

J. SCHMIDT.

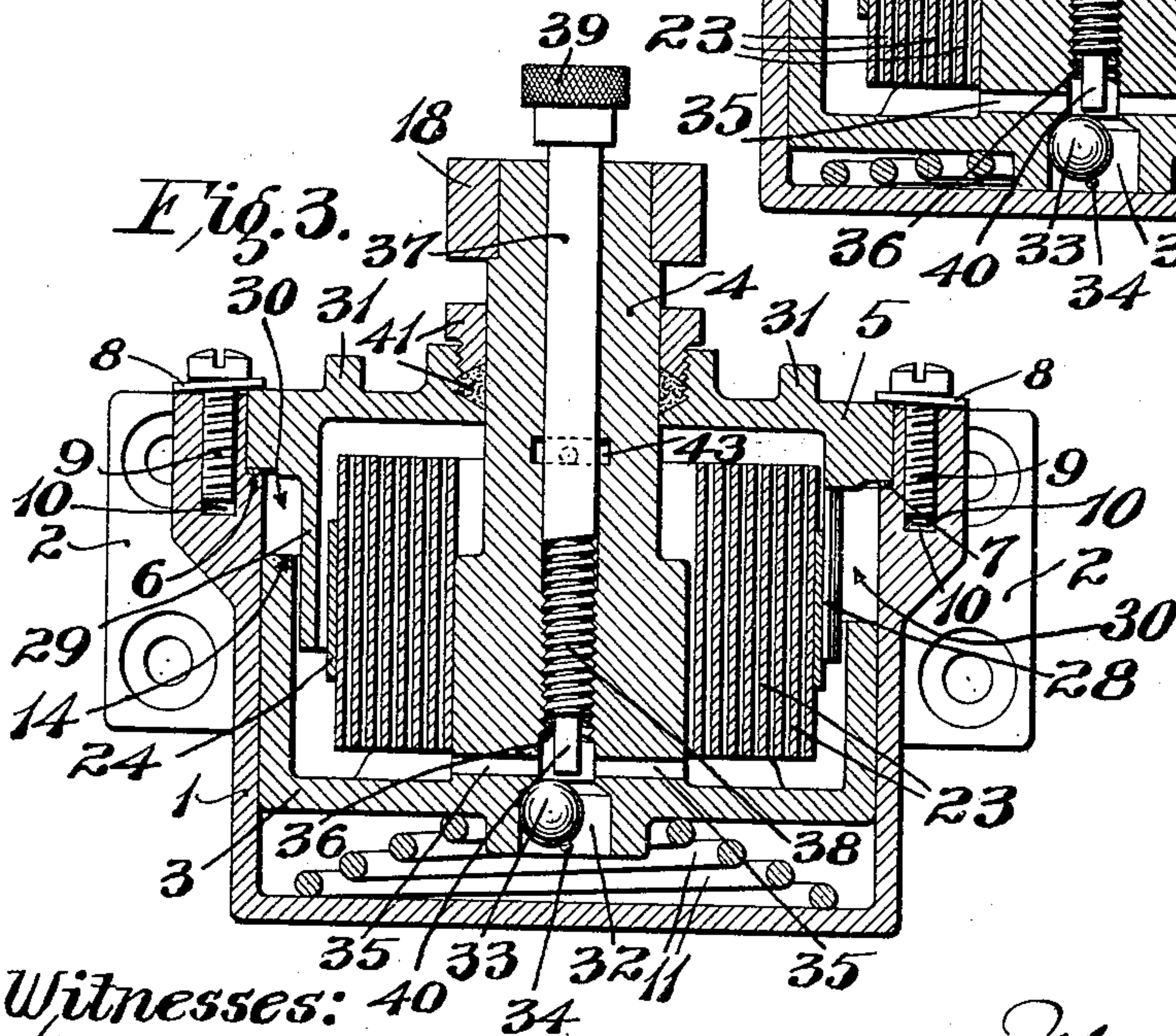
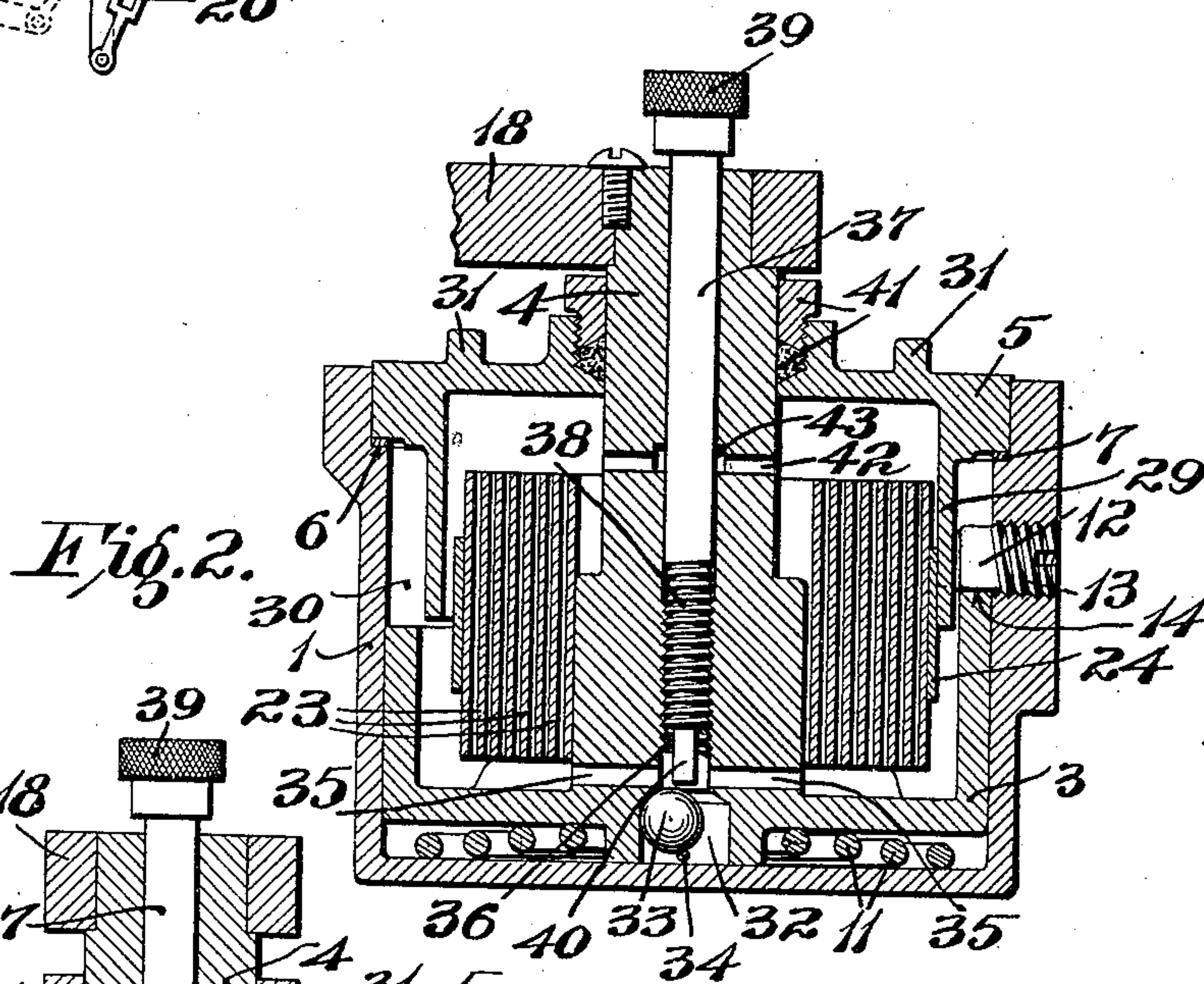
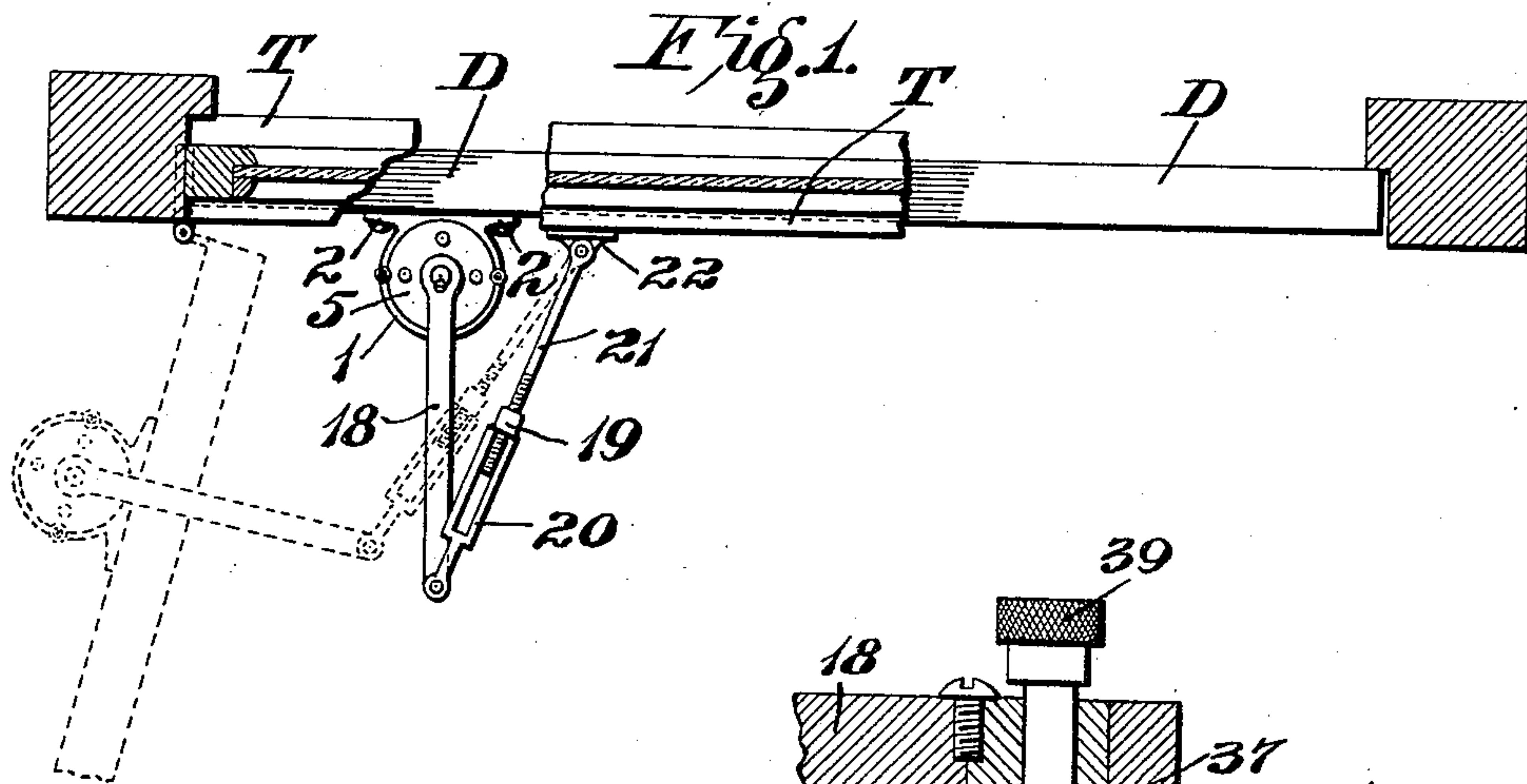
DOOR CHECK.

APPLICATION FILED NOV. 24, 1909.

999,598.

Patented Aug. 1, 1911.

3 SHEETS—SHEET 1.



Witnesses: 40 34
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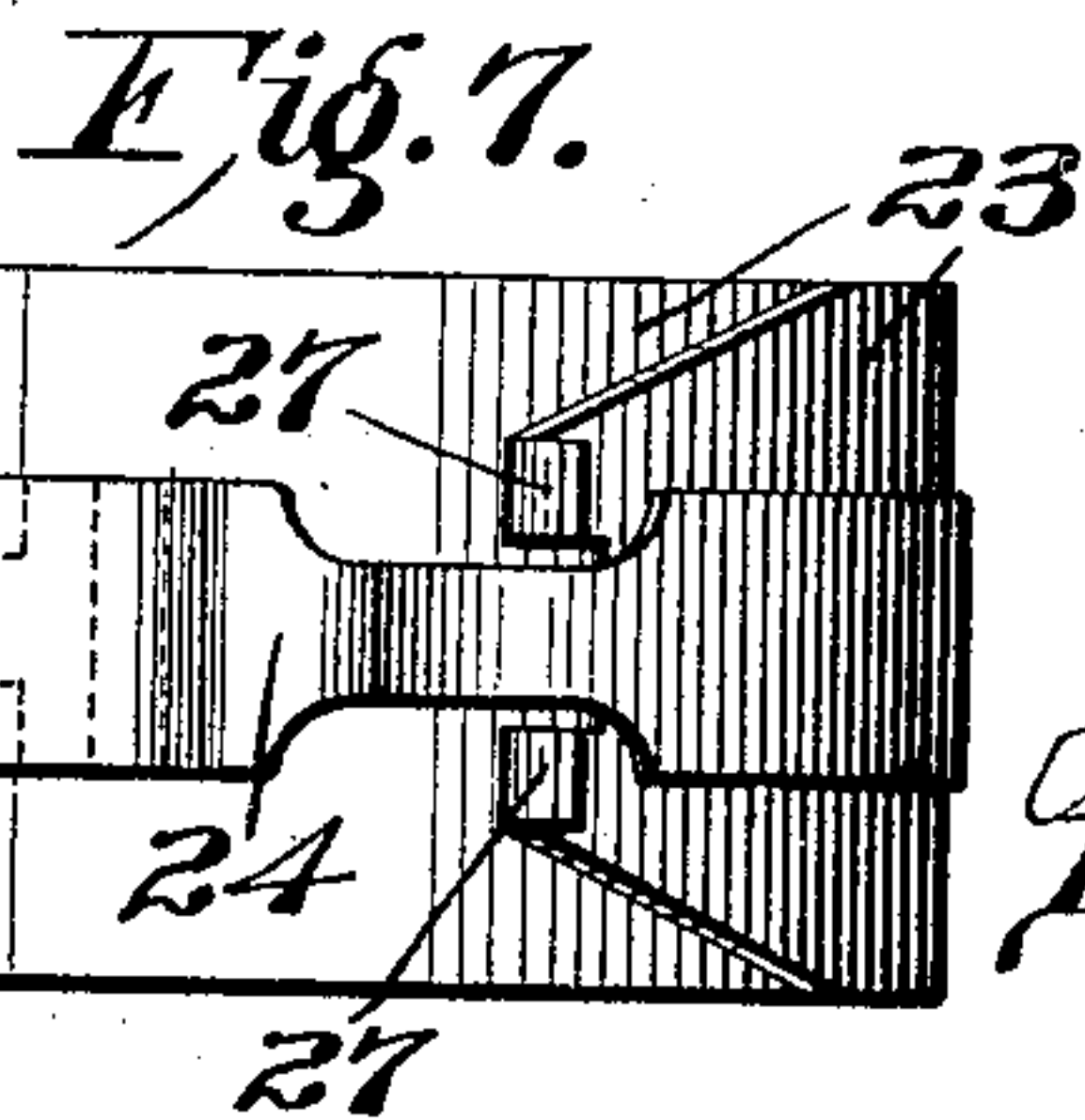
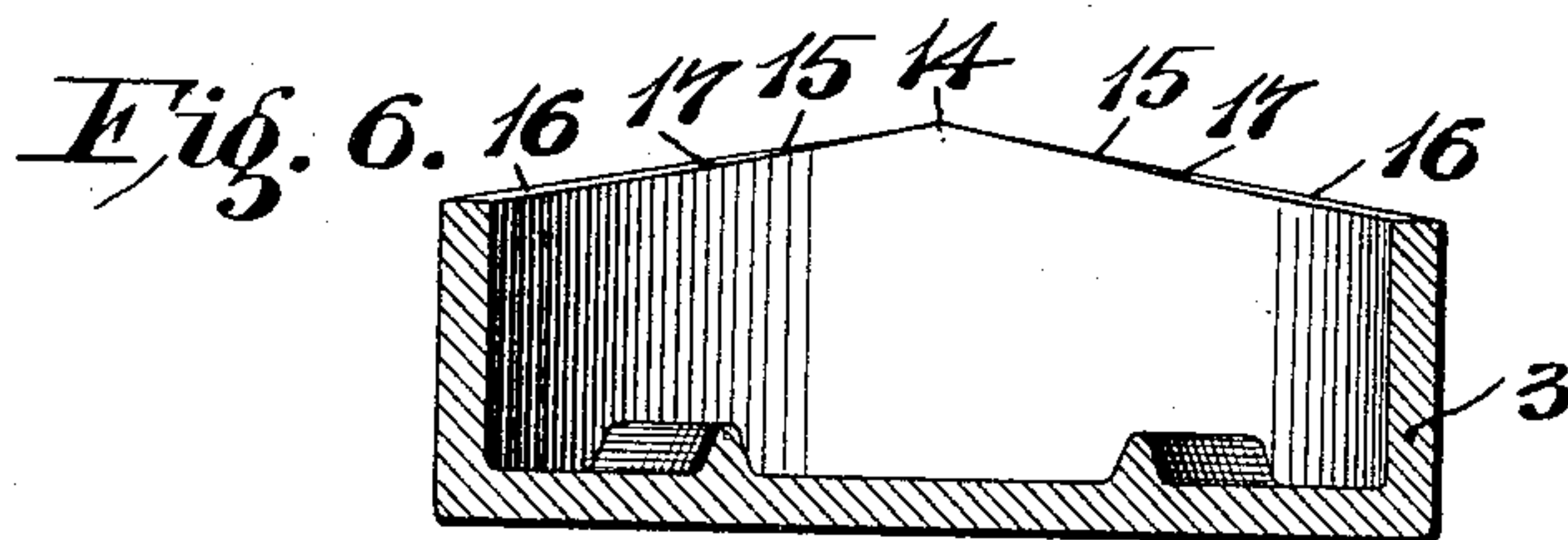
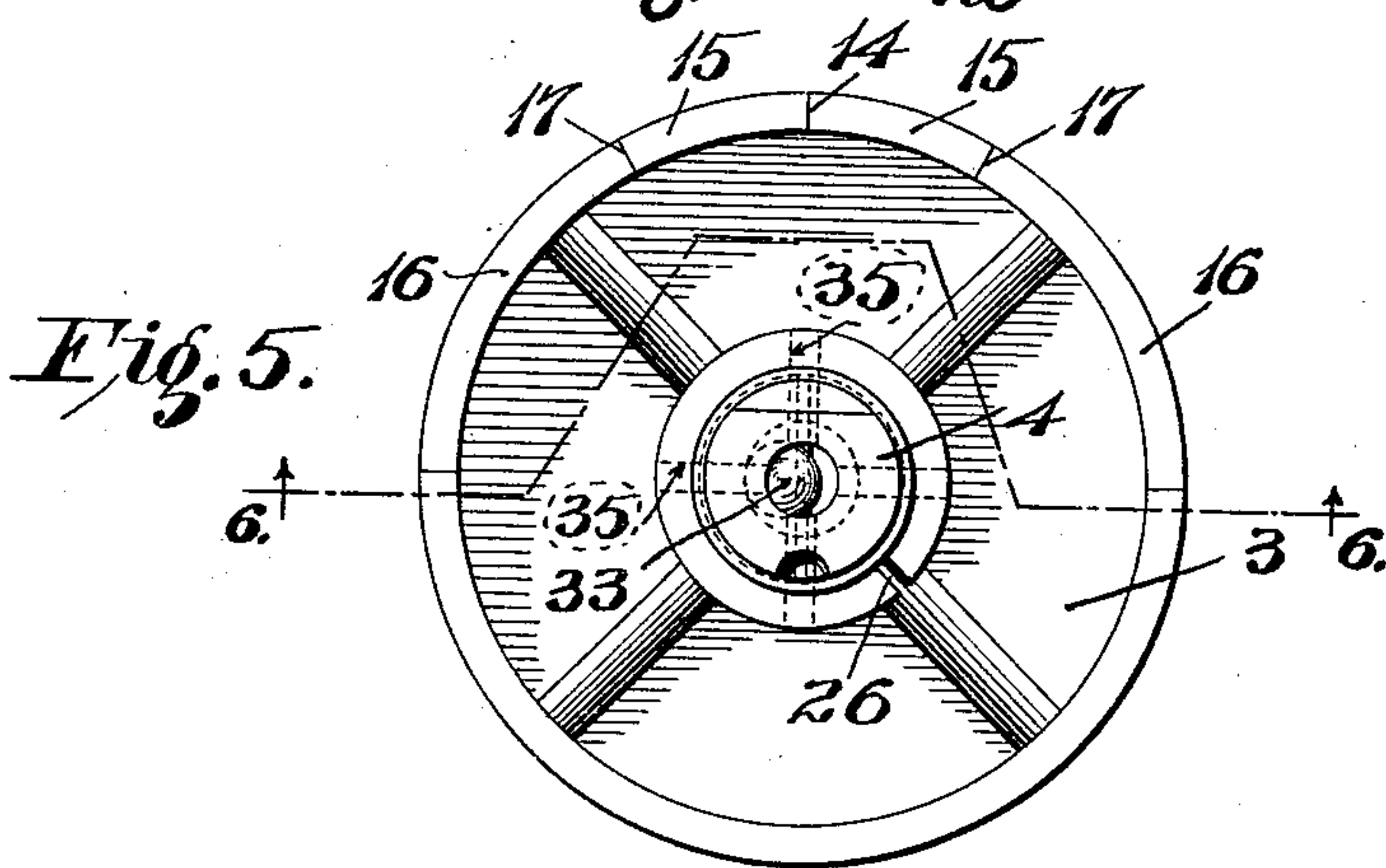
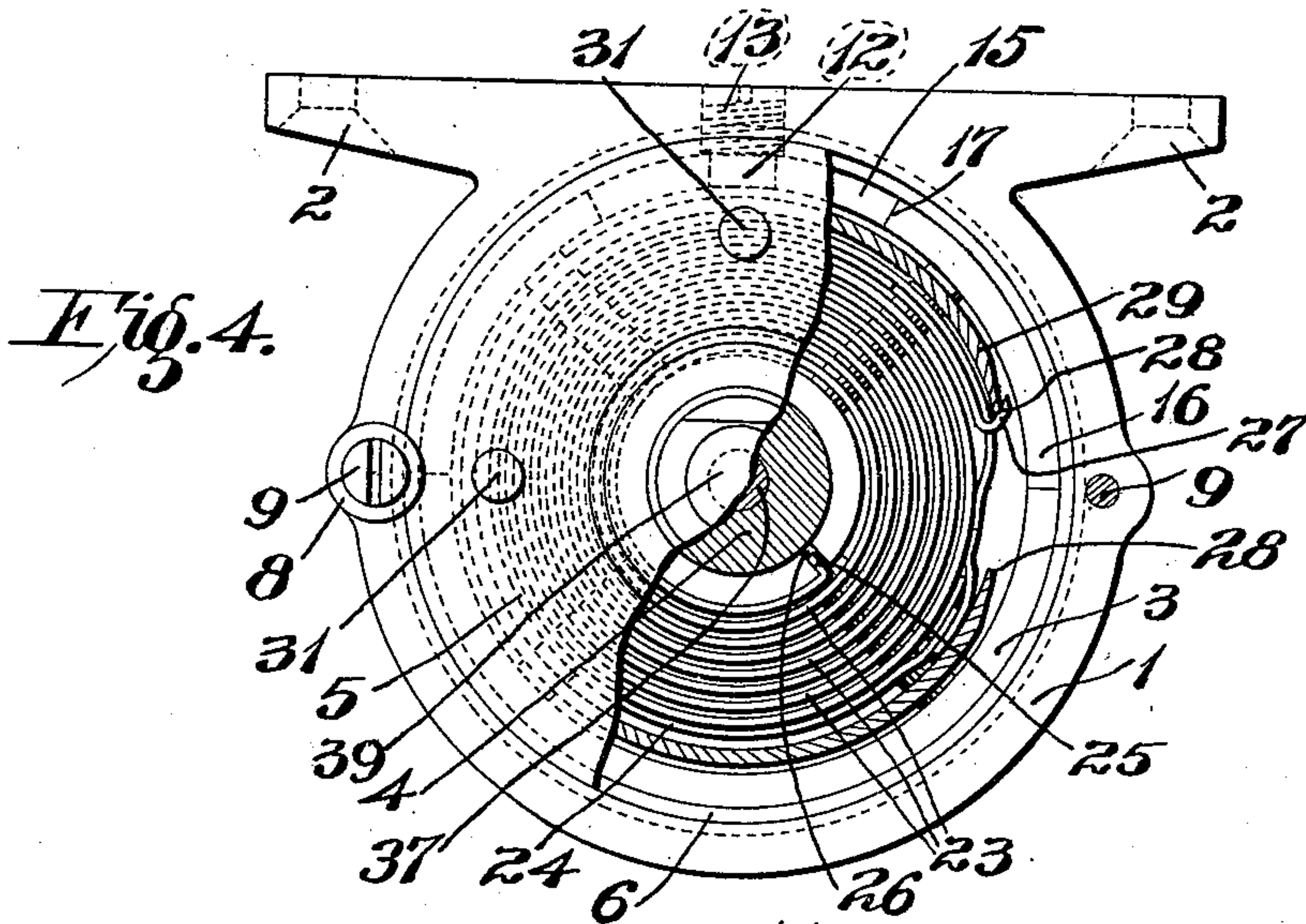
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3 SHEETS—SHEET 2.



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3 SHEETS-SHEET 3.

Fig. 8.

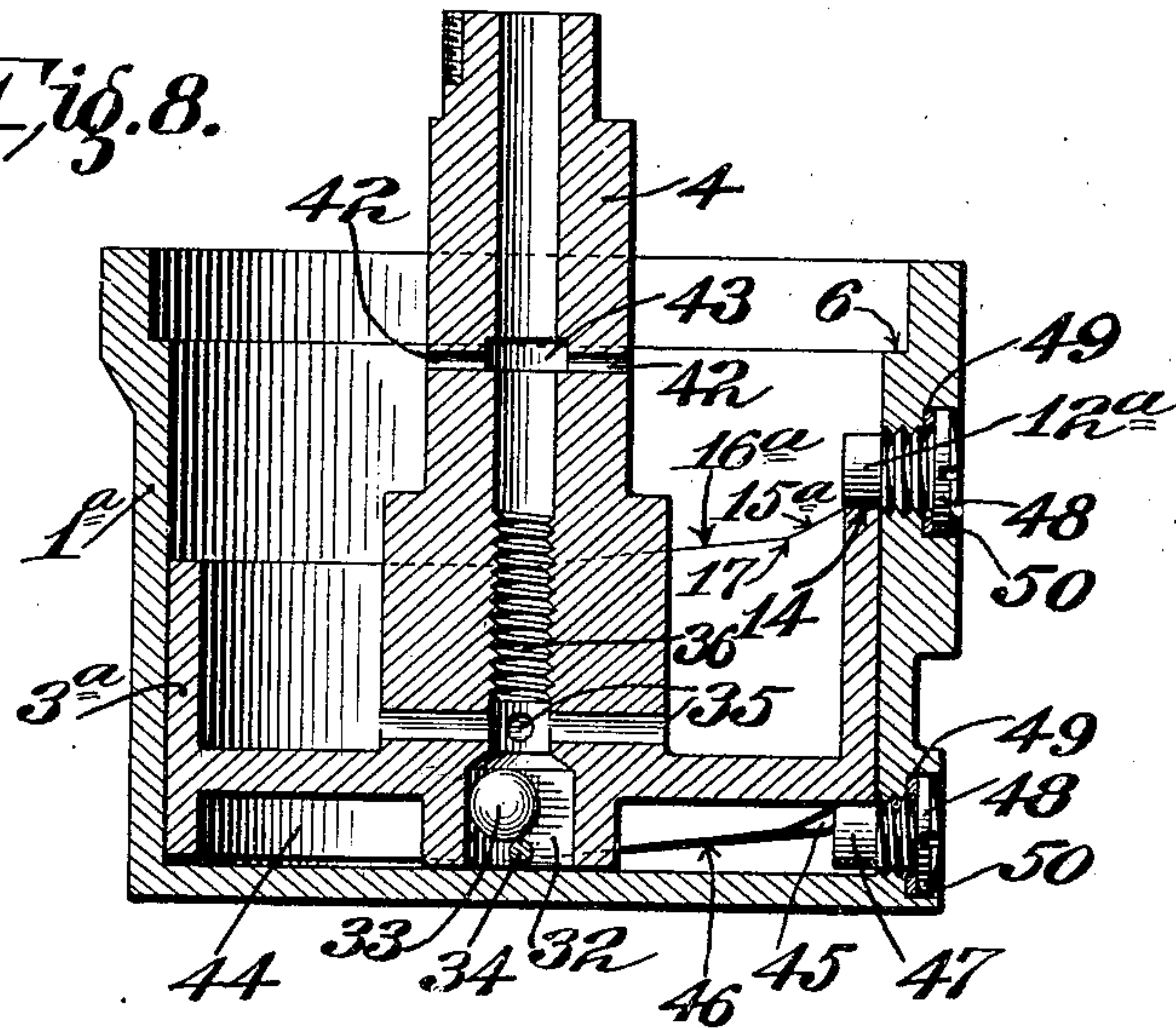
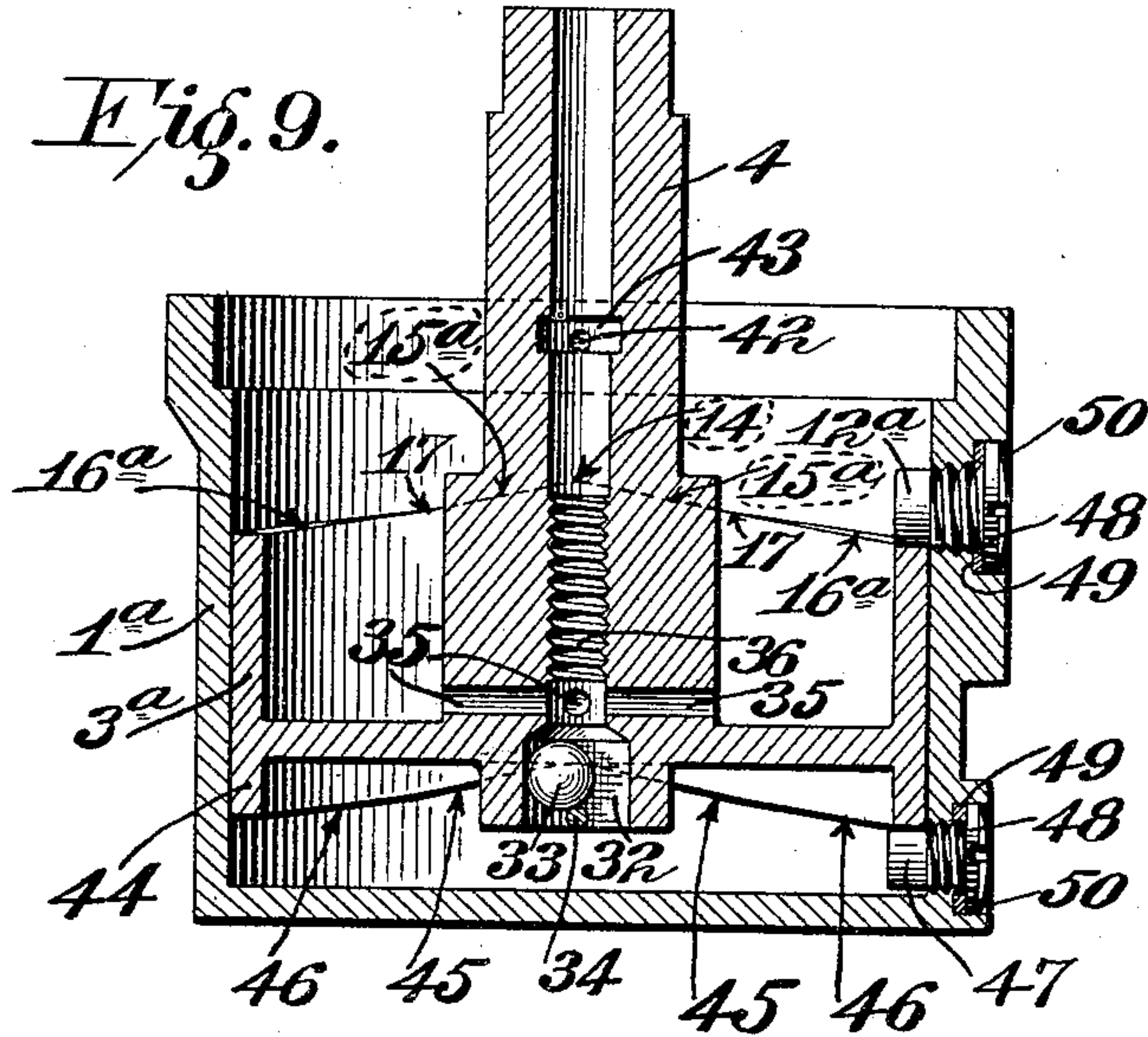


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN SCHMIDT, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
ORION S. MILLER, OF ST. LOUIS, MISSOURI.

DOOR-CHECK.

999,598.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed November 24, 1909. Serial No. 529,670.

To all whom it may concern:

Be it known that I, JOHN SCHMIDT, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Door-Checks, of which the following is a specification.

This invention relates to door checks.

It has for its principal objects to produce a simple and efficient door check which can be economically manufactured and readily adjusted, to produce a device which can be readily applied to a door which is hinged either on the right or left hand side, and to attain certain other advantages hereinafter more fully appearing.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings which form part of this specification and wherein like symbols refer to like parts wherever they occur, Figure 1 is a horizontal section through a door frame above the transom bar, portions of the transom window and bar being broken away to show the top edge of the door and showing how the door is applied; Fig. 2 is a vertical cross section through the cylinder and parts associated therewith and showing the relative positions of the parts when the door is closed; Fig. 3 is a vertical cross section taken at right angles to the line of section of Fig. 2 and showing the relative positions of the parts when the door is opened; Fig. 4 is a view of the cylinder and parts contained therein partly in top plan and partly in horizontal section; Fig. 5 is a top plan view of the plunger or piston; Fig. 6 is a vertical section taken on or about the line 6—6 of Fig. 5; Fig. 7 is a side view of the reversible spiral spring; and Figs. 8 and 9 are vertical sections of a modification of the device, showing the relative positions of the piston when rotated a quarter turn.

The device as shown in the drawings comprises a cylindrical shell or casing 1 which has a closed bottom. It is provided with lugs or ears 2 which are perforated for the reception of screws or other suitable securing devices. Within the casing 1 is freely fitted a cylindrical cup-shaped piston or plunger 3. The piston has an upstanding central stem or shank 4 which is of cylindrical section. It extends through a central

opening in the cover 5. The cover 5 is fitted into the open end of the casing which is counterbored to provide an annular shoulder 6. A gasket or packing ring 7 is placed on the shoulder 6 beneath the cover 5 whose marginal portion projects a slight distance above the top edge of the casing 1. The cover is clamped in place by two or more washers or perforated plates 8 which are sleeved on headed screws 9 and arranged to bear upon the edge portion of the cover when said screws are inserted into threaded holes 10 provided therefor in the top of the casing.

A volute spring 11 is placed between the bottom of the casing 1 and the plunger 3 so as to exert its force to lift the plunger and hold the same in contact with a stud or stop 12 which projects inwardly from the side of the casing. The stud is preferably screw-threaded as at 13 and inserted through a tapped hole in the casing 1 so as to be readily removed when it is desired to remove the plunger 3 from the casing. Obviously, however, the stud may be otherwise arranged for ready removal.

The upper edge portion of the annular wall of the plunger 3 is inclined downwardly on opposite sides of a neutral point 14 to form two cams of like shape. Preferably the cams each comprise two portions 15, 16, which are at different inclinations. That is, each entire cam extends generally through an angle of about ninety degrees from the point 14 along the edge of the plunger. The portion 15 extends through an angle of about thirty degrees and has a rise greater than that of the portion 16 which extends through an angle of about sixty degrees from the dividing point 17. By this arrangement, the plunger is in its lowermost position (see Fig. 2) when the neutral or high point 14 of the cams is under the stud 12 and against which the plunger is held by the spring 11. When the plunger is rotated either to the right or the left, the respective cam portions 15, 16, ride under the stud and the plunger is raised by the spring.

On the upper end portion of the stem 4 is secured an arm or lever 18 which extends horizontally in a diametrical line with the high point 14 of the plunger cam. The casing 1 is secured to the face of the door D adjacent to the hinge side with the arm 18

projecting at a right angle to the face of the door when the door is closed as shown in Fig. 1. A longitudinally adjustable link or bar 19 comprising two members 20, 21, is 5 pivotally connected at one end to the outer end of the arm 18 and pivotally connected at its opposite end to a bracket or lug 22 which is secured to transom bar T of the door frame at a point inwardly toward the center 10 of the door from the casing 1. By this arrangement the arm 18 and bar 19 constitute a toggle whereby, when the door is opened, the plunger 3 is rotated. At the same time the spring 11 raises the plunger as the cam 15 portions 15, 16, pass under the stud 12.

The door is closed by a strong spiral spring 23 which is fixed at its inner end to the stem 4 of the plunger and at its outer end to the depending flange 29 of the cover 20 so as to be wound when the plunger is rotated during the opening movement of the door. The spring 23 is made detachable and reversible so that it may be used for 25 or left hand side as the case may be. Normally, the spring is partially wound and it is bound by an annular retaining band 24. The inner end 25 of the spring 23 is bent inwardly so as to fit in a vertical 30 groove 26 in the stem 4 of the piston. Its outer end is bifurcated to straddle the retaining band 24 and bent outwardly and slightly hooked as at 27 so as to engage one of the vertical edges 28 of a cutaway 35 portion of a depending annular flange 29 on the cover 5. The depending annular flange 29 is located some distance inwardly from the periphery of the cover 5 so as to provide an annular space 30 to make clear- 40 ance for the annular side wall of the plunger 3.

When it is desired to regulate the tension of the spring 23 in applying the check to the door, the plates 8 are loosened and the 45 cover 5 is rotated on the casing 1 by using a wrench or other implement which will engage lugs 31 or equivalent devices which are provided on the top side of the cover. By this arrangement the spring may be 50 readily tightened or loosened as the case may be.

An axial bore is provided through the stem 4 to the bottom of the plunger which is counterbored as at 32. In the counter- 55 bore 32 is placed a ball valve 33 which is of a larger diameter than the bore in the stem portion; and the inner portion of the counterbore 32 is beveled to form a seat for said ball valve. A cross bar or any suitable 60 spider 34 is arranged across outer end of the counterbore 32 to retain the ball therein. The stem 4 is provided near the bottom of the plunger with radial or cross ports or passage-ways 35 which establish 65 communication between the axial bore and

the cupped portion of the axial bore above the passage-ways or ports 35 is reduced in diameter and screw-threaded as at 36. A rod 37 is fitted freely in the bore and has its inner end portion screw-threaded as at 70 38 to fit the reduced threaded portion 36 of the bore. On the outer end of the rod 37 is a knurled knob 39 for conveniently manipulating the rod. The extreme inner end portion 40 of the rod is considerably re- 75 duced in diameter so as not to close the bore above the ball valve. By screwing the rod inwardly the end of its reduced portion may be adjusted so that the ball cannot entirely close the opening above the beveled 80 seat in the counterbore 32. Thus, the size of the opening left unclosed when the ball is acting as a check-valve may be readily varied by adjusting the rod inwardly or outwardly as the case may be. 85

In practice the casing 1 is filled or partially filled with oil or other suitable liquid. The ball valve 33 normally rests on the cross member or spider 34, and communication being established between the 90 ports 35 and counterbore 32, the oil will flow therethrough when the piston or plunger 3 is raised during the opening movement of the door. As the spring 23 reacts to restore the piston and close the door, the 95 ball valve 33 will be forced toward the beveled seat and the portion 40 of the rod 37 being adjusted so that the ball cannot entirely close the opening, the oil confined 100 beneath the plunger will be forced slowly through the opening so restricted, with the result that the door will be closed without slamming. During the restoring movement of the plunger 3, the cam portion 16 which 105 is longer than the cam portion 15 but of less pitch first moves under the stud 12, whereby the door closes gently, at a gradually decreasing speed and without a momentary pause or rebounding action.

To prevent the oil from working out 110 around the stem 4 of the piston or plunger 3 a packing gland 41 is provided on the cover 5. Holes 42 are bored transversely through the stem 4 of the piston so as to intersect the axial bore therein at a point 115 above the normal level of the oil in the chamber. By this arrangement, any oil which seeps up around the rod 37 will drain through the holes 42 back into the chamber. Preferably, the portion of the axial bore 120 which is intersected by the holes 42 is enlarged or grooved annularly as at 43 to provide a trap for the oil and prevent it from seeping above the holes 42.

Figs. 8 and 9 illustrate a modification of 125 the piston or plunger. In this construction, the piston 3^a is provided with upper cam faces 15^a, 16^a which are similar to the cam faces 15, 16 on the piston 3 and coöperate 130 with the stud 12^a. On the bottom of the

piston 3^a is an annular flange 44. This flange is provided with cam faces 45, 46 which are counterparts of the cam faces 15^a, 16^a, respectively. A stud 47 similar to the
 5 stud 12^a is projected into the bottom portion of the casing 1^a beneath the flange 44 so as to cooperate with the cam faces 45, 46. By this arrangement, the piston 3^a is rotated between the two projections 12^a and
 10 47 and the piston is thereby positively raised and lowered. This construction obviates the necessity of utilizing the spring 11 or other resilient device for raising the piston and holding the same in contact
 15 with the stud or projection 12^a. It also permits of the use of a much lighter and weaker spring 23, since it requires less power to overcome the friction of the cam faces against the studs 12^a and 47 in restoring the piston to normal position. The
 20 tendency of the piston is to drop by its own weight, and, therefore, the spring 23 has to act only against the resistance of the oil in passing through the restricted opening of
 25 the passageway which is controlled by the check valve.

To prevent leakage around the threads of the studs 12^a, 47, the studs are preferably provided with heads 48 which are tightened
 30 against gaskets or packing rings 49 in countersunk depressions 50 in the casing.

Obviously, the device admits of considerable modification without departing from my invention. Therefore, I do not wish to
 35 be limited to the specific construction and arrangement shown.

What I claim as my invention and desire to secure by Letters Patent is:

1. A door check comprising a casing having a cylindrical chamber adapted to contain a liquid, a piston arranged to rotate and reciprocate therein and having an upstanding annular flange portion whose upper edge is inclined to constitute a cam, said piston also
 40 having a passageway therethrough, a downwardly opening check valve therein, means for preventing the valve from entirely closing and for regulating the size of the opening left unclosed, a stop projecting into said
 45 cylindrical chamber from the side of the casing above the annular flange of said piston, means including a spring for rotating said piston, and means for holding said piston with its annular flange portion in
 50 contact with said stop whereby the piston is forced downwardly when it is rotated in one direction, and is raised when it is rotated in the opposite direction.

2. A door check comprising a casing having a cylindrical chamber adapted to contain a liquid, a piston arranged to rotate and reciprocate therein, and having an upstanding annular flange portion whose upper edge is inclined downwardly on opposite sides of a
 60 neutral high point so as to constitute two

like cams, said cams each comprising two portions of different pitch, and said piston having a passageway therethrough, a downwardly opening check valve therein, means for preventing the valve from entirely closing and for regulating the size of the opening left unclosed, a stop projecting into said cylindrical chamber from the side of the casing above the annular flange of said piston, means for holding said piston with its
 70 annular flange portion in contact with said stop, whereby the piston is raised when it is rotated in a direction to move its neutral high cam point away from said stop and is forced downwardly when it is rotated in a direction to bring said high cam point under said stop, means including a lever arranged to rotate said piston while the door is being opened, said means also being adapted to normally hold said piston with its neutral
 75 high cam point under said stop after the door is closed, and also including a detachable and reversible spiral spring arranged with one end stationarily secured with respect to said casing, and its opposite end secured to said piston, whereby, when said piston is rotated during the opening of the door, said spring is wound, and said spring being adapted by its reaction to reversely rotate said piston and effect the closing of
 80 the door.

3. A door check comprising a casing having a cylindrical chamber adapted to contain a liquid, a cylindrical cup-shaped piston arranged to rotate and reciprocate therein, the annular flange portion of said piston being provided on its upper edge portion with two like cam faces which are inclined downwardly on opposite sides of a neutral high point, said piston also having an upstanding stem portion provided with an axial bore therethrough, the bottom portion of said axial bore being counterbored, a ball-valve mounted in said counterbore, a rod mounted in said axial bore and adapted to be adjusted endwise thereof, the lower end of said rod being reduced and adapted to cooperate with said ball-valve to limit the closed position thereof, said central stem portion also having cross ports therethrough which communicate with said axial bore above the bottom of said piston, a stop projecting into said cylindrical chamber above the annular flange portion of said piston, means for holding said piston with its annular flange portion in contact with said stop whereby the piston is raised when it is rotated in one direction and is forced downwardly when it is rotated in the opposite direction, means for rotating said piston in one direction while the door is being opened, and a detachable and reversible spiral spring adapted to have one end stationarily secured with respect to said casing and its opposite end secured to said central stem portion of
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the piston, whereby, when said piston is rotated while the door is being opened the spiral spring is wound, and said spiral spring being adapted by its reaction to re-
5 versely rotate the piston and close the door.

4. A door check comprising a casing having a cylindrical chamber adapted to contain a liquid, a piston arranged to rotate and reciprocate therein, said piston having
10 a passageway therethrough with a downwardly opening check-valve therein, means for preventing the check-valve from entirely

closing and for regulating the size of the opening left unclosed, means for rotating said piston, means for raising the piston 15 when it is rotated in one direction, and means for forcing said piston downwardly when it is rotated in the opposite direction.

Signed at St. Louis, Missouri, this 22nd day of November, 1909.

JOHN SCHMIDT.

Witnesses:

G. A. PENNINGTON,
J. B. MEGOWN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
