

No. 608,334.

Patented Aug. 2, 1898.

F. & H. F. KEIL.
COMBINED HINGE AND DOOR CHECK.

(Application filed Sept. 24, 1895.)

(No Model.)

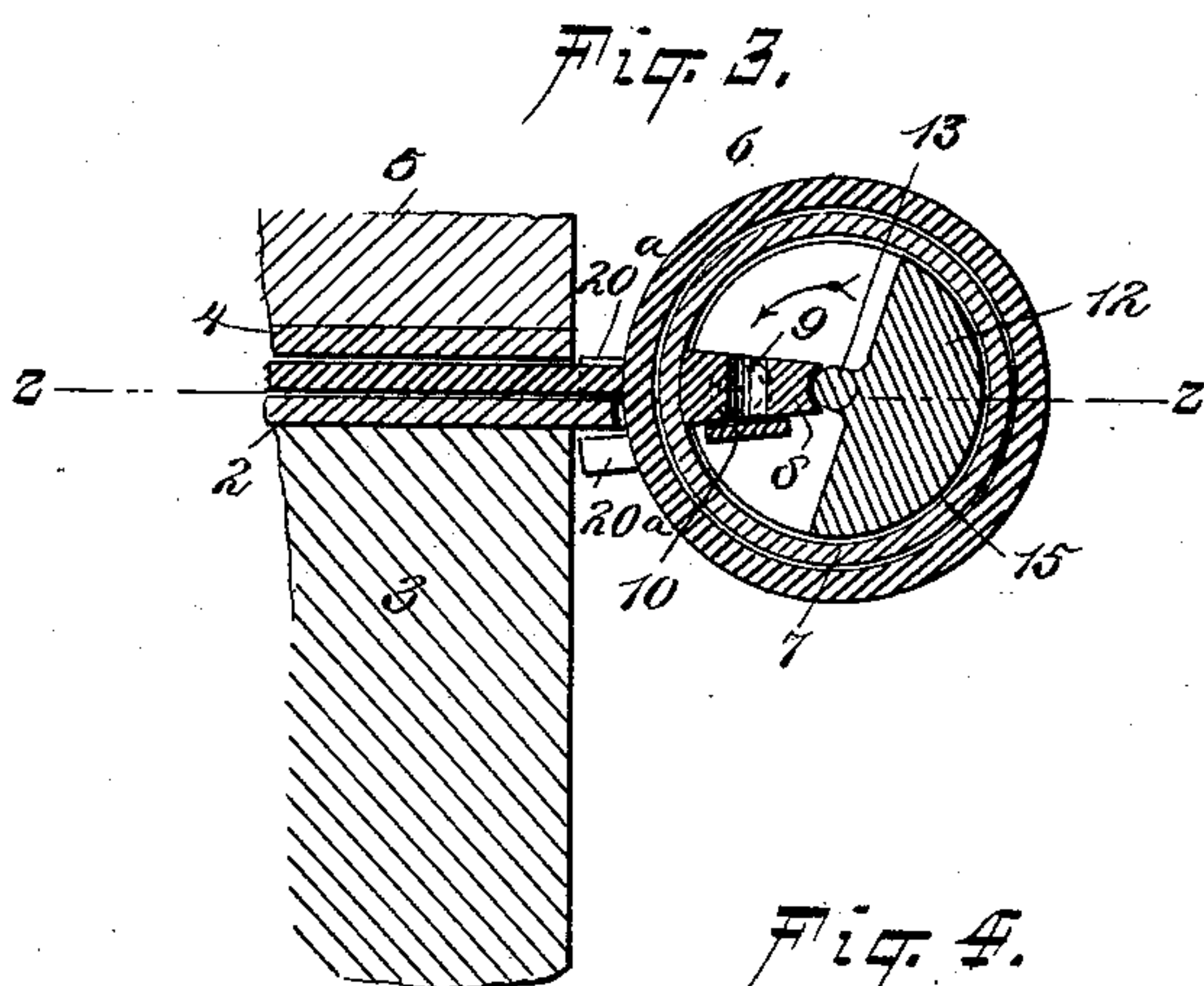
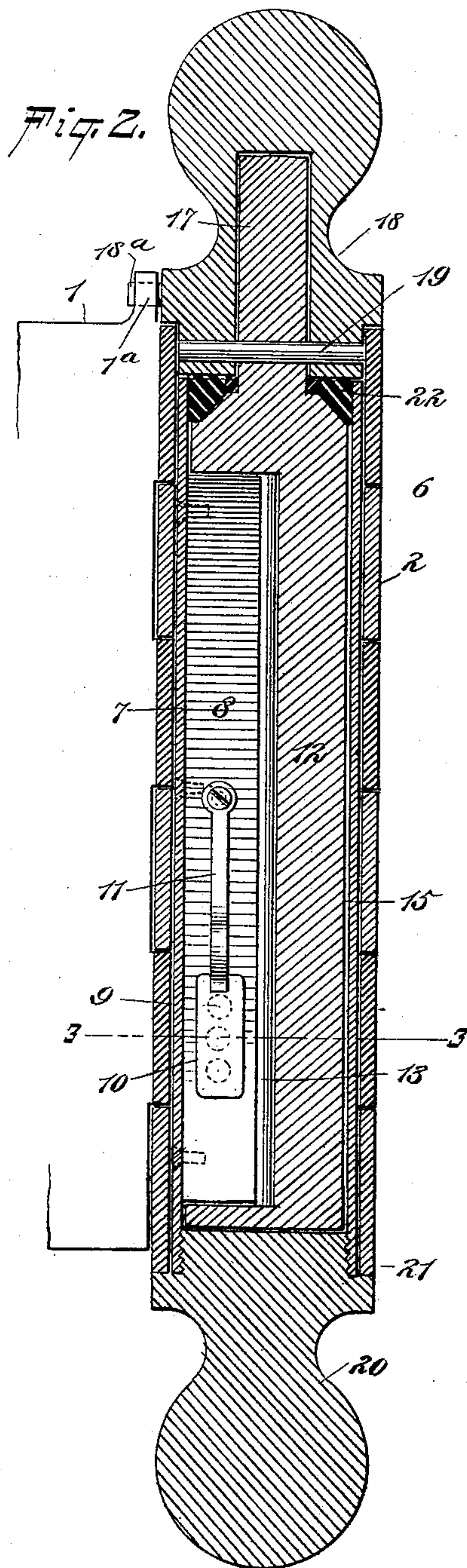
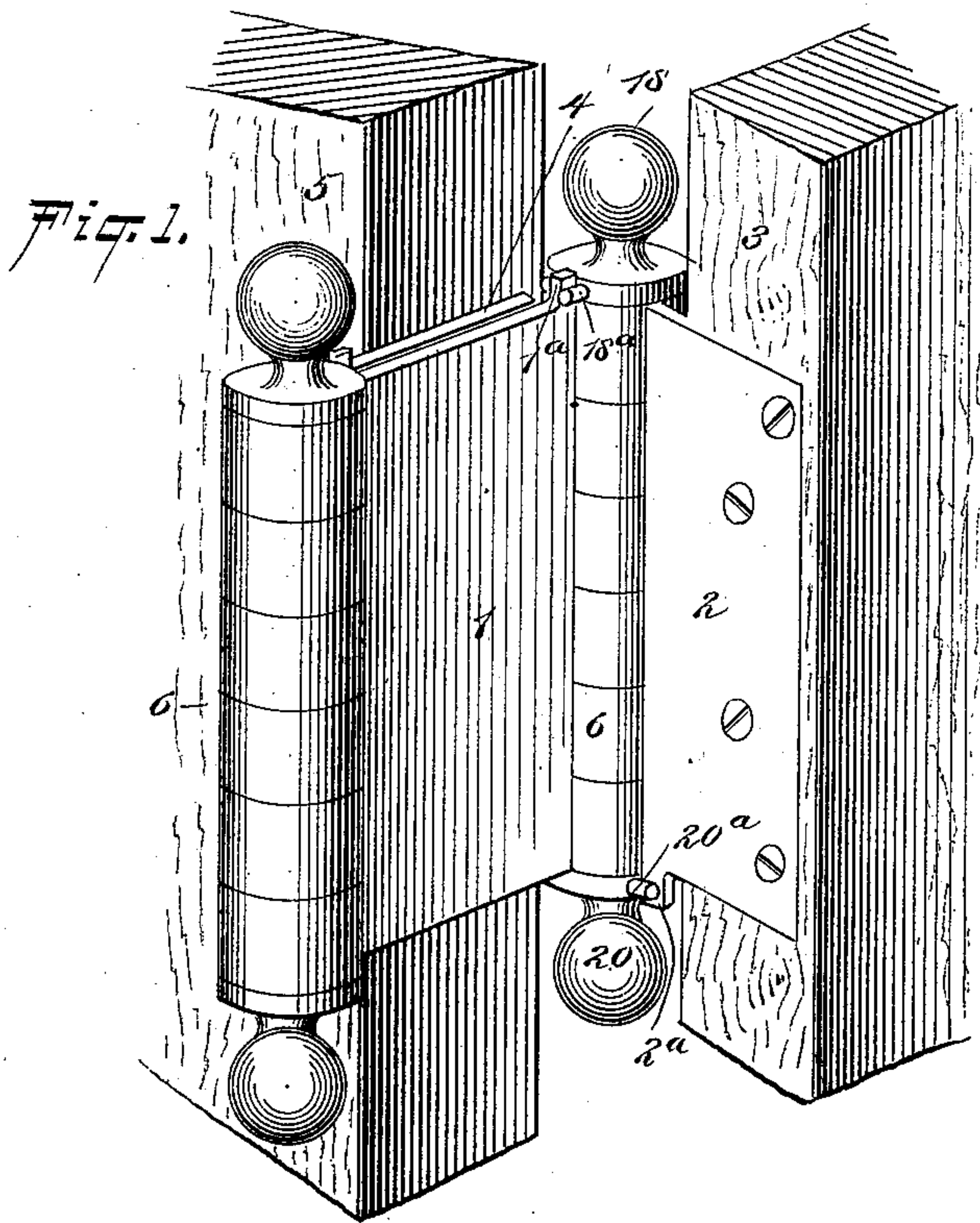
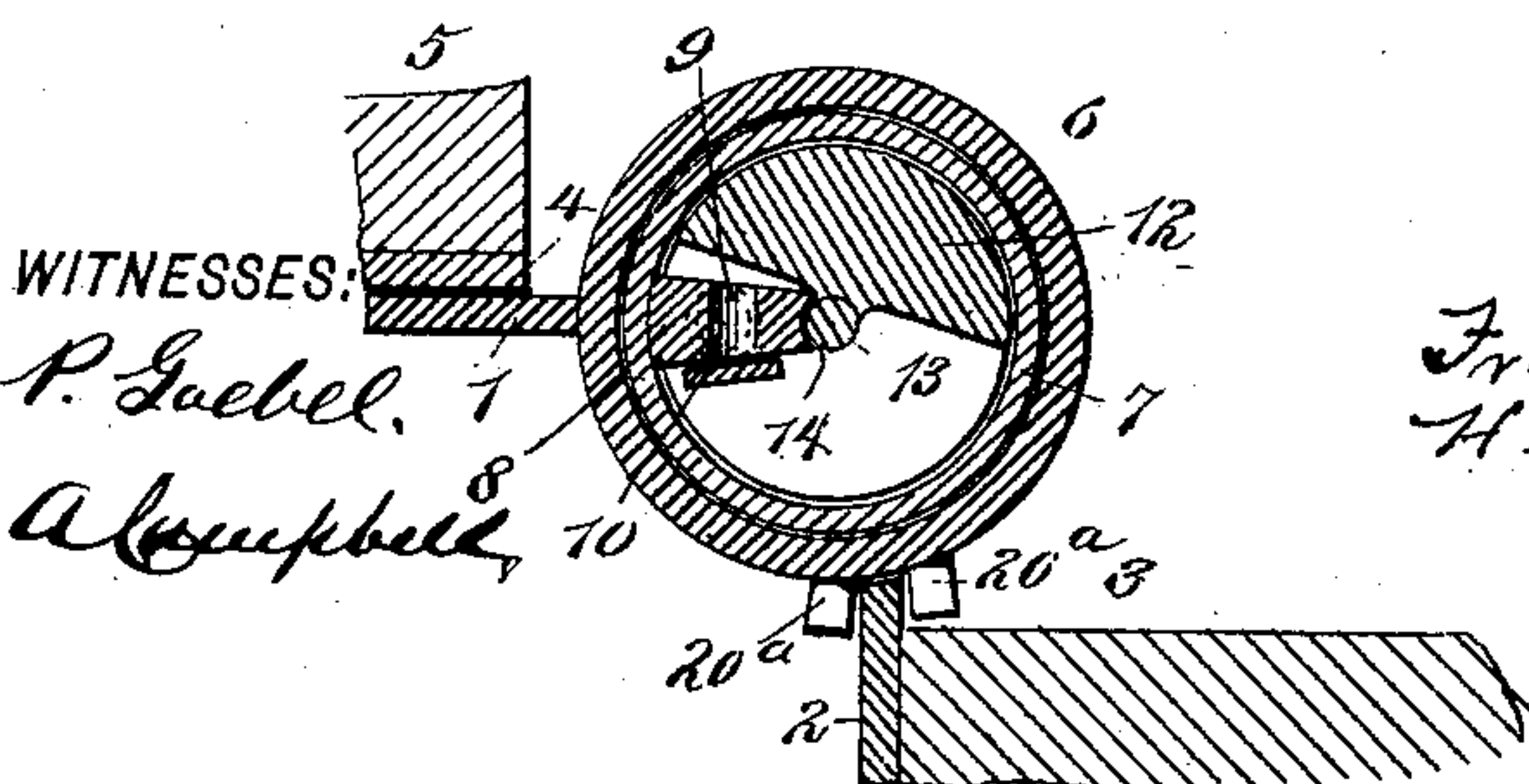


Fig. 4.



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COMBINED HINGE AND DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 608,334, dated August 2, 1898.

Application filed September 24, 1895. Serial No. 563,488. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS KEIL and HENRY FRANCIS KEIL, citizens of the United States of America, and residents of New York city, county and State of New York, have invented a new and useful Improvement in a Combined Hinge and Door-Check, of which the following is a specification.

Our invention relates to combined hinge and door-checks, and has for its object the production of a novel and improved mechanism to check the door when swinging to its normal position after having been opened; and the invention consists in a hinge having within its knuckles a fluid-containing barrel in which the fluid is passed into a chamber by the act of opening the door and is returned through restricted passages when the door is closed, as by the pressure of any suitable spring closing mechanism.

In the accompanying drawings, Figure 1 is a perspective view of a form of a double-swing hinge containing our improvements. Fig. 2 is an enlarged vertical section through one of the knuckles. Fig. 3 is a section taken on the line 3 3 of Fig. 2. Fig. 4 is a sectional view similar to Fig. 3, but showing the parts in a different position.

Similar reference characters are used throughout the several views to denote the same or like parts.

Referring to the figures of the drawings, which show one form of our invention, the intermediate leaf 1 of a double-swing hinge is connected to the leaves 2 and 4 by the usual form of knuckle 6, said leaves 2 and 4 being adapted for attachment to a door and casing 3 and 5 in the ordinary way. In this form of hinge the checking mechanism, which will now be described, may be located in both knuckles, if desired, or but one if it is desired to check the movement of the door only when closing one way. A simple form of hinge having two leaves, as 1 and 2, may of course be provided with our improvements.

The alternating knuckles of the two connected leaves are held together by a tubular pintle 7, which also constitutes the cylinder containing the fixed radial partition or head 8, which is provided with openings 9, said

openings being covered on one side by a valve 10, secured to the partition or head by a spring-shank 11.

An oscillating piston 12 is arranged within the cylinder and extends lengthwise of it and is provided with an axial rod 13, fitting closely in the concave edge 14 of the partition 8. This piston, at its middle portion, may be semicylindrical, as indicated in Figs. 3 and 4, or may be segment-shaped in cross-section. The partition or head 8 is secured to the inner periphery of the cylinder by suitable means, such as screws, as shown in dotted lines in Fig. 2, while the upper and lower ends of the piston are cylindrical and extend over the ends of the partition or head 8.

An upwardly-extending shank or pin 17 of the piston has a tip 18 secured to it by a cross-pin 19, and two lateral lugs or pins 18^a project from the tip 18 on each side of a lug 1^a, formed on the leaf 1.

The lower tip 20 is secured to the lower end of the cylinder at 21 and has two lateral pins 20^a, which engage opposite sides of a lug 2^a formed on the leaf 2.

Suitable packing 22 is interposed between the upper conical end of the piston and the inside of the cylinder to prevent the leakage of fluid at that end.

While we have here described the partition as "fixed" and the piston as "oscillating," it is to be understood that the terms are used relatively—that is to say, the partition is fixed to the cylinder, and if the parts are so assembled and applied to use that the cylinder always remains stationary then the terms used are strictly correct and descriptive; but if the hinge is so applied that the opening of the door moves the cylinder then the piston of course remains stationary.

The operation of the mechanism will now be described. Supposing that the connection is such that the cylinder remains stationary—that is, supposing that the leaf 1 is attached to a door and the leaf 2 to the door frame or casing—the opening of the door causes the piston to move and press the fluid contained in the cylinder freely through the openings 9, the valve 10 moving to permit it. When the door is closed, as by any preferred spring or

weight mechanism, the piston moves in the opposite direction and the valve 10 prevents the return of fluid through the openings 9. The passage of the fluid is then restricted to the space 15, formed between the piston 12 and the cylinder 7. By this construction a uniform check is provided extending the entire length of the piston, inasmuch as whenever the door is closed or the hinge moved the fluid must pass through the space at the same uniform speed.

We are aware that combined hinges and door-checks have been constructed in which fluid is adapted to be passed through large openings while the door is being opened, and on closing the door the fluid is passed through restricted openings; but in all such constructions the openings are placed in one position, thereby causing the liquid to be forced at unequal pressure against the walls of the hinge, and necessarily, by reason of such unequal pressure, cause a variation of the shape of the hinge and cause it to bind. By providing the space 15, extending the entire length of the piston, and therefore including all points where the weight of the door would be most naturally exerted, any tendency of the hinge to bind would be eliminated, since the pressure exerted on the fluid by the piston would be equalized the entire length of the piston, and therefore at all points where the strain caused by the weight of the door would be expected to be the least able to admit of such strain the equalized pressure would prevent such variation, and therefore prevent any binding. By the employment of an imperforate cylinder within the knuckle and extending the entire length of the bearing-points of the hinge, together with the piston extending the entire length of the cylinder, with the equalized pressure of the checking mechanism, we form a hinge that will be durable, simple, and which is of greater capability than the door-checking hinges heretofore known.

Although we have herein shown and described a pressure-equalizing check mechanism for a combined hinge and door-check, it is obvious that changes can be made, by addition or otherwise, by means of which the speed of closing can be regulated, one form of such means being shown, described, and claimed in a divisional application of this present application filed March 2, 1897, Serial No. 625,705.

Having thus described our invention, what we claim as new is—

1. The combination with a hinge of a fluid cylinder or barrel within the knuckle thereof and pressure-equalizing check mechanism contained in said cylinder or barrel substantially as set forth.

2. In a combined hinge and door-check, the combination of a tubular pintle adapted to contain a fluid with pressure-equalizing check

mechanism contained in said pintle as described.

3. In a hinge, the combination of a cylinder or chamber located within the knuckle thereof, a valved partition therein, a piston loosely fitted in said cylinder or chamber, whereby a restricted passage is formed between the cylinder and piston substantially as and for the purpose set forth.

4. The combination with the hinge-leaves of a tubular pintle adapted to contain a fluid, a partition provided with a valve in said pintle, of a piston fitted loosely within the pintle whereby a restricted passage for the fluid is formed between the piston and pintle and suitable connections between the piston and one leaf of the hinge and the pintle and the other half substantially as set forth.

5. The combination of a hinge having a tubular pintle and a valved partition in said pintle with an oscillating piston extending through the entire length of said pintle and fitted loosely therein whereby a space is formed between the inner wall of the pintle and the piston, the ends of said piston extending over said partition, as set forth.

6. The combination with a hinge provided with a fluid cylinder or barrel in the knuckle thereof and a valved partition in said cylinder and fixed thereto, a piston fitting loosely within said cylinder and movable from one side to the other of said partition, tips or heads connected respectively to the cylinder and piston and connections between said tips and the leaves of the hinge as set forth.

7. The combination with the knuckle of a hinge, of a tubular pintle extending through the knuckles and having closed ends to form a fluid-tight cylinder and having the valved partition, the axially-supported loose-fitting piston extending the entire length of the pintle, and connections between the pintle and one leaf of the hinge and the piston and the other hinge-leaf as set forth.

8. The combination with the hinge-knuckle of a tubular pintle extending through the knuckle having the partition 8 provided with valved passages; the tip 20 secured to one end of said pintle and connected to one leaf of the hinge, and the loosely-fitted piston having the tip 18 secured to one end thereof, and connections between said tip 18 and the other hinge-leaf as specified.

9. The combination of hinge-leaves connected by a tubular pintle, a partition extending inwardly from the inner wall of said pintle, and provided with valved passages, an oscillating piston fitting loosely within the pintle and seated in the inner edge of the partition, said piston having its ends projecting over the ends of the partition, as set forth.

10. The combination with the leaves of a hinge, of a fluid-chamber, a partition therein, a piston fitted loosely in said chamber whereby a restricted passage is formed be-

tween the inner wall of the chamber and the piston to permit the restricted flow of the liquid, a valved port for permitting the free passage of the liquid in one direction, connections between one leaf of the hinge and piston and between the fluid-chamber and the other leaf of the hinge as set forth.

In testimony that we claim the foregoing

as our invention we have signed our names, in presence of two witnesses, this 18th day of 10 September, 1895.

FRANCIS KEIL.

HENRY FRANCIS KEIL.

Witnesses:

JOHN WERNER,

JOSEPH KATSCHKE.