement whereby the retarding or checking action is effected, and means for throwing the retarding or checking mechanism out of operative relation at a predetermined point, substantially as set forth.

25. In a door-hinge, the combination with the leaves and knuckles, of tubular pintle-sections for the knuckles, collars sleeved on the inner ends of said pintle-sections, a closing-spring connected with said collars, two disks having tubular shanks extending through the pintle-sections, a retarding or checking spring secured to said shanks, a device for locking one of said disks to one side of the hinge, a cam coöperating with the other disk during the closing movement whereby the retarding or checking action is effected, a cam adjacent to one of said disks and carried by a rod extending through the shanks and adjustably secured to the other disk, and a finger coöperating with the last-named cam to place the first-named cam out of operative engagement with its disk at a predetermined point, substantially as set forth.

26. In a door-hinge, the combination with the leaves and knuckles, of a mechanical device for retarding or checking the closing movement, and means for reversing the operative elements of said device relative to the two sides of the hinge, substantially as set forth.

27. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, a mechanical device for retarding or checking the closing movement, and means for reversing the operative elements of said device relative to the two sides of the hinge, substantially as set forth.

28. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring carried thereby, means for retarding or checking the closing movement, and means for operatively engaging the elements of the retarding or checking means with the hinge elements, said means being reversible to permit the use of the hinge with doors moving in opposite directions, substantially as set forth.

29. In a door-check, the combination with two members one arranged for attachment to a door and the other to its casing, of a mechanical device operatively connected with said members for retarding or checking the closing movement of the door, means for throwing said device out of retarding or checking action at a predetermined point, and means whereby the retarding or checking element may be maintained in inoperative position, substantially as set forth.

30. In a combined door closer and check, the combination with two members, one arranged for attachment to a door and the other to its casing, of a closing-spring operatively connected with said members, a mechanical device also operatively connected with said members for retarding or checking the closing movement of the door, means for throwing said device out of retarding or checking action at a predetermined point, and means whereby the retarding or checking element may be maintained in inoperative position, substantially as set forth.

31. In a door-hinge, the combination with the leaves and knuckles, of a mechanical device for retarding or checking the closing movement, and means whereby said device may be maintained in inoperative position throughout the closing movement, substantially as set forth.

32. In a door-hinge, the combination with the leaves and knuckles, of a mechanical device for retarding or checking the closing movement of the door, means for throwing said device out of retarding or checking action at a predetermined point, and means whereby the retarding or checking element may be maintained in inoperative position throughout the closing movement, substantially as set forth.

33. In a door-hinge, the combination with the leaves and knuckles, of a closing-spring, means for cutting said spring out of action, a mechanical device also combined with the hinge for retarding or checking the closing movement, and means whereby said device may be maintained in inoperative position throughout the closing movement, substantially as set forth.

34. In a door-hinge, the combination with

the leaves and knuckles, of a closing-spring, means for cutting said spring out of action, a mechanical device also operatively connected with the hinge for retarding or checking the closing movement, means for throwing said device out of retarding or checking action at a predetermined point, and means whereby the retarding or checking element may be maintained in inoperative position throughout the closing movement, substantially as set forth.

This specification signed and witnessed this 14th day of July, 1896.

WILLIAM PELZER.

Witnesses:
GEO. B. CRONK,
EUGENE CONRAN.