

Feb. 14, 1933.

A. H. T. WILLIAMS

1,897,351

CONCEALED DOORCHECK

Filed Dec. 29, 1930

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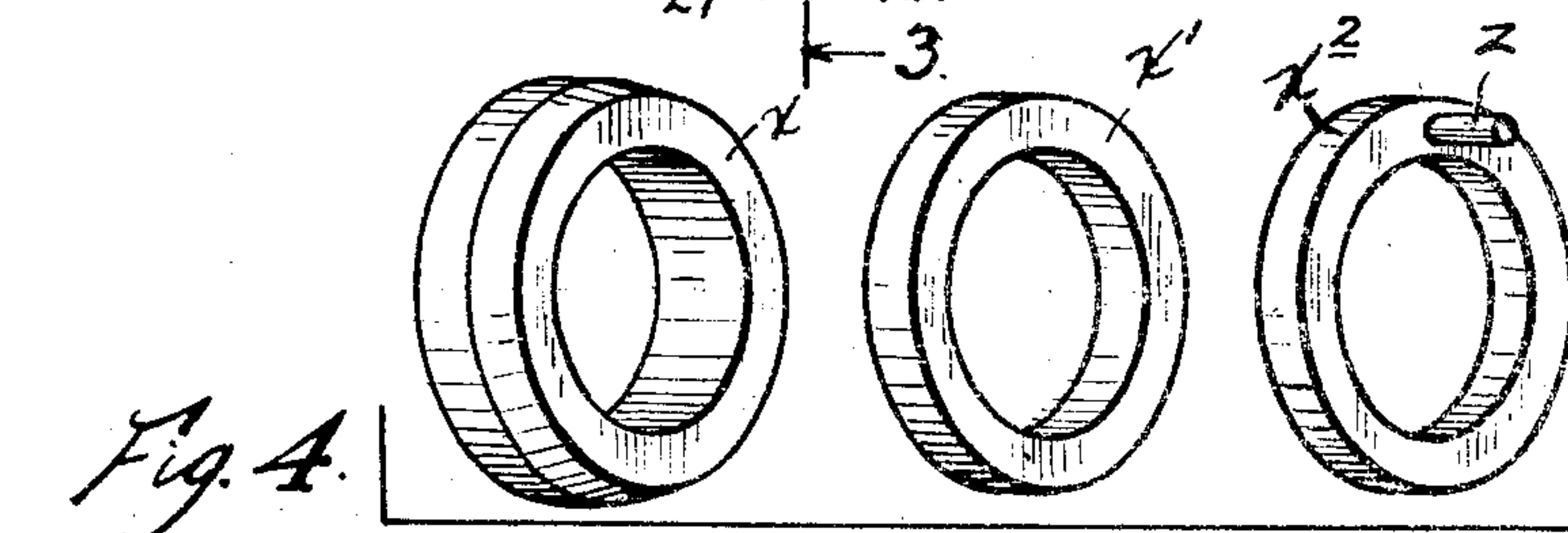
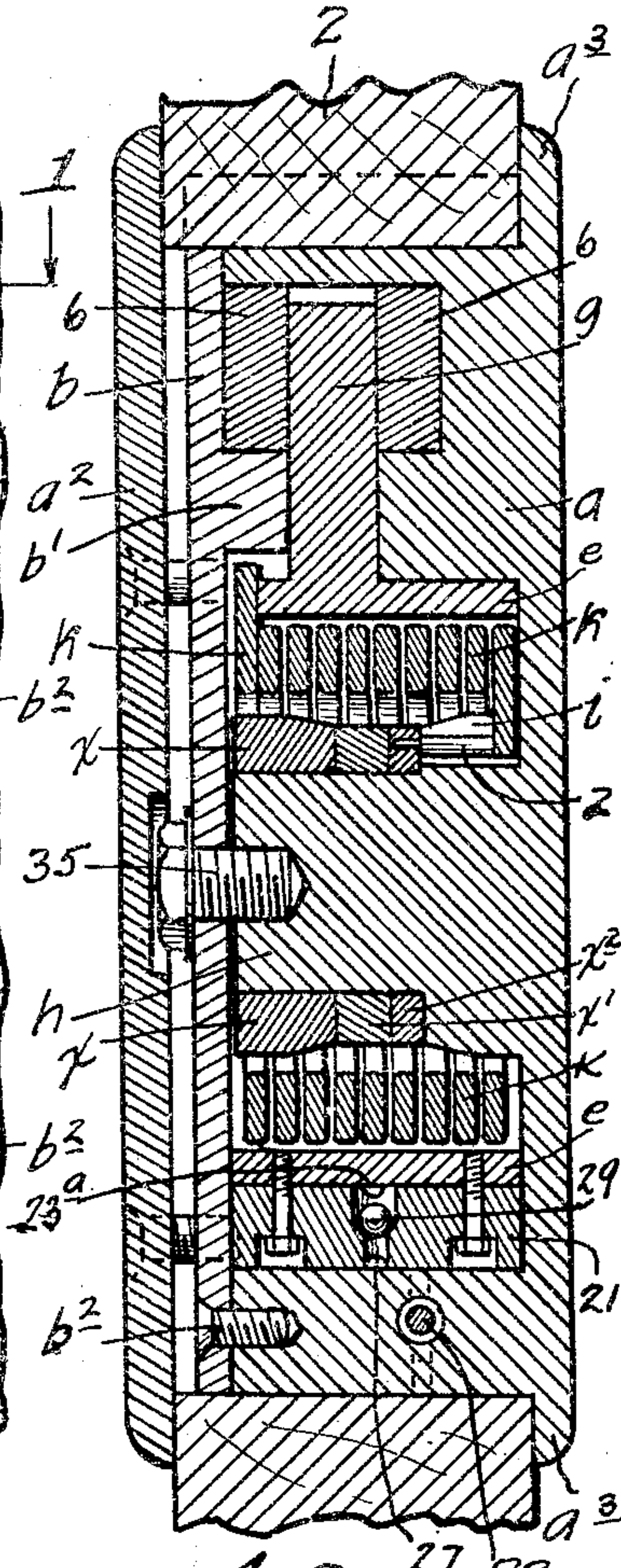
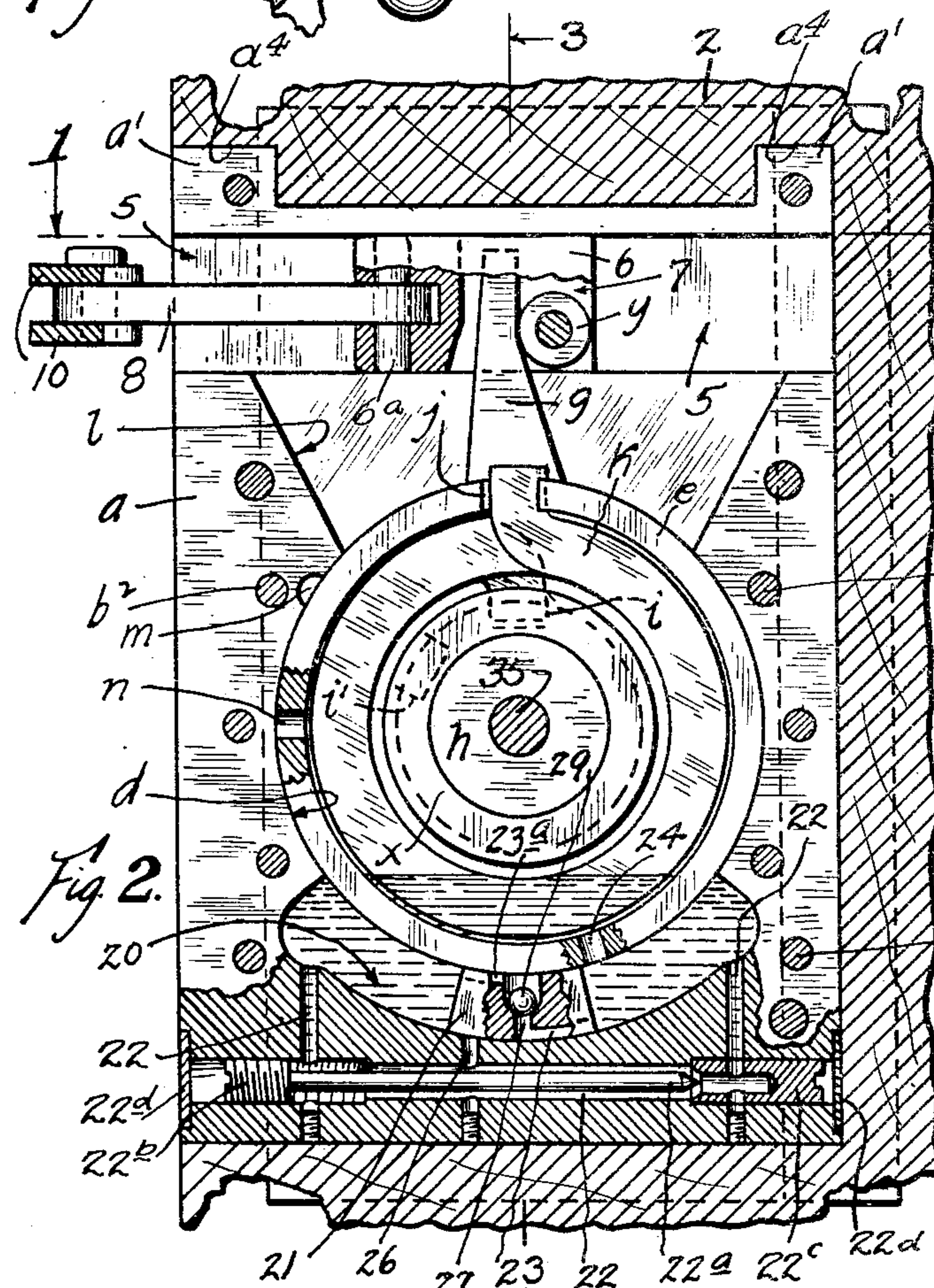
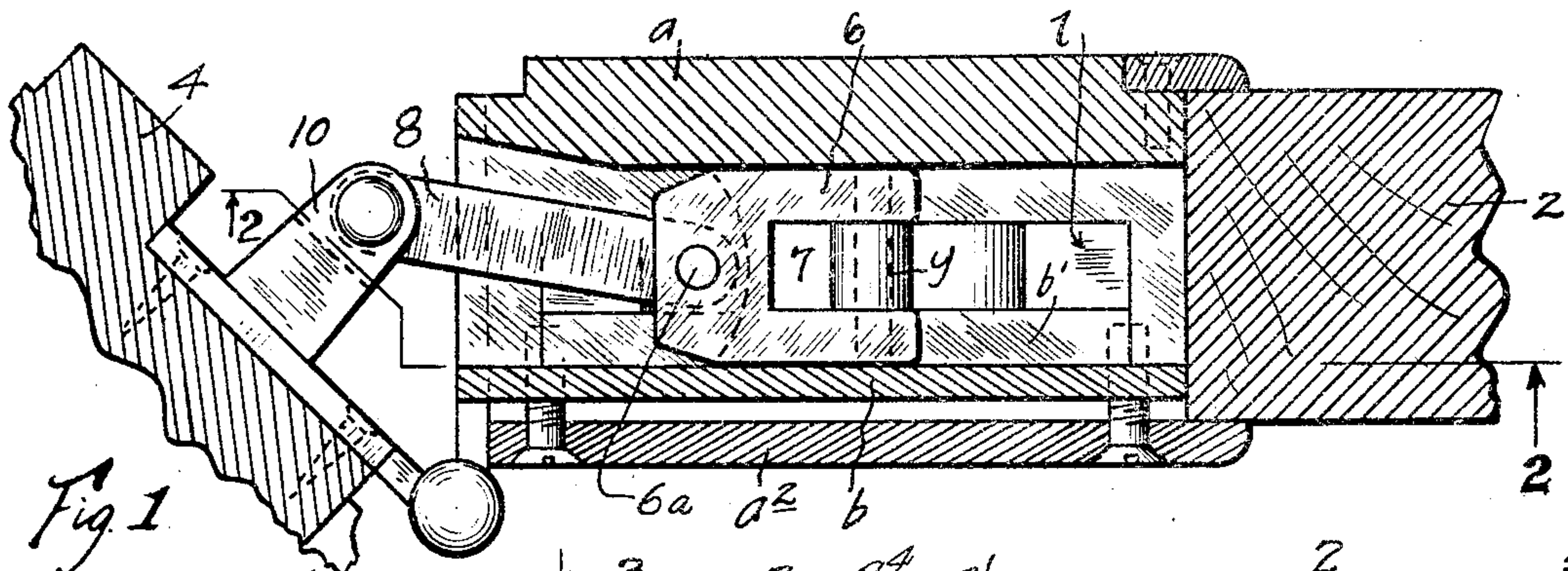


Fig. 3.
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Feb. 14, 1933.

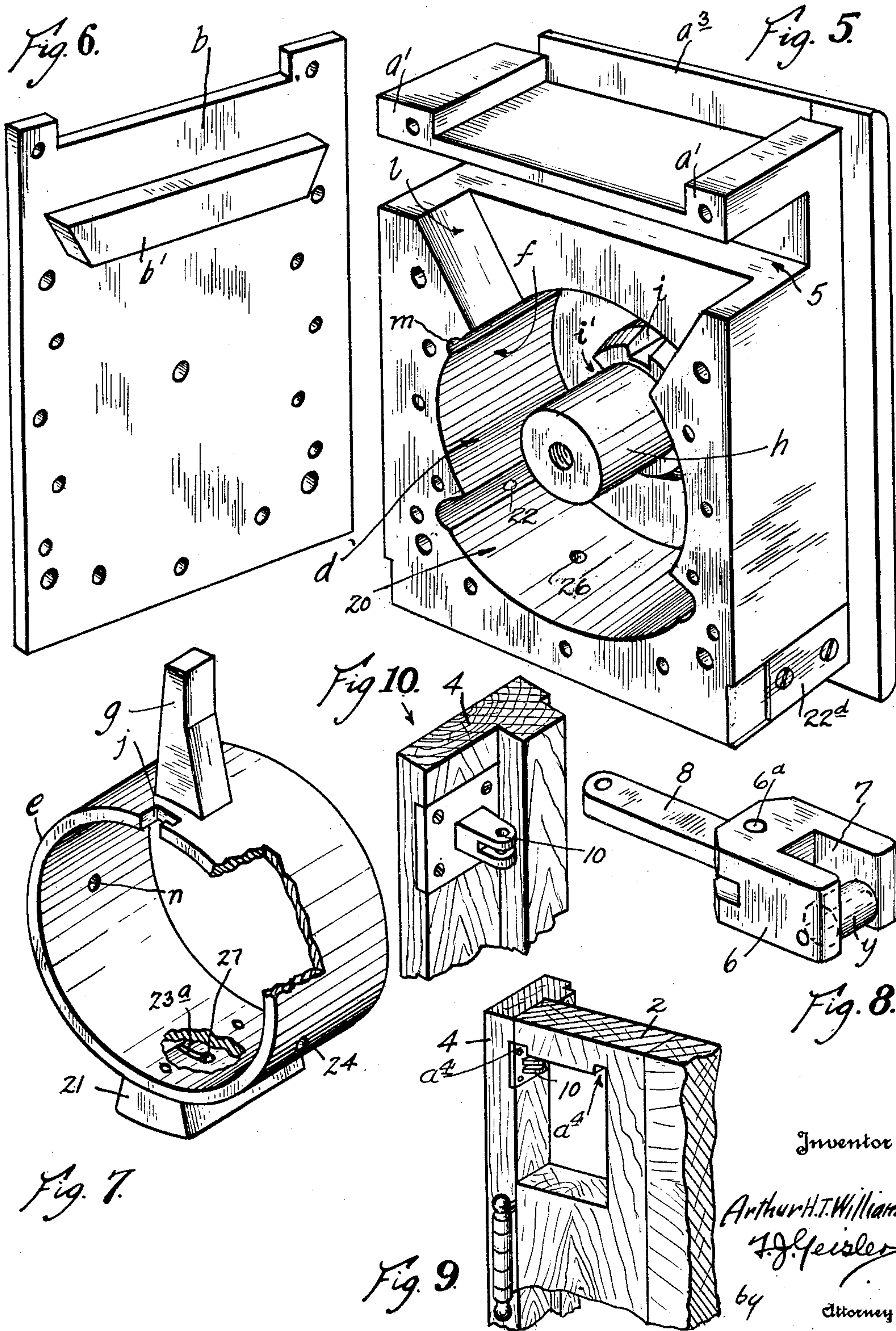
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3 Sheets-Sheet 2



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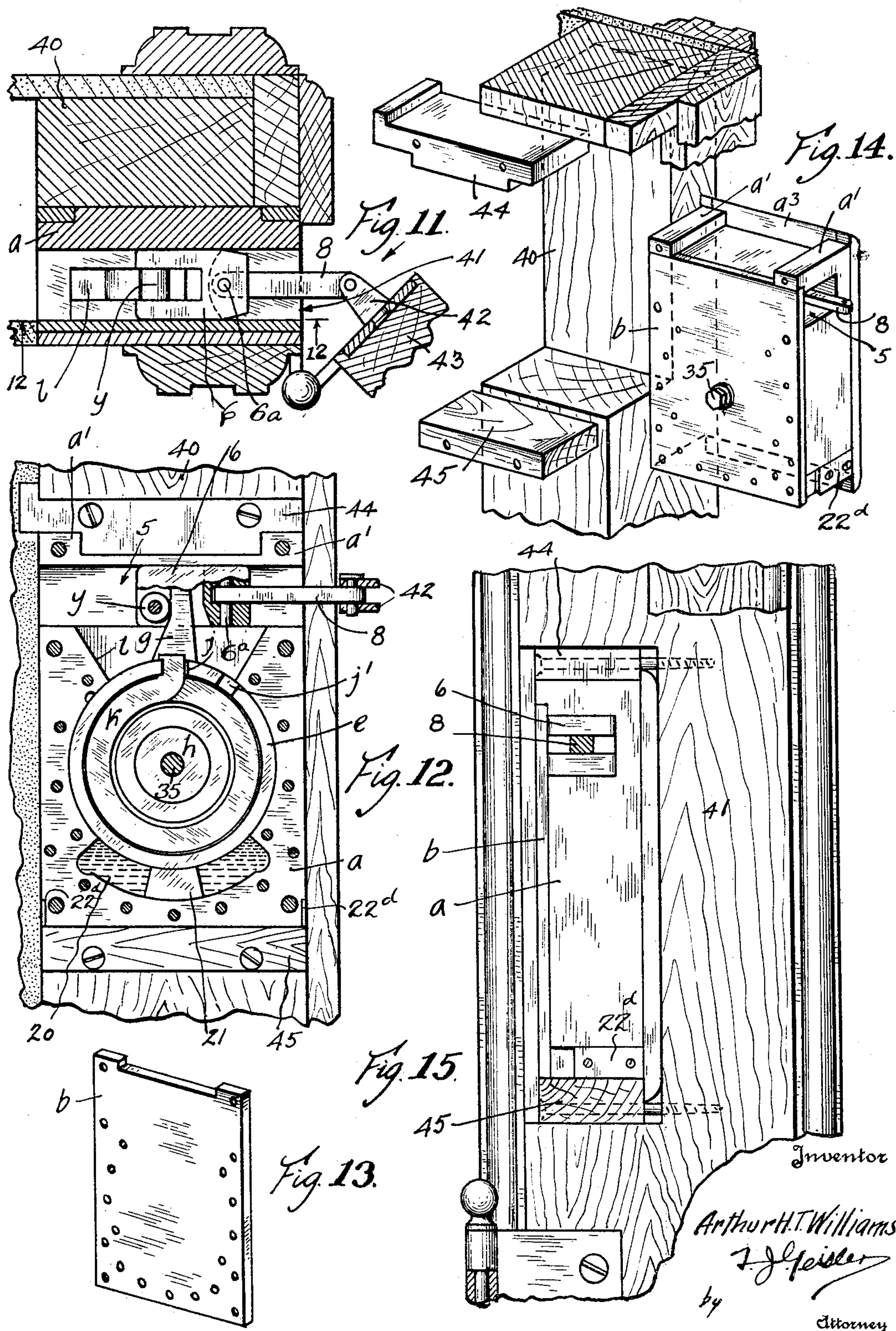
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CONCEALED DOORCHECK

Filed Dec. 29, 1930

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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CONCEALED DOORCHECK

Application filed December 29, 1930. Serial No. 505,299.

My invention relates to devices for closing and for controlling the closing movements of a door, commonly known as "door checks".

The door checks in present use are secured to the side of the door and connected by a closing arm to the door frame and are consequently conspicuous and tend to mar the finished appearance of a room or building and for this reason are frequently not used when they would otherwise be desirable.

Therefore the object of my invention is to provide a simple, but efficient and economically manufactured door check consisting of but few parts adapted to be contained entirely within the door members and thereby concealed from view.

It is impractical to locate the present door checks entirely within the door, so that they will be concealed, first, because of their size, and second because they are provided with closing arms of considerable length, having a pitman like movement which is laterally much greater than the thickness of the door.

A further and more particular object of my invention is to provide a door check in which the checking force is effected by imposing the resistance of a non-compressible liquid to the movement of the checking element; the speed of the closing movement being regulated by the interval required for the displacement of the liquid. Such means also being adapted to impose substantially no resistance to the opening of the door.

A further object of my invention is to provide a door check adapted to be located without change in either the door or the frame, as may appear most desirable, the latter arrangement being preferable in new construction, since it would then be easier to install the door check in the door frame as it is built in, rather than to mortise the door itself.

I attain my objects in a door check comprising a housing, provided with a lineal guideway and an annular chamber having a lower end exterior cavity for holding a liquid, a member reciprocable in said guideway, and an articulate connection therefrom to a door member, a spring-controlled annular member oscillatable in said chamber, said annular member provided with a radial arm engaging

said reciprocable member, and with a radial piston operative in said cavity, a duct connecting the opposite ends of said cavity, said annular member traversing said cavity and provided with a duct on one side of said piston to permit passage of the liquid, a relief port connecting said duct with said cavity, and opened and closed by the movement of said piston.

These and other incidental objects of my invention the details of construction and mode of operation are hereinafter fully described with reference to the accompanying drawings.

In the drawings:

Fig. 1 shows a fragmentary transverse section taken on the line 1—1 of Fig. 2 through a door and casing and illustrates how my door check is installed therein;

Fig. 2 shows a section taken on the line 2—2 of Fig. 1 and illustrates further details of construction;

Fig. 3 shows a section taken on the line 3—3 of Fig. 2;

Fig. 4 shows a perspective view of the anti-friction means on which the spring is mounted, removed from the device;

Fig. 5 shows a perspective view of the housing of my door check with its parts removed;

Fig. 6 shows the removable side wall of the housing;

Fig. 7 shows a perspective view of the crank element removed from the device;

Fig. 8 shows a perspective view of the closing arm and slide;

Fig. 9 shows in a perspective view how a door may be mortised for having my door check installed;

Fig. 10 shows a fragmentary, perspective view of a door frame and illustrates how the closing arm may be connected thereto;

Fig. 11 shows a fragmentary transverse section through a door and its frame and illustrates how my door check may be installed in the door casing with the closing arm connected to the door;

Fig. 12 shows a section taken on the line 12—12 of Fig. 11 and illustrates further details of construction;

Fig. 13 shows a perspective view of the

removable side wall shown as removed in Fig. 12;

Fig. 14 shows a fragmentary, perspective view of a door casing and further illustrates how my door check may be installed therein; and

Fig. 15 shows a fragmentary view of the jamb of the door casing with my door check installed, as illustrated in Fig. 11.

Referring now to Figs. 1 to 9, I will first describe my door check as installed entirely within a door with its closing arm connected to the door jamb.

My door check comprises a rectangular relatively narrow housing a provided with a removable cover plate b and adapted to be mortised within a door 2, as illustrated in Figs. 1, 2, 3 and 9. Exterior transverse flanges a' are provided on the upper side of the housing a adapted to be secured in complementary grooves a'' in the mortise of the door to hold the housing firmly against longitudinal displacement.

A side plate a^2 is provided, adapted to be secured over the removable cover plate b to hold the housing a in the door against lateral displacement, in cooperation with laterally extending perimetric flanges a^3 provided on the other side of the housing. The interior of the housing is formed to constitute an annular recess or chamber d , see Fig. 5. An annular element e having a radial arm g is arranged in the said recess d and is revoluble on the exterior wall f of the recess d . The said wall f is cut away as at l to accommodate a limited movement of the radial arm g and a coil spring k is mounted within the annular element e , one end of which is connected to the crank element e in a notch j and the other end of said coil spring is connected in one of a number of notches i, i' in the base of the inner wall h of the recess d which constitutes a post. By these latter means the tension of the said spring may be adjusted.

A slot or guideway 5 is provided in the housing, arranged parallel with its upper edge and intersecting the opening l in the wall f . A complementary boss b' is provided on the inner surface of the cover plate b and constitutes a closure for the adjacent side of the said slot 5. A slide 6 is mounted in the slot 5 provided with a socket 7 in which the end of the radial arm g bears. A short closing arm 8 is pivotally connected to the said slide 6 on a pin $6a$ for lateral movement in the plane of movement of the slide 6. The other end of the closing arm 8 is pivotally connected to a fastening element 10 adapted to be secured to the jamb 4 of the door frame.

Rings x, x', x^2 , see Figs. 3 and 4, are provided between the coil spring k and the interior wall of the recess d . The ring x^2 is provided with a pin z adapted to be engaged

in the notch i in which the end of the spring k is inserted to hold the same in place. The rings x, x' are freely rotatable and serve as anti-friction means to permit the said spring, as it is contracted by the opening of the door, to move freely against the said interior wall or post h .

Further, a roller element y is provided in the socket 7 of the closing arm 8 against which the radial arm g will bear under the influence of the spring k .

A chamber or cavity 20 is provided in the lower portion of the exterior wall f of the recess d , and a piston element 21 is provided on the exterior of the said annular element e , movable therewith in the chamber 20. An incompressible fluid such as oil is provided in the chamber 20, the opposite ends of which are connected by a by-pass 22 to permit the flow of the oil from one end of the chamber to the other. A port 24 is provided in the annular element e to permit the fluid to escape from the chamber 20 on one side the piston into the recess d . A regulating valve is provided in the by-pass 22 to regulate the amount of oil flowing therethrough and the degree of resistance to be imposed on the closing movement of the door.

Such valve comprises a pin $22a$ provided with a threaded head $22b$ threaded in the open end of the by-pass 22 so as to be readily adjustable, and a valve seat $22c$ threaded in the opposite end so as to be also readily adjustable. In order to prevent possible leakage of oil past the head $22b$ or valve seat $22c$, I have provided plates $22d$ adapted to be secured closely over the ends of said by-pass.

Further, a relief port 26 is provided in the by-pass 22 communicating with the chamber 20 spaced from the end of the by-pass 22 adjacent the left side of the chamber 20, in Fig. 2, the width of the piston 21. A duct 27 is provided in the piston 21 having grooves 23 and $23a$ communicating respectively with each side the piston, and a ball check valve 29 is provided in the said duct 27 to permit flow of the fluid in only one direction.

An oil groove m is provided in the wall f of the recess d and a port n is provided in the annular element e , adapted to register with said oil groove m and drain off and return the oil collected therein back into the recess d .

Further, the cover plate b is secured to the housing by a centrally arranged screw 35 threaded into the post h which is of less height than the exterior wall f of the recess d , so that when the screw is tightened the plate will be drawn closely against the edges of the housing a and onto the wall h , thus holding them in fluid tight contact to prevent the leakage of oil therefrom. Supplementary fastening screws $b2$ are also provided about

the perimeter of the side plate to hold the said plate in position.

In the operation of my door check, as illustrated in Figs. 1 to 3, when the door is opened, the closing arm 8, which is secured to the door jamb 4, see Figs. 8 and 10, pulls the radial arm *g* anti-clockwise and rotates the annular element *e* against the tension of the coil spring *k*, which is adjusted to be normally under tension when the door is closed, thereby to hold the door closely at all times against the door jamb. Simultaneously the piston 21 forces the oil from the chamber 20 out through the by-pass 22 and through the port 24, in the latter instance, so that pressure against the oil will be quickly released and the opening of the door will not be resisted. Further the duct 26 in the piston which is controlled by the ball valve 29 permits the oil to flow readily from one side of the piston to the other.

Then when the door has been opened and is released, it is closed by the force of the spring *k*, which was tensioned by the opening of the door, on the radial arm *g* and the closing arm 8, which draws the door towards the frame to close it.

However, the closing movement of the door rotates the annular element *e* clockwise and therewith the piston 21 against the fluid in the chamber 20, which may only flow slowly therefrom through the by-pass 22, the ball valve 29 having closed the duct 26 so that the closing movement of the door is thus retarded and its slamming against the door jamb prevented. However, just as the door is nearly closed, the relief port 26 is uncovered by the piston 21, so that the pressure on the oil is relieved by being permitted to flow directly into chamber 20. The door is thus then brought sharply against the jamb by the force of spring *k*, to overcome the drag of the door latch on the strike and cause the latch to engage the strike in the usual manner.

By these means I have provided a compact and efficient door check of such dimensions as to be wholly contained within the dimensions of the door and having a closing arm 8 of such limited lateral movement that it is entirely contained within the dimensions of the door.

With reference now to Figs. 11 to 15, I will describe how my door check may be installed in the door casing with the closing arm connected to the door which has this advantage that in this installation my door check will be entirely concealed not even side cover plates being required.

In these figures, the construction and operation of my door check is exactly the same as before described, and like parts will be indicated by like reference characters with reference to Figs. 1 to 10.

In Fig. 11 the housing *a* is located in the

door frame 40 with the closing arm 8 extending from the jamb as at 41 and connected to a bracket 42 secured to the edge of the door 43. Fastening plates 44, 45 are provided for adapting the housing to this installation where required. This is particularly desirable in that my door check may be more effectively concealed in the housing than when it is located in the door.

I claim:

1. In a door check, a housing provided with an annular chamber having a lower end exterior cavity for holding a liquid, a spring controlled checking member oscillatable in said chamber, such member provided with a radial piston operative in said cavity, a duct connecting the opposite ends of said cavity, said checking member traversing said cavity and provided with a duct on one side of said piston to permit the passage of the liquid, and a relief port connecting said duct with said cavity and opened and closed by the movement of said piston.

2. In a door check, a housing provided with an annular chamber having a lower end exterior cavity for holding a liquid, a spring controlled checking member oscillatable in said chamber, such member provided with a radial piston operative in said cavity, a duct connecting the opposite ends of said cavity, said checking member traversing said cavity and provided with a duct on one side of said piston to permit the passage of the liquid, a relief port connecting said duct with said cavity and opened and closed by the movement of said piston, a groove in the wall of said chamber and a port in said checking member adapted to cooperate with said groove, whereby the liquid collecting between said chamber wall and said checking member will be permitted to draw back into said cavity.

3. In a door check, a housing having a removable cover plate, and a central post encompassed by an annular chamber, the latter having a lower end exterior cavity for holding a liquid, a spring coiled about said post, an annular checking member oscillatable in said chamber about, and connected with said spring, such checking member traversing said cavity and provided with a radial piston operative therein, means permitting the displacement of the liquid in said cavity from one side to the other, by the movement of the piston, more rapidly in the opening than in the closing of the door and means whereby to draw and secure the said cover plate in liquid tight relation with the walls of said chamber.

4. In a door check, a housing having a removable cover plate, and a central post encompassed by an annular chamber, the latter having a lower end exterior cavity for holding a liquid, a spring coiled about said post, an annular checking member oscillat-

- able in said chamber about, and connected with said spring, such checking member traversing said cavity and provided with a radial piston operative therein, means permitting the displacement of the liquid in said cavity from one side to the other, by the movement of the piston, more rapidly in the opening than in the closing of the door, and means in part cooperating with said post whereby to draw and secure the said cover plate in liquid tight relation with the walls of said chamber.
5. In a door check, a housing having a removable cover plate, and a central post encompassed by an annular chamber, the latter having a lower end exterior cavity for holding a liquid, a spring coiled about said post, an annular checking member oscillatable in said chamber about, and connected with said spring, such checking member traversing said cavity and provided with a radial piston operative therein, means permitting the displacement of the liquid in said cavity from one side to the other, by the movement of the piston, more rapidly in the opening than in the closing of the door, and transverse shoulders provided on the exterior of the said housing at one end, adapted to hold the housing firmly in place in the door member against the pull of the checking means.
6. In a door check, a housing having a removable cover-plate, and provided with a central post encompassed by an annular chamber, the walls of the chamber diverging upwardly and provided with certain elements of a guideway, the cover-plate provided with a complementary element of said guideway, a member reciprocable in said guideway and an articulate connection therefrom to a door member, a spring-controlled checking-member oscillatable in said chamber, such member provided with a radial arm engaging said reciprocable member, means for imposing resistance through the medium of a liquid to the oscillation of said oscillating member in one direction, means whereby to draw and secure said cover plate in liquid tight relation with the walls of said chamber.
7. In a door check, a housing having a removable cover-plate, and provided with a central post encompassed by an annular chamber, the walls of the chamber diverging upwardly and provided with certain elements of a guideway, the cover-plate provided with a complementary element of said guideway, a member reciprocable in said guideway and an articulate connection therefrom to a door member, a spring-controlled checking-member oscillatable in said chamber, such member provided with a radial arm engaging said reciprocable member, means for imposing resistance through the medium of a liquid to the oscillation of said oscillating member in one direction, means in part cooperating with said post, whereby to draw and secure said cover plate in liquid tight relation with the walls of said chamber.
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