No. 635,411. Patented Oct. 24, 1899.

J. WOLF.

COMBINED DOOR SPRING AND CHECK.

(Application filed Apr. 13, 1899.)

(No Model.) 2 Sheets—Sheet 1.

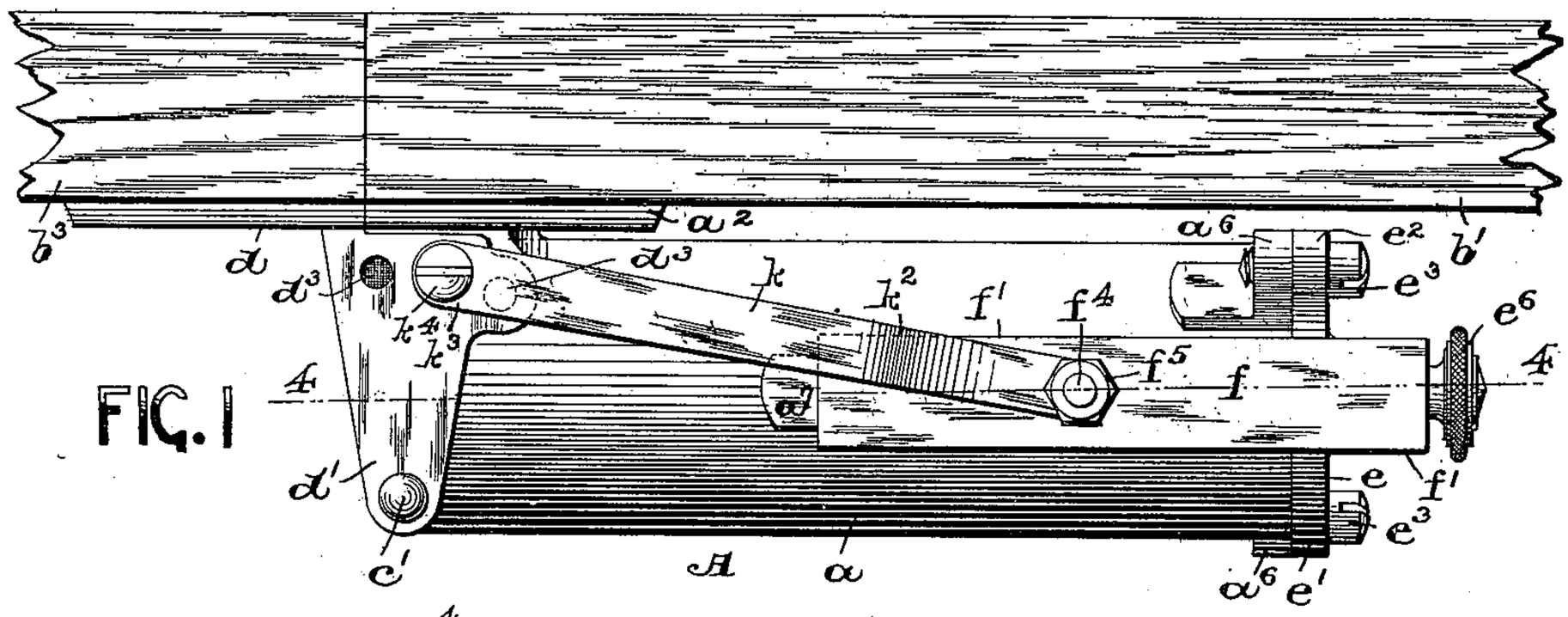

FIG. 1

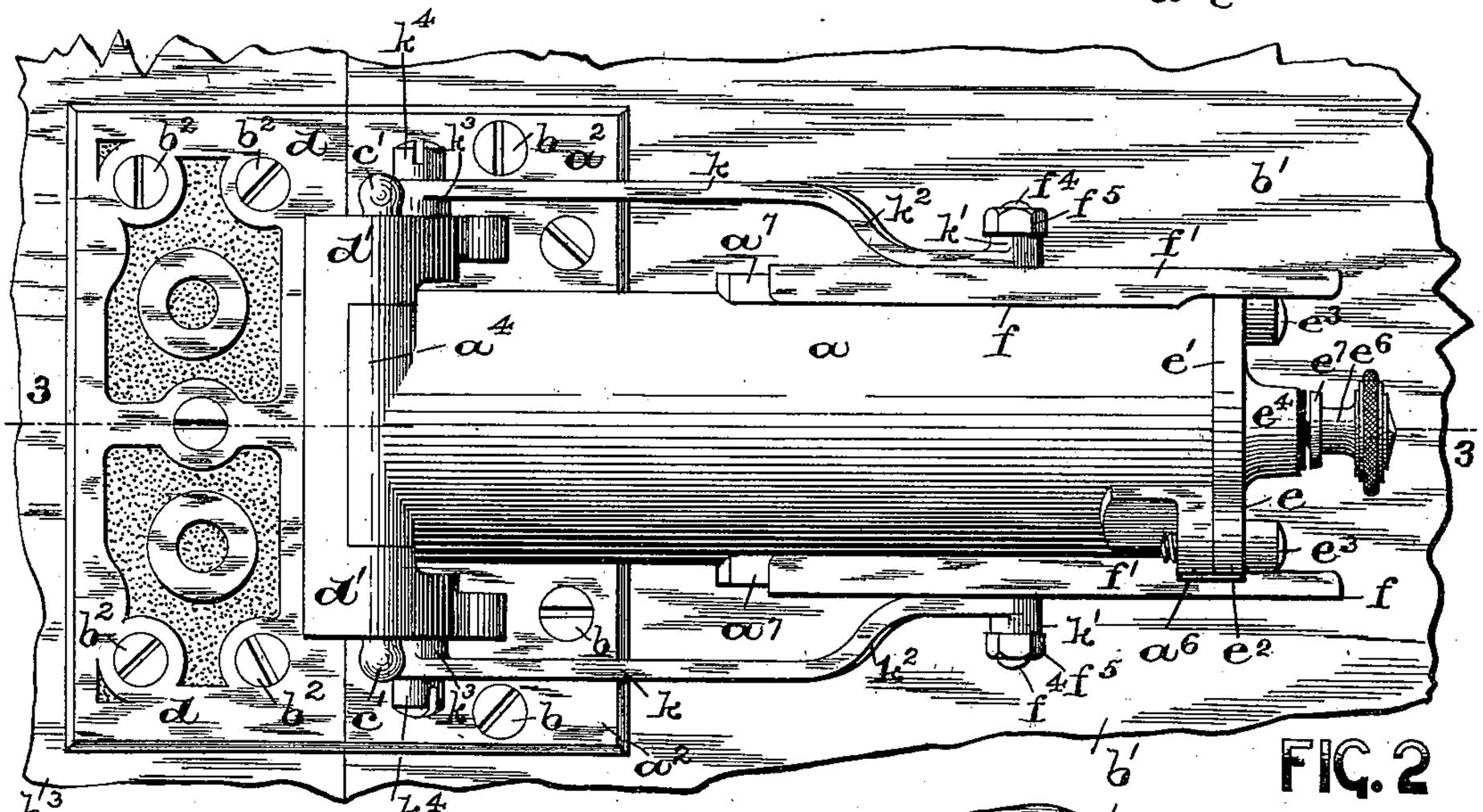

FIG. 2

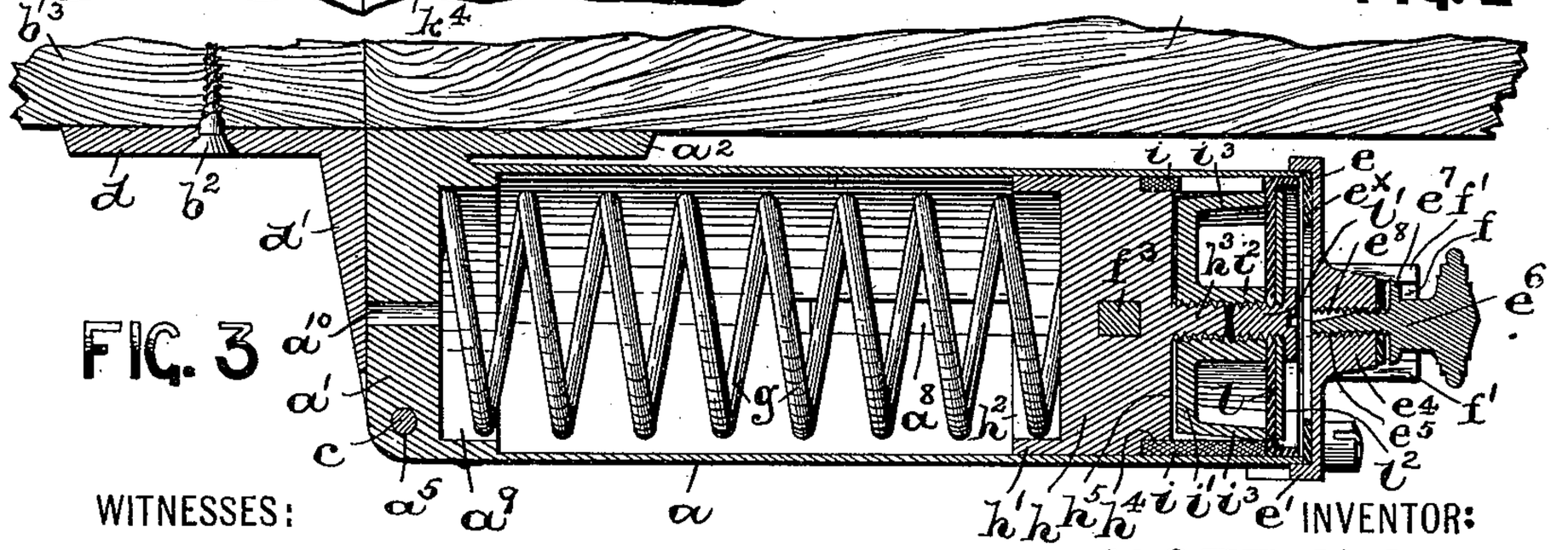

FIG. 3

WITNESSES:

Wm. H. Campbell, Jr.

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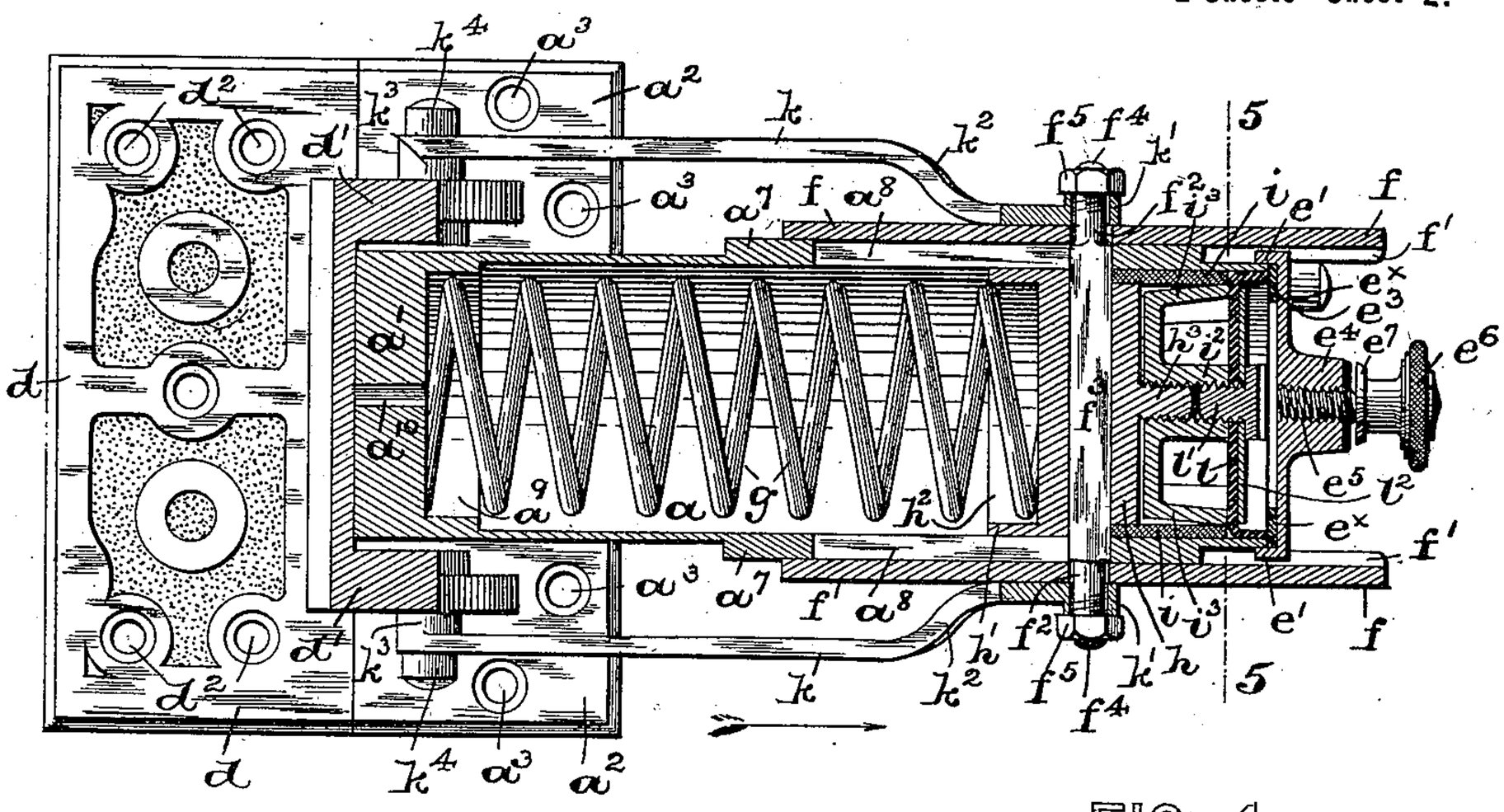

FIG. 4

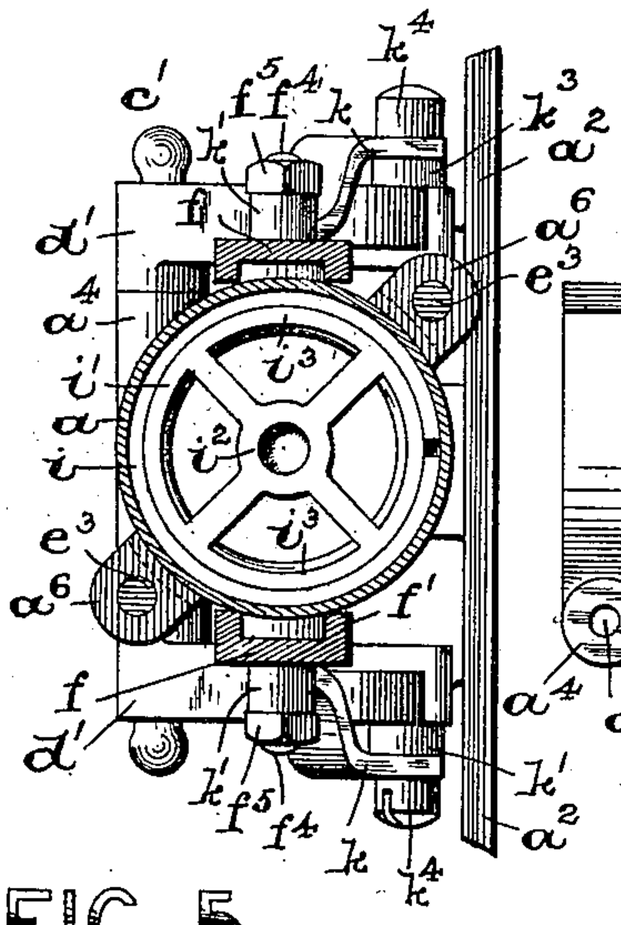

FIG. 5

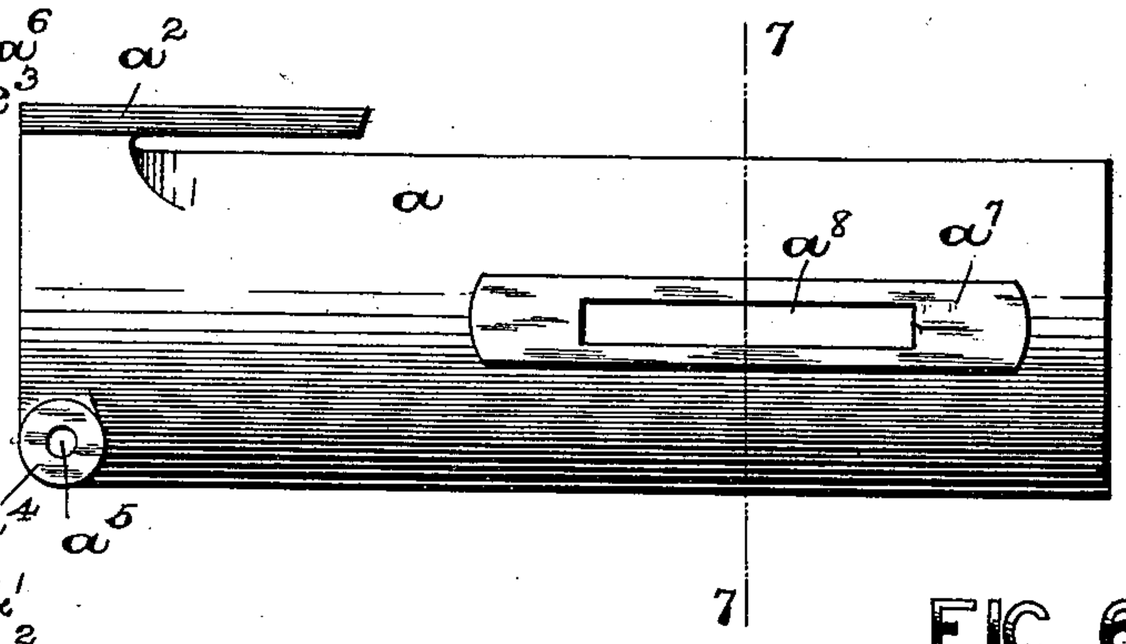

FIG. 6

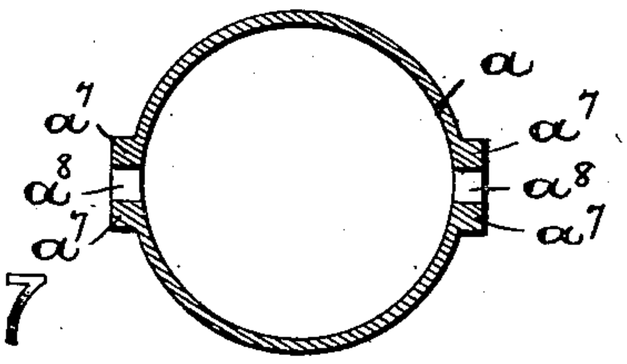

FIG. 7

WITNESSES:

Wm. H. Canfield, Jr.

Walter H. Talmage

INVENTOR:

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UNITED STATES PATENT OFFICE.

JOSEF WOLF, OF WATSESSING, NEW JERSEY.

COMBINED DOOR SPRING AND CHECK.

SPECIFICATION forming part of Letters Patent No. 635,411, dated October 24, 1899.

Application filed April 13, 1899. Serial No. 712,864. (No model.)

To all whom it may concern:

Be it known that I, JOSEF WOLF, a citizen of the United States, residing at Watsessing, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in a Combined Door Spring and Check; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My present invention relates to improvements in combined door-springs and door-checks; and the invention has for its principal object to provide a novel construction of combined door-spring and door-check in which the opened door is partially closed by the action of a spring and after the door is nearly closed the tension of the spring is at first opposed to the action of the air which is compressed in front of the piston to act as a check to the closing of the door and to prevent the slamming or noisy closing of the same, but permitting the final closing of the door by the gradual escape of the compressed air through a valve or other means of egress arranged in the end of the cylinder of the device.

Another object of this invention is to provide a combined door spring and check of such a construction that the action of its mechanism can be employed either to close the door or to retain the door in its opened position, according to the degree of the angle at which the door is opened relative to the position of the door-frame.

A further object of the invention is to provide a novel arrangement of guiding means connected with the piston of the device and one of the hinge-pieces by means of which the piston within the cylinder is actuated when the door is opened to compress the coils of a spring in said cylinder and also to provide an adjusting means for varying the tension of said spring to increase or decrease the closing power of the coils of the spring against the piston and whereby the closing motion of the opened door may be varied as may be deemed necessary.

Finally, the principal object of this invention is to provide a combined door spring and check of the character and for the purposes hereinabove specified which shall be of a simple and durable construction and shall be very effective when in use.

The invention therefore consists in the novel construction of a combined door-check and door-spring hereinafter set forth, and, furthermore, the invention consists in the novel arrangements and combinations of the several parts, as well as in the details of the construction thereof, all of which will be hereinafter fully set forth and finally embodied in the clauses of the claim.

The invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the combined door-spring and door-check embodying the principles of my present invention, and Fig. 2 is a front or face view of the same. Fig. 3 is a longitudinal vertical section of the combined door spring and check, taken on line 3 3 in Fig. 2. Fig. 4 is a horizontal section of the device, taken on line 4 4 in Fig. 1. Fig. 5 is a cross-section of the same, taken on line 5 5 in said Fig. 4. Fig. 6 is a top view of the cylinder of the device; and Fig. 7 is a cross-section of said cylinder, taken on line 7 7 in said Fig. 6.

Similar letters of reference are employed in all of the said above-described views to indicate corresponding parts.

In said drawings, A indicates the complete door-spring and door-check, comprising a cylinder a, which is closed at its rear end, as at a', and is provided with a plate-like hinge portion a^2, in which there are perforations a^3 for the reception of screws b, whereby the cylinder can be suitably secured in position upon the face of a door b', substantially as illustrated in the several figures of the drawings. Said cylinder a is also provided with a tubular part a^4, formed integral with said cylinder, and a^5 is a perforation therein, said perforation also extending through the end portion a' of the cylinder, as will be seen from an inspection of Fig. 3. In said perforation a^5 I have arranged a pin c, the opposite ends of which extend into and project through perforated ears or lugs d' of a hinge-plate d, which is provided with screw-holes d^2 for the reception of screws b^2, whereby said plate d

can be secured in proper position upon the door-frame b^3, substantially as illustrated. In this manner the said cylinder a and said plate d are pivotally connected with each other and can be secured in their operative positions upon the door and door-frame, as will be clearly evident. The opposite end of the cylinder a is closed by means of a cylinder-head e, which is preferably provided with an annular flange e', adapted to embrace the cylindrical edge of the cylinder a, as shown in Figs. 3 and 4, said head having two or more perforated lugs or ears e^2, in which I have arranged screws e^3, which are screwed into correspondingly-arranged screw-threaded ears or lugs a^6 on the cylinder a, substantially as illustrated in Figs. 1 and 2; but of course it will be obvious that the said head may be secured upon or in the end of the cylinder a in any other desirable manner.

Between the cylindrical edge of the cylinder a and the inner surface of the head e may be arranged a suitable packing-ring or gasket $e^\times$, of rubber, leather, or any other suitable material, and said head e may also be provided with a hub e^4, having a screw-threaded perforation e^5, into which is secured a screw e^6, having a shoulder e^7 and its screw portion provided with a slot e^8 to regulate the egress of the compressed air in front of the piston in said cylinder a, as hereinafter more fully set forth.

The ends of the pin c, which project from the sides of the perforated lugs d' of the hinge-plate d, may be screw-threaded for the reception of ornamental or other suitable heads or nuts c', as indicated.

On the opposite and outer surfaces forming the top and bottom of the cylinder a the latter is formed with suitably-constructed guides a^7, a longitudinally-arranged slot a^8 being formed in each guide, which extends entirely through the side walls of the cylinder a, so as to establish a communication between the outside and the inner cylindrical portion of the cylinder a, as more clearly indicated in Figs. 4, 6, and 7. Slidably arranged upon each of said guides a^7, so as to move back and forth thereon, is a slide f, provided with flanges f' to properly embrace the sides of the guides a^7, and said slides being of sufficient length that said slides f will at all times cover the slots a^8, and thereby prevent dirt and dust from getting into the cylinder a. Each slide f has a hole or perforation f^2, in each of which is arranged one of the cylindrical and screw-threaded ends f^4 of a pin or bar f^3, said bar having its main body portion preferably made square and slidably arranged in the slots a^8 in the opposite sides of the cylinder a. Upon this main body portion of the pin or bar f^3 I have arranged a solid piston or plunger h, and on the free ends f^4 of the bar f^3 are the eye portions k' of certain connecting rods or links k, the same being operatively secured in position on the ends f^4 of the said pin or bar f^3 by means of nuts f^5, substantially as illustrated. The said rods or links k are preferably curved, as at k^2, and are provided at their opposite ends with eye portions k^3 and screw-pins k^4, whereby said rods or links may be adjustably connected with the respective lugs d' of the hinge-plate d by screwing said pins k^4 into any one of a series of screw-holes d^3 in said lugs d', said holes d^3 having their centers in the arc of a circle, the center of which is in line with the longitudinal central axis of the pin c. As clearly illustrated in Figs. 3 and 4, the said piston h is preferably provided with an annular projection h', whereby a recess h^2 is formed in said piston h, and the said cylinder a is likewise and preferably provided with a recessed part, as a^9, and into these recesses h^2 and a^9 I have fitted the ends of a coiled spring g, the normal tendency of which is to drive the piston h forward within the cylinder a in the direction of the arrow in Fig. 4. By the arrangement of said recesses h^2 and a^9 I can use a spring of smaller diameter than the inner diameter of the cylinder a, thereby avoiding any friction between the coils of the spring and the inner surface of the cylinder, whereby a free movement of the movable parts of the device will be the result, and any scraping noise which might be caused by contact between the spring and the inner surface of the cylinder will be fully obviated.

The piston h is preferably provided with a centrally-arranged and screw-threaded stud h^3 and an annular offset h^4 for the reception of a split ring i, which may be of brass or Babbitt metal or any other suitable metal. Frictional and close contact is caused between the outer cylindrical surface of said ring i and the inner surface of the cylinder a by means of a locking device or nut i', which has a screw-threaded hub i^2 for screwing it upon said stud h^3 above mentioned. The said device or nut i' is also provided with an annular edge i^3, which is made conical, as shown, to cause the split ring i to be tightly, but still operatively, forced against the inner surface of the cylinder a when said device or nut i' is screwed down tight against the surface h^5 of the piston h, as will be clearly understood from an inspection of said Figs. 3 and 4.

As an extra precaution to prevent dirt and grit from getting upon the ring i and the piston h there may be secured against the free edges of said ring i and the device or nut i' a cup-shaped or other washer l, of leather or any other suitable material, which is secured in position by means of a screw l' and a metal disk l^2, substantially as illustrated.

The solid end or wall a' of the cylinder a is provided with a duct or hole a^{10} to permit the escape of the air from said cylinder when the piston h is forced back against the coils of the spring by the opening of the door to permit the door to be more easily opened.

The operation of the device is as follows:

After the several parts of the combined door-spring and door-check have been properly assembled and adjusted they can be secured in their operative positions upon the door and door-frame in the manner illustrated in Figs. 1, 2, and 3. As soon as the door is opened the cylinder *a* will be caused to swing on its pivotal pin *c* between the fixed ears or lugs *d'* of the hinge-plate *d*, and, the cylinder *a* swinging on a different center from the center of the support of the rods or links *k*, the result will be that the piston *h* in said cylinder *a* will slide back toward the solid wall *a'* of said cylinder and will compress the coils of the spring *g*. As soon as the person has entered and the door is released the tension of the compressed coils of the spring *g* will cause the door to close very rapidly, returning the piston *h* to the forward end portion of the cylinder *a*, whereby the air in front of the piston is greatly compressed and the closing movement of the several parts of the device and that of the door are suddenly checked, and while the air slowly escapes through the screw-threaded hub e^4 in the cylinder-head *e* the door closes slowly and without slamming or noise. When the door, to which the cylinder *a* is secured, is opened far enough to cause the links or rods *k* to pass over the line of the central longitudinal axis of the pivotal pin *c*, then the tendency of the spring-actuated piston *h* will be to retain the door in its opened position. It will thus be evident that the device may be employed as a door-closer and also as a means for retaining the door in its opened position.

By connecting the ends k^3 of the links *k* with the various holes d^3 in the lugs or ears *d'* of the hinge-plate *d* the throw of the piston may be varied, whereby the door can be made to close automatically at different points of its open relation to the door-frame, and also the tension of the coils of the spring *g* may be thereby varied to suit the device to doors of different sizes and different weights.

Of course it will be evident that changes may be made in the several arrangements and combinations of the parts, as well as in the details of the construction thereof, without departing from the scope of my present invention. Hence I do not limit my invention to the exact arrangements and combinations of the parts as herein described and as illustrated in the accompanying drawings, nor do I confine myself to the precise details of the construction of the parts comprising the combined door-check and door-spring.

Having thus described my invention, what I claim is--

1. In a combined door spring and check, the combination, with a cylinder, a spring-actuated piston therein, having a laterally-extending opening, a bar or pin in said opening of said piston, having its free ends projecting from the sides of said piston, and means on said cylinder for securing it to a door, of a hinge-plate adapted to be secured to a door-frame, ears or lugs on said plate, means for pivotally connecting said cylinder with said ears or lugs, and an operative connecting means between the projecting ends of said bar which is connected with said piston and said lugs or ears of said hinge-plate, substantially as and for the purposes set forth.

2. In a combined door spring and check, the combination, with a cylinder, a spring-actuated piston therein, and means on said cylinder for securing it to a door, of a hinge-plate adapted to be secured to a door-frame, ears or lugs on said plate, means for pivotally connecting said cylinder with said ears or lugs, and an operative connecting means between said piston and said lugs or ears of said hinge-plate, consisting, essentially, of a pair of rods or links pivotally connected at their opposite ends with said piston and said lugs or ears, substantially as and for the purposes set forth.

3. In a combined door spring and check, the combination, with a cylinder, a spring-actuated piston therein, and means on said cylinder for securing it to a door, of a hinge-plate adapted to be secured to a door-frame, ears or lugs on said plate, means for pivotally connecting said cylinder with said ears or lugs of said hinge-plate, and an operative connecting means between said piston and said lugs or ears of said hinge-plate, consisting, essentially, of a pair of rods or links pivotally connected at one end with said piston in the cylinder, and pivotally and adjustably connected at their opposite ends with said lugs or ears, substantially as and for the purposes set forth.

4. In a combined door spring and check, the combination, with a cylinder, a spring-actuated piston therein, and means on said cylinder for securing it to a door, of a hinge-plate adapted to be secured to a door-frame, perforated ears or lugs on said plate, means for pivotally connecting said cylinder with said ears or lugs, and an operative connecting means adjustably arranged between and connected with said piston and said lugs or ears of said hinge-plate, substantially as and for the purposes set forth.

5. In a combined door spring and check, the combination, with a cylinder, having longitudinally-arranged slots or openings in its sides, of a pin or bar slidably arranged in said slots or openings, a spring-actuated piston having a laterally-extending opening in which said pin or bar is arranged, a hinge-plate adapted to be secured to the door-frame, a pivotal connection between said cylinder and hinge-plate, and an operative connecting means between said pin or bar and said hinge-plate, for actuating said pin or bar, substantially as and for the purposes set forth.

6. In a combined door spring and check, the combination, with a cylinder, having longitudinally-arranged slots or openings in its sides, of a pin or bar slidably arranged in said slots or openings, a spring-actuated piston on said

pin or bar, a hinge-plate adapted to be secured to the door-frame, a pivotal connection between said cylinder and hinge-plate, and an operative connecting means adjustably arranged between and connected with said pin or bar and said hinge-plate for actuating said pin or bar, substantially as and for the purposes set forth.

7. In a combined door spring and check, the combination, with a cylinder, having longitudinally-arranged slots or openings in its sides, of a pin or bar slidably arranged in said slots or openings, a spring-actuated piston on said pin or bar, a hinge-plate adapted to be secured to the door-frame, a pivotal connection between said cylinder and hinge-plate, and an operative connecting means between said pin or bar and said hinge-plate, for actuating said pin or bar, consisting, essentially, of a pair of rods or links pivotally connected at their opposite ends with said pin or bar and said hinge-plate, substantially as and for the purposes set forth.

8. In a combined door spring and check, the combination, with a cylinder, having longitudinally-arranged slots or openings in its sides, of a pin or bar slidably arranged in said slots or openings, a spring-actuated piston on said pin or bar, a hinge-plate adapted to be secured to the door-frame, a pivotal connection between said cylinder and hinge-plate, and an operative connecting means between said pin or bar and said hinge-plate, for actuating said pin or bar, consisting, essentially, of a pair of rods or links pivotally connected at one end with said pin or bar, and pivotally and adjustably connected at their opposite ends with said hinge-plate, substantially as and for the purposes set forth.

9. In a combined door spring and check, the combination, with a cylinder, having longitudinally-arranged slots or openings, and guides on the outer sides of said cylinder, said guides surrounding said slots or openings, of slides movably arranged on said guides, so as to cover said slots or openings, a pin or bar slidably arranged in said slots or openings, having its ends extending into and projecting from perforations in said slides, a spring-actuated piston on said pin or bar, a pivotal connection between said cylinder and hinge-plate, and an operative connecting means between the free ends of said pin or bar and said hinge-plate, for actuating the pin or bar, substantially as and for the purposes set forth.

10. In a combined door spring and check, the combination, with a cylinder, having longitudinally-arranged slots or openings, and guides on the outer sides of said cylinder, said guides surrounding said slots or openings, of slides movably arranged on said guides, so as to cover said slots or openings, a pin or bar slidably arranged in said slots or openings, having its ends extending into and projecting from perforations in said slides, a spring-actuated piston on said pin or bar, a pivotal connection between said cylinder and hinge-plate, and an operative connecting means between the free ends of said pin or bar and said hinge-plate, for actuating the pin or bar, consisting, essentially, of a pair of rods or links pivotally connected at their opposite ends with the said free ends of said pin or bar and said hinge-plate, substantially as and for the purposes set forth.

11. In a combined door spring and check, the combination, with a cylinder, having longitudinally-arranged slots or openings, and guides on the outer sides of said cylinder, said guides surrounding said slots or openings, of slides movably arranged on said guides, so as to cover said slots or openings, a pin or bar slidably arranged in said slots or openings, having its ends extending into and projecting from perforations in said slides, a spring-actuated piston on said pin or bar, a pivotal connection between said cylinder and hinge-plate, and an operative connecting means between the free ends of said pin or bar and said hinge-plate, for actuating the pin or bar, consisting, essentially, of a pair of rods or links pivotally connected at one end with the free ends of said pin or bar, and pivotally and adjustably connected at their opposite ends with the hinge-plate, substantially as and for the purposes set forth.

12. A combined door spring and check, comprising a cylinder, a piston in said cylinder, means for actuating said piston, a split piston-ring connected with said piston, a screw-stud on said piston, a spreading device i' on said stud, having an annular and tapering rim, a cup-shaped packing connected with said spreading device, and means for attaching it thereto, substantially as and for the purposes set forth.

13. A combined door spring and check, comprising a cylinder, having longitudinally-arranged slots or openings in its sides, and a hinge-plate, lugs or ears d' on said plate with which said cylinder is pivotally connected, and said lugs or ears having a series of screw-threaded perforations on an arc of a circle concentric with the central axis of the pivotal connection between said cylinder and the ears or lugs d', a spring-actuated piston in said cylinder, links or rods pivotally connected at one end with said piston, and screws in the opposite ends of said links or rods for adjustably securing said screws in said perforations in the ears or lugs d', substantially as and for the purposes set forth.

14. A combined door spring and check, comprising a cylinder, having longitudinally-arranged slots or openings in its sides, and a hinge-plate, lugs or ears d' on said plate with which said cylinder is pivotally connected, and said lugs or ears having a series of screw-threaded perforations on an arc of a circle concentric with the central axis of the pivotal connection between said cylinder and the ears or lugs d', a spring-actuated piston in said cylinder, a bar or pin connected with said piston said bar or pin having its ends

slidably arranged in said slots or openings in the cylinder, links or rods pivotally connected at one end with the free ends of said bar or pin, and screws in the opposite ends of said links or rods for adjustably securing said screws in the perforations in said ears or lugs *d'*, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 10th day of April, 1899.

JOSEF WOLF.

Witnesses:
FREDK. C. FRAENTZEL,
WALTER H. TALMAGE.