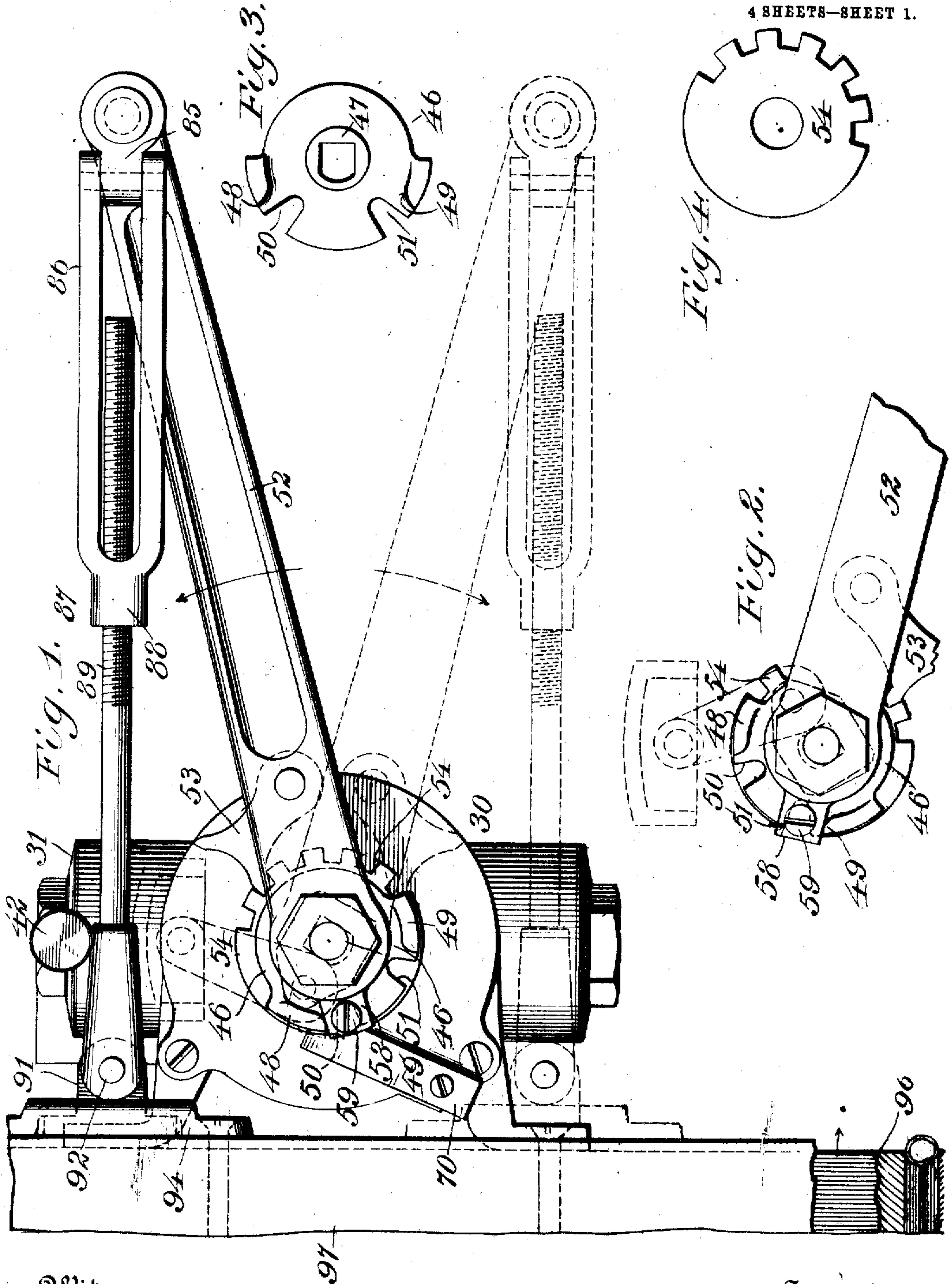


J. BARDSLEY.
DOOR CLOSER AND CHECK,
APPLICATION FILED SEPT. 30, 1908.

915,819.

Patented Mar. 23, 1909.

4 SHEETS—SHEET 1.



Witnesses:
All Brudine.
Arthur Marion.

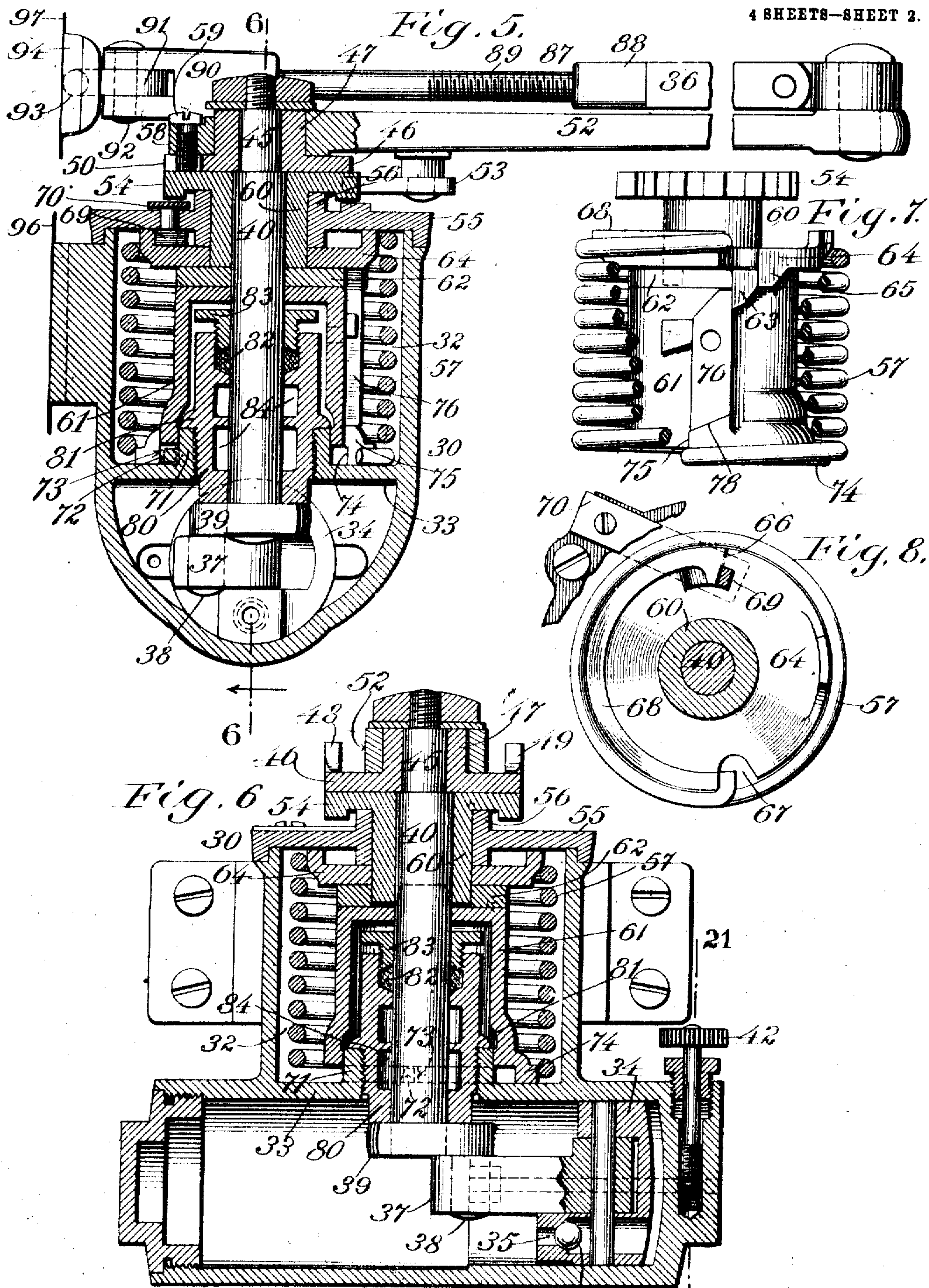
Inventor
Joseph Bardsley,
By his Attorney
Chas. E. Hill

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4 SHEETS—SHEET 2.



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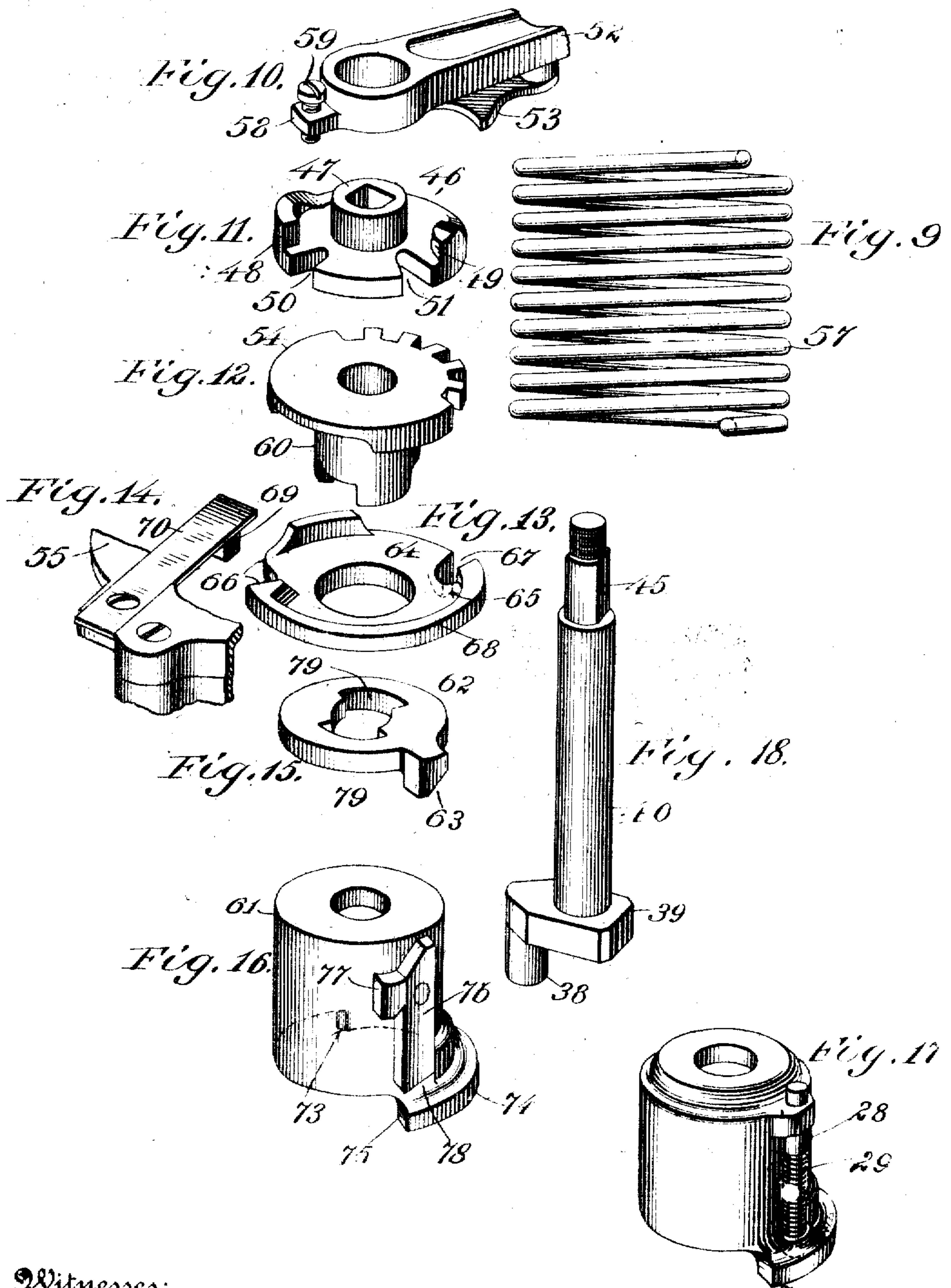
Inventor
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4 SHEETS—SHEET 3.



Witnesses:
All Bundeine
Arthur Marion.

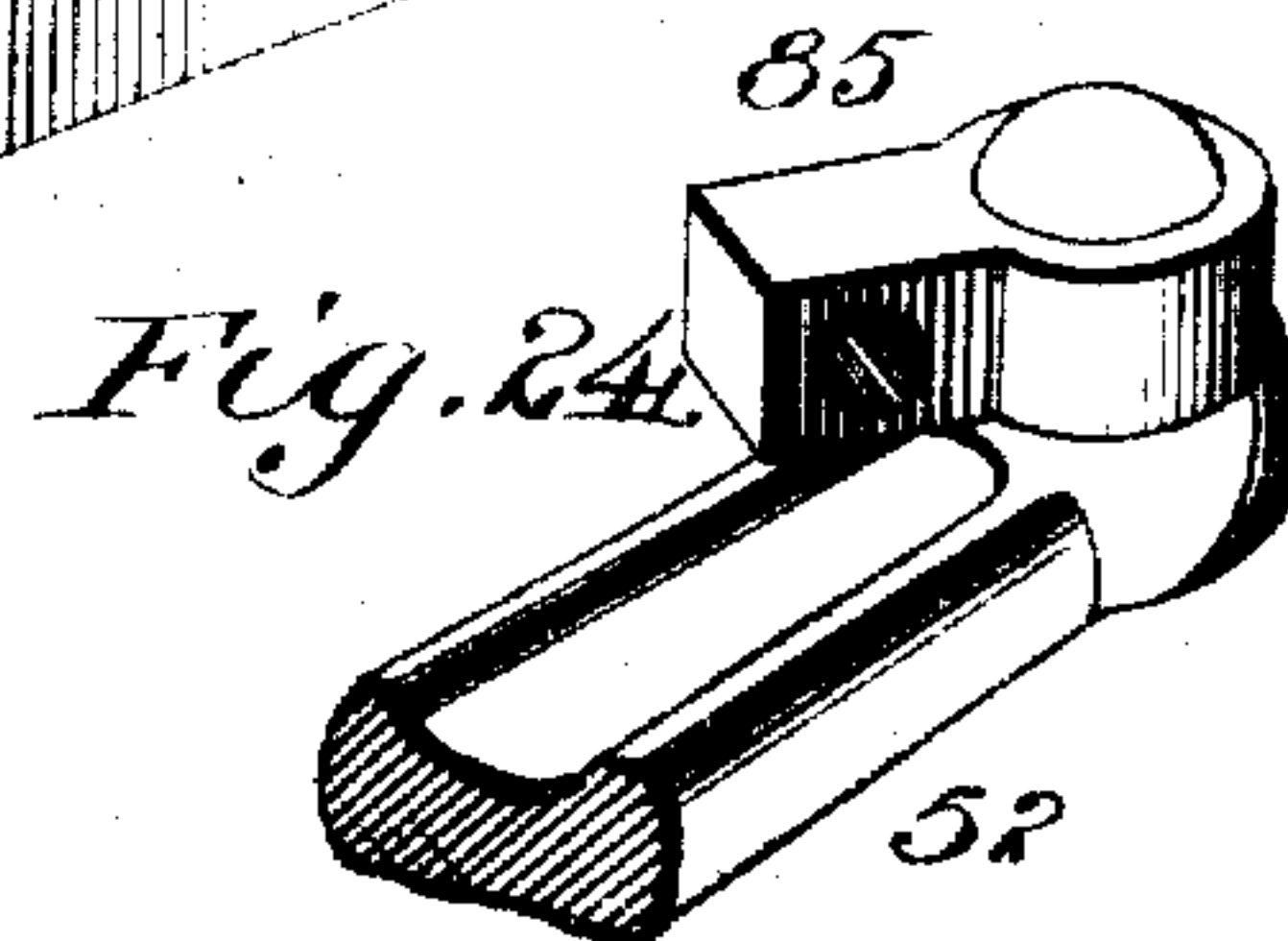
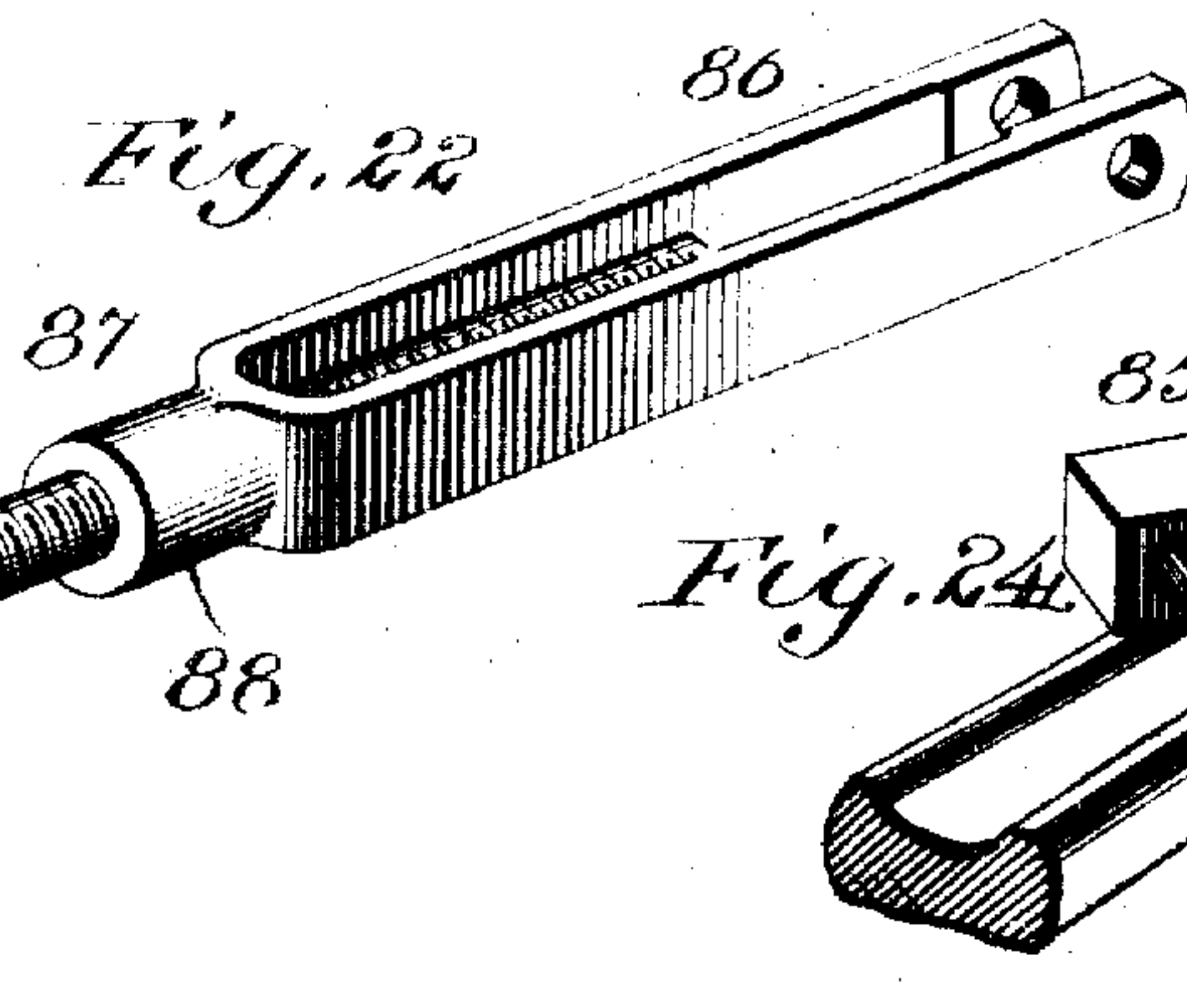
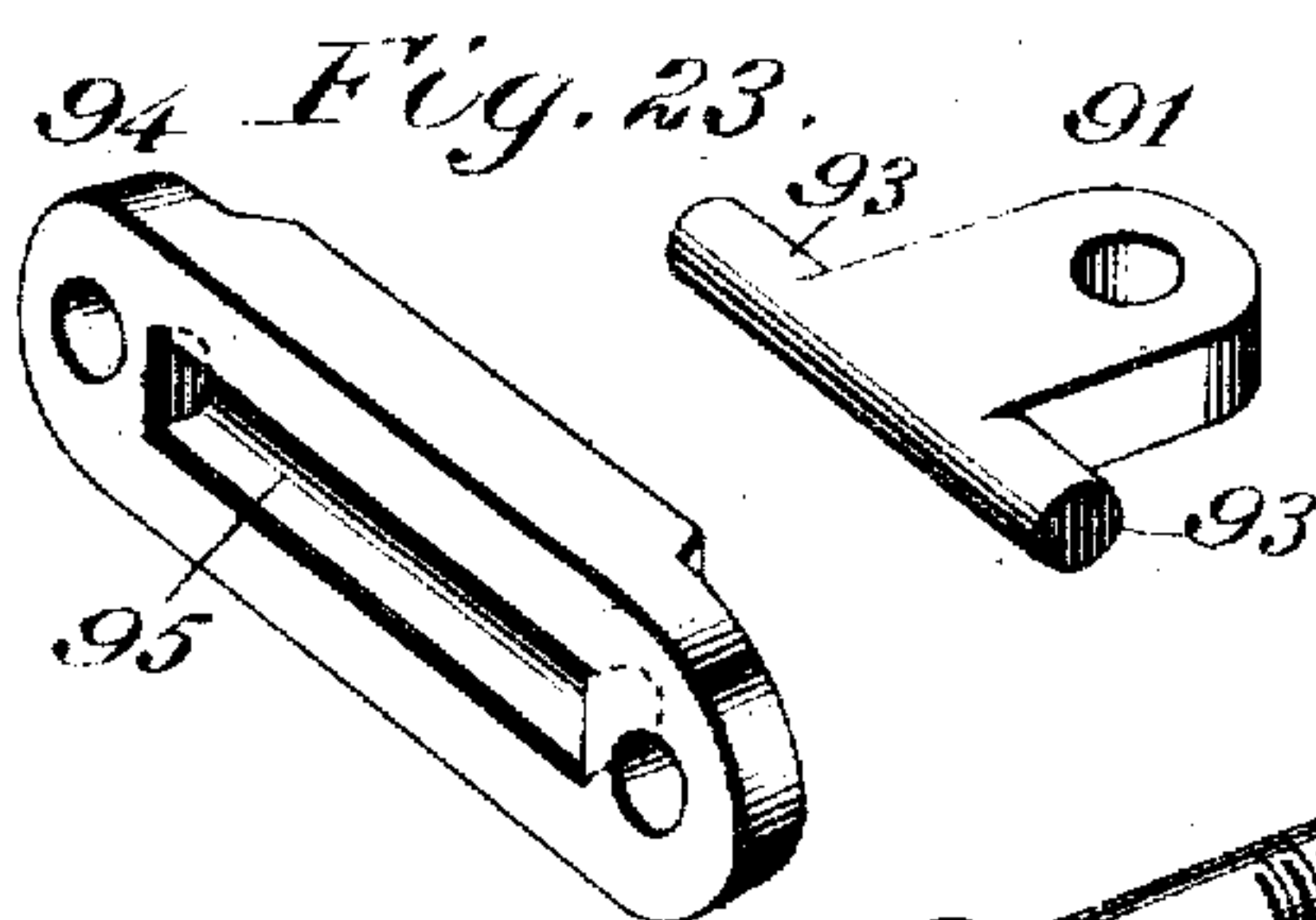
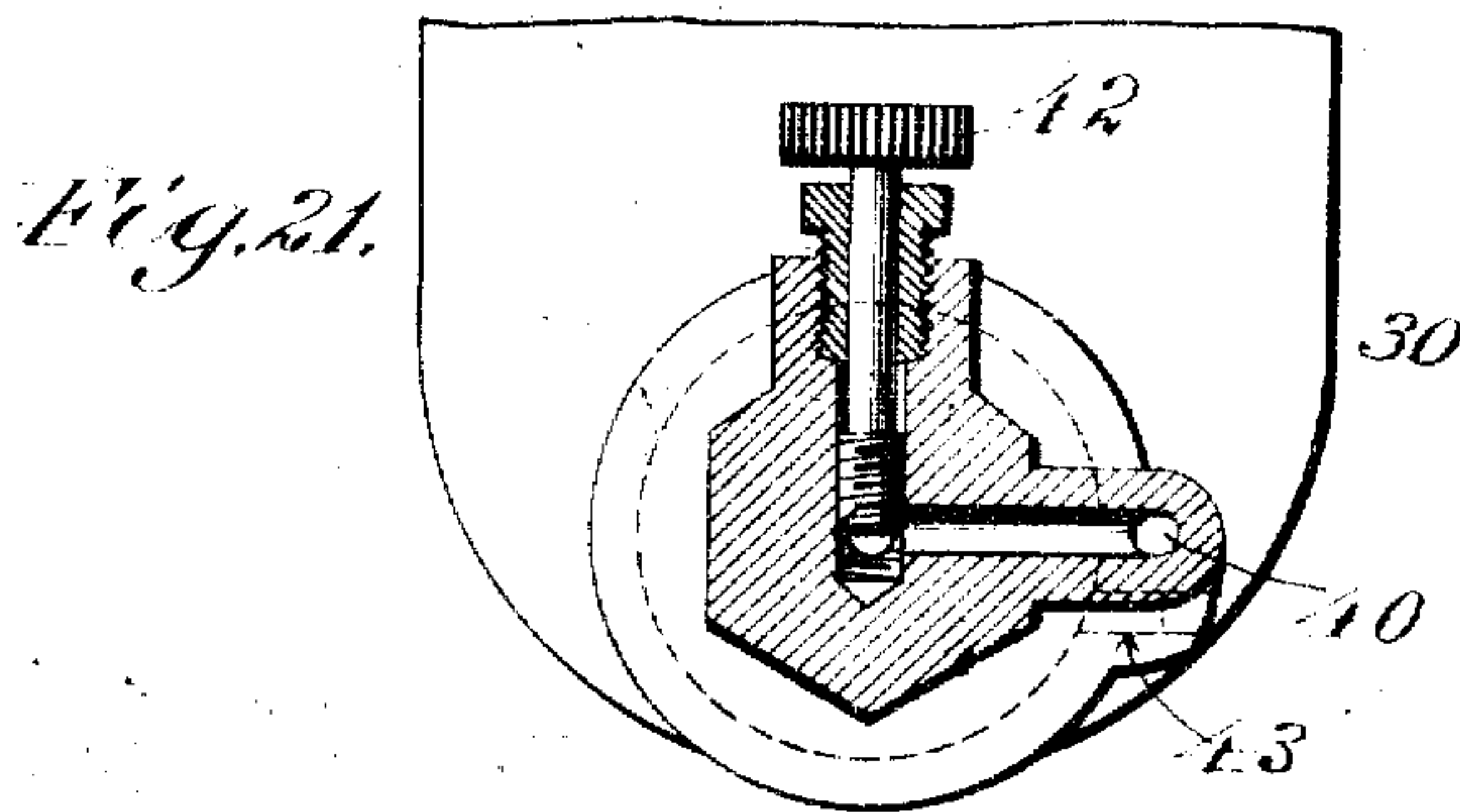
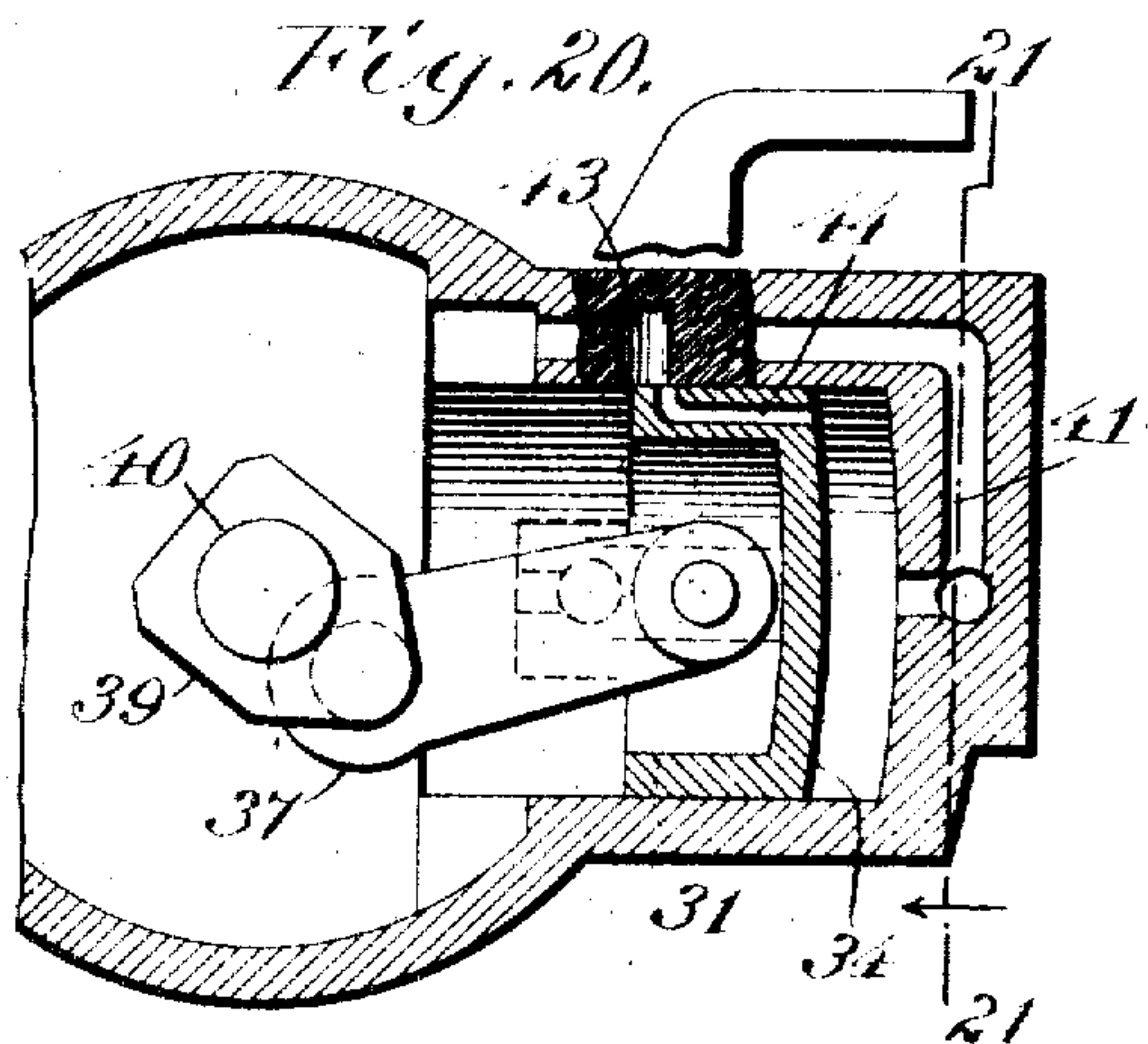
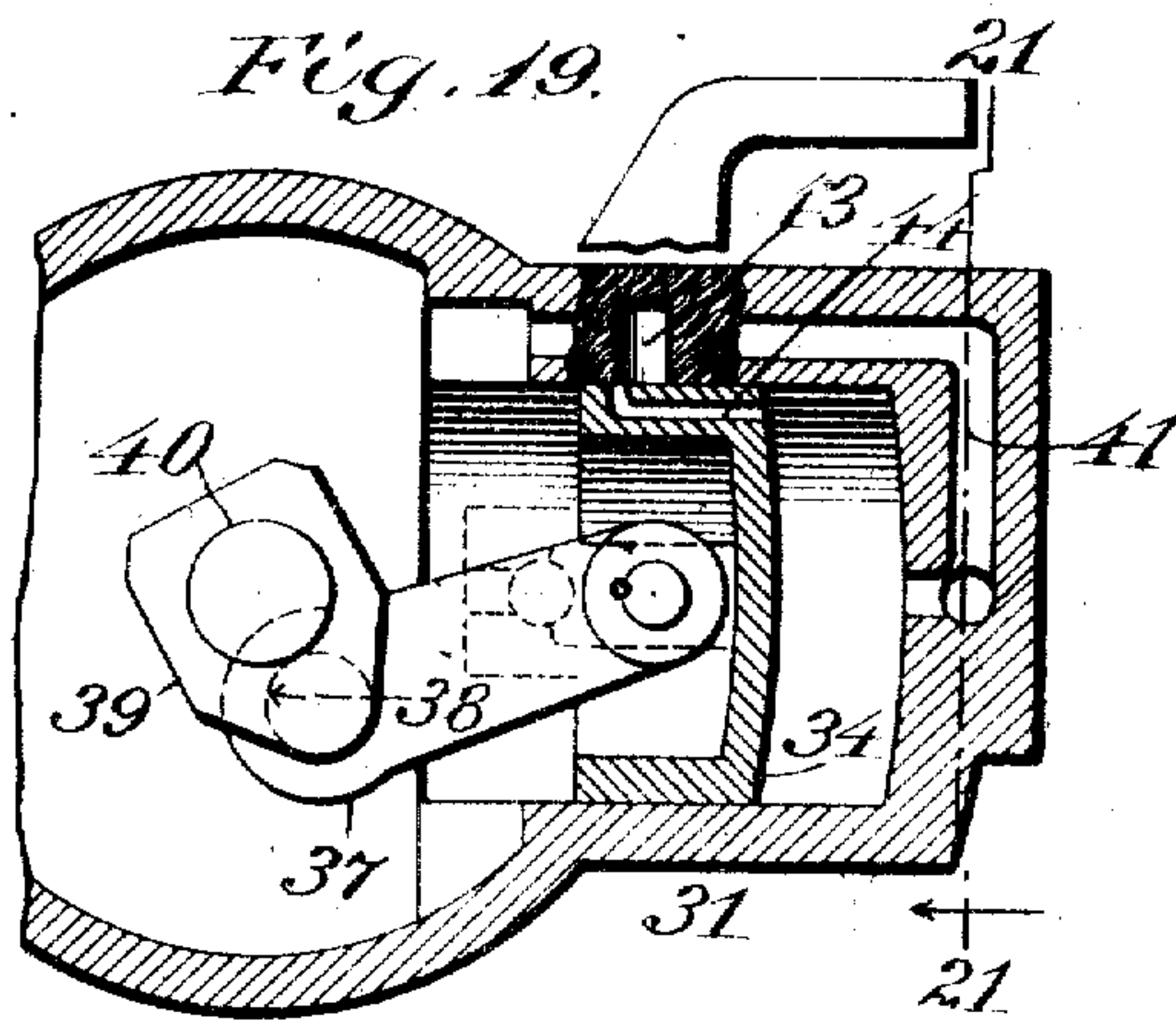
Inventor
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By his Attorney Chas. C. Gill

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Patented Mar. 23, 1909.

4 SHEETS—SHEET 4.



Witnesses:
Alfred B. Bardsley
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Inventor
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By the Attorney
Chas. C. Gill

UNITED STATES PATENT OFFICE.

JOSEPH BARDSLEY, OF MONTCLAIR, NEW JERSEY.

DOOR CLOSER AND CHECK.

No. 915,819.

Specification of Letters Patent.

Patented March 23, 1909.

Application filed September 30, 1908. Serial No. 455,558.

To all whom it may concern:

Be it known that I, JOSEPH BARDSLEY, a citizen of the United States, and a resident of Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Door Closers and Checks, of which the following is a specification.

The invention relates to improvements in door closers and checks; and it consists in the novel features, arrangements and combinations of parts hereinafter described, and particularly pointed out in the claims.

The object of the invention is to provide an entirely efficient and durable door closer and check adapted without change in its interior mechanism or the removal and adjustment of the lever arm on the actuating spindle; for either right or left hand doors, the closer embracing a double-acting spring which may be wound from one end during the opening of a right hand door and from the other end during the opening of a left hand door.

The door check and closer also comprises special features of arrangement and construction whereby the proper checking action at the proper point during the closing of the door may be secured and the door closed and latched without slamming.

A further feature of the invention resides in the novel means provided for sealing the liquid in the cylinder of the check and excluding it from the spring chamber; and a further feature of the invention comprises a novel construction and connection of the lever arm and connecting rod with each other and with the door or door-frame, whereby certain adjustments may be secured insuring the proper application of the device to position and its efficient operation.

In the preferred construction, the closing spring is arranged to be operated during the opening of the door, directly from the exposed lever-arm and independently of the actuating spindle and the spindle is rotated to retract the piston by novel means applied on its upper exposed end cooperating with said lever-arm and which adapt the mechanism for either right or left hand doors.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a top view of a door check and closer constructed in accordance with and

embodying the invention and applied to a right hand door, the several parts being shown in the position they occupy when the door is in its closed position; Fig. 1 represents by dotted lines the position the actuating lever-arm and connecting rod will have when the mechanism is applied to a left hand door; Fig. 2 is a detached top view, partly broken away, illustrating the position of the lever-arm and its pawl and cooperating plates when the mechanism is applied to a left hand door; Fig. 3 is a detached top view of a plate applied on the upper end of the actuating spindle for operating the latter from the lever arm, said plate being independent of the toothed plate shown in Figs. 1 and 2 whereby, by means of the pawl connected with the lever arm, the spring is actuated; Fig. 4 is a detached top view of a toothed plate for cooperation with the lever-arm and pawl thereon for actuating the spring; Fig. 5 is a central vertical transverse section, partly broken away, through the door closer and check; Fig. 6 is a vertical longitudinal section through the same on the dotted line 6-6 of Fig. 5; Fig. 7 is a detached front elevation, partly broken away, of the mechanism confined within the spring chamber; Fig. 8 is a top view, partly in section, of the same, a portion of the top of the exterior casing being illustrated for the purpose of showing the spring carrying the upper stop for the top plate connected with the spring; Fig. 9 is a detached side elevation of the closing spring; Fig. 10 is a detached perspective view of the inner end of the lever-arm; Fig. 11 is a detached perspective view of the plate by which from the lever-arm the actuating spindle is operated independently of the closing-spring; Fig. 12 is a detached perspective view of the toothed plate whereby from the pawl on the lever-arm the closing spring is actuated, said plate having depending therefrom a key-portion for connection with the parts more immediately in engagement with the ends of the spring; Fig. 13 is a detached perspective view of the top plate connected with the closing spring and through the center of which the depending key, shown in Fig. 12, passes in the assembling of the parts; Fig. 14 is a detached perspective view of a portion of the exterior casing carrying a spring having on its inner end a stop for cooperation with the plate shown in Fig. 13; Fig. 15 is a detached perspective view of a plate to be loosely mounted on the actuating

spindle below the plate shown in Fig. 13 and receive the depending key illustrated in Fig. 12; Fig. 16 is a detached perspective view of a cylindrical frame to be mounted freely on the actuating spindle and connected with the lower end of the closing spring, said frame being provided with a movable stop for coöperation with the downwardly projecting lug of the plate shown in Fig. 15; Fig. 17 is a perspective view of a slightly modified form of the cylindrical frame and movable stop thereon shown in Fig. 16; Fig. 18 is a detached perspective view of the actuating spindle, with the crank-arm and pin carried on the lower end thereof; Fig. 19 is a horizontal section through a portion of the exterior casing and liquid-cylinder and illustrates the position of the piston when the door is approaching or nearly at its closed position, the crank on the lower end of the actuating spindle and the rod connecting it with the piston being shown in the position they will occupy when the mechanism is on a left hand door, this being the opposite position to that shown in Fig. 1 which represents the closer-check applied to a right hand door; Fig. 20 is a like view of the same, the piston being at its outer position with the liquid at the outer end of the piston releasing through a special port for assuring the latching and gentle, though firm, closing of the door; Fig. 21 is a sectional view on the dotted line 21—21 of Figs. 19 and 20 through a portion of the outer end of the liquid cylinder, Fig. 21 being presented to illustrate the by-pass and means for controlling the same; Fig. 22 is a detached perspective view of the connecting rod whereby the actuating lever-arm is connected with the door-frame or door, as the case may be; Fig. 23 illustrates in perspective a link-plate and bracket whereby one end of the rod shown in Fig. 22 is to be secured to a door frame or door, the said plate to be secured on a vertical pivot to said rod and have its laterally projecting trunnions or pins held within a chamber in the bracket, which is to be fastened by screws to a door-framing or door; and Fig. 24 is a detached perspective view, partly broken away, of the outer end of the lever-arm and the means thereon for flexibly receiving and holding the connecting rod of Fig. 22.

In the drawings, 30 designates the exterior casing comprising the cylinder 31 and spring-chamber 32, said cylinder being disposed below said spring-chamber, as usual, and separated therefrom by means of a partition 33 and the sealing means hereinafter described, whereby the liquid supplied to the cylinder 31 is excluded from the spring-chamber.

Within the cylinder 31 is arranged the usual piston 34 having the through aperture 35 (Fig. 6) adapted to be closed by a valve 36 during the closing of the door. To the piston 34 is pivotally connected the outer

end of the piston-rod 37 whose inner end is apertured to fit upon a pin 38 depending from the crank-arm 39 which is rigidly secured upon or formed with the lower end of the actuating spindle 40. The cylinder 31 is provided with a by-pass 41 extending by the piston 34 and adapted to be controlled by an adjusting screw 42 in a well-known manner. The cylinder 31, in addition to the by-pass 41, has in its side wall below the plane of the by-pass, a recess 43 (Figs. 19 and 20) which coöperates with a port or by-pass 44 formed in the wall of the piston 34 and adapted at its inner end, during the latter portion of the closing movement of the door, to pass into communication with said recess 43, while the outer end of said port or by-pass 44 is always open to the outer end of the cylinder. The inner end of the by-pass 44 is at a right angle to the longitudinal axis of the piston and is closed by the wall of the cylinder 31 except when said end passes into communication with the recess 43, at which time the liquid at the outer end of the piston 34 may pass through the by-pass 44 and into the recess 43, and after the piston reaches the position shown in Fig. 20, said liquid may escape to the inner end of the piston, since the recess 43 is of sufficient width to become partly uncovered by the piston while the inner end of the by-pass is in line with said recess. It is intended that the piston 34 shall attain the position in which it is shown in Fig. 20 at the closing point of the door so that a sudden release of the liquid from the outer end of the piston may take place through the by-pass 44 and recess 43, whereby, the checking action becoming suddenly relieved, the closer may exert its maximum force in effecting the final closing action and the latching of the door. The novel feature connected with the cylinder 31 and piston 34 resides in the provision, in the present instance, of the by-pass or port 44 and recess 43 arranged to effect a sudden release of the checking action at the closing point of the door, without causing the door to slam but firmly closing and latching it.

The actuating spindle 40 extends upwardly through the spring chamber 32 and has detachably secured upon its upper angular portion 45 (Fig. 18), a plate or member 46 (Fig. 11) which is in the form of a disk having a vertical hub 47, oppositely disposed abutments or shoulders 48, 49, and recesses 50, 51, adjacent to said abutments. Upon the hub 47 is detachably secured the inner end of the lever-arm 52 carrying the pivoted double-pointed pawl 53 for engagement with the toothed plate 54 (Fig. 12), which is exposed above the cap 55 closing the upper end of the spring chamber 32 and having a central vertical tubular hub portion 56 whose upper end passes within an annular recess formed in the underside of said plate 54, as

shown in Figs. 5 and 6. The top of the plate 54 is flat and receives upon it the lower flat face of the plate 46, and the lever 52 is connected with the plate 46 for acting through it on the actuating spindle 40, while the pawl 53 and plate 54 are for the purpose of acting on the closing spring 57 independently of the spindle 40.

The lever-arm 52 is formed with a reduced portion which, for convenience, may be designated an arm 58 and which is confined upon the surface of the plate or member 46 between the abutments 48, 49, and said arm 58 may be provided with a screw 59 for engagement with one or the other of the recesses 50, 51, formed in said plate or member. When the lever-arm 52 is arranged for use on a right hand door, as shown by full lines in Fig. 1, the arm 58 will be in engagement with the abutment 48, and the screw 59 may then be screwed downwardly into the recess 50 for retaining the said lever-arm in rigid position, and when the lever-arm 52 is arranged for a left hand door, as shown by dotted lines in Fig. 1 and full lines in Fig. 2, the arm 58 will be in engagement with the abutment 49 and the screw 59 may then be screwed downwardly into the recess 51, for retaining the lever-arm in position. The surface 45 on the actuating spindle 40 is of irregular shape and the hub 47 of the plate 46 has a correspondingly-shaped bore to fit upon said surface 45, and the purpose of the irregularity in the form of the surface 45 and of the bore in the hub 47 is to prevent the application of the plate 46 on the upper end of the spindle 40 except in one position, whereby an inexperienced person in assembling the parts is prevented from placing the plate 46 on the spindle 40 except in a correct position. The surface 45 on the spindle 40 is given an angular outline in cross-section so that said spindle may be rotated by means of the plate 46, which will be rotated during the opening of the door by means of the lever-arm 52 acting through the arm 58 against one or the other of the abutments 48, 49 or through the screw 59 acting against the walls of one or the other of the recesses 50, 51. While I have provided the screw 59 for positively connecting the lever-arm 52 with the plate 46 said screw is not essential and the door check-and-closer is perfectly operative without it, as will hereinafter appear. The double-ended pawl 53 is provided to engage one of the notches of the plate 54 and will be placed in engagement with that particular notch of said plate that will enable the proper tension to be created in the closing spring 57. One point of the pawl 53 will be caused to engage the plate 54 when the mechanism is arranged for a right hand door, as shown in Fig. 1, and the other point of the pawl will be placed in engagement with said plate 54 when the mechanism is

arranged for a left hand door, as shown in Fig. 2.

The plate 54 is formed with a depending key-portion 60 which is cylindrical in outline and has a smooth bore. The key-portion 60 passes downwardly through the hub 56 of the cap 55 and is received upon and affords a bearing for the upper portion of the spindle 40.

Within the spring-chamber 32 is arranged the closing spring 57, a cylindrical cap-frame 61 (Fig. 16), a plate 62 having a depending lug 63 (Fig. 15), and a plate 64 (Fig. 13) having a depending lug 65 (Fig. 7), an upwardly extending shoulder 66, and a recess 67, the shoulder 66 being formed at one end of a segmental edge flange 68 formed on the plate 64 and terminating at one end at the edge of the recess 67 whereat a second shoulder is created. The shoulder formed at the recess 67 by the end of the flange 68 receives the upper inwardly bent end of the closing spring 57, as shown in Figs. 7 and 8. The shoulder 66 cooperates with a depending stop 69 carried by a spring 70 which is fastened at its outer end by a screw upon the cap 55. The stop 69 passes downwardly through a hole in the cap 55 in position to be engaged by the shoulder 66 for arresting the plate 64 against undue reverse movement and for holding said plate in a proper initial position. The cap-frame 61 receives upon its upper end the plate 62, and the plate 64 is placed upon the plate 62, and these three parts of the mechanism are all mounted on the actuating spindle 40 and are encircled by the closing spring 57.

The cap frame 61 is mounted on the bottom of the spring chamber 32 or on the partition 33 and receives within its lower end the upwardly projecting collar 71 on one edge of which is formed a shoulder or abutment 72 (Fig. 5) to engage a shoulder 73 formed by one end of a segmental flange 74 constituting a part of the frame 61. The flange 74 extends about half way around the lower edge of the frame 61 and one of its ends forms the shoulder 73 while the other end 75 forms a shoulder on which the lower inwardly bent end of the closing spring 57 may be hooked, as shown in Figs. 5 and 7. On the side of the frame 61 shown in Fig. 16 is provided a stop 76 which may yield against pressure applied to one edge of its upper end but which affords an abutment against pressure applied to the other edge of its upper end. The stop 76 shown in Fig. 16 is in the form of a pivoted bar having one side of its upper portion beveled and arranged to initially stand against a rigid shoulder 77 located adjacent to the upper end of said bar. The lower end of the bar is beveled and arranged to engage a beveled shoulder 78 (Fig. 7) formed on the frame 61. When lateral pressure is applied

The plate 62 is formed with the depending lug 63 which sets outwardly from the general periphery of the plate and is adapted at one edge to engage the stop-bar 76, as shown in Fig. 7, and at its other edge forms a shoulder against which the depending lug 65 of the upper plate 64 may press. The lower edge of the lug 63 of the plate 62 is beveled on one side to ride against the beveled edge at the upper end of the bar 76 (or against the upper end of the rod 24, if said rod is used in lieu of the bar 76) and pass by the same at the proper time or during the assembling of the parts of the mechanism. When the parts are assembled within the spring chamber 32 and the spring 57 is under tension, the upper end of the spring acts against the plate 64 to press its shoulder 66 against the stop 69, and said stop prevents the rotation of said plate under the stress of the spring, whereby the spring is prevented from unwinding at its upper end. The lower end of the closing spring 57 exerts its force through the shoulder 75 on the cap-frame 61 to turn the latter, but said frame is initially held in rigid position against the stress of the spring by the engagement of the shoulder 73 on said frame with the rigid stop 72 integral with the general casing. The upper plate 64 thus rigidly holds the upper end of the spring 57 and the frame 61 rigidly holds the lower end of said spring, whereby said spring is prevented from unwinding and losing the tension which may be given to it upon the assembling of the mechanism. During the use of the door-check and closer the cap-frame 61 is rotated during the opening of a left hand door to wind the spring from its lower end, the upper end of the spring being then held stationary by the plate 64 and stop 69, and during the opening of a right hand door the upper end of the spring 57 is wound by the rotation of the plate 64, the lower end of the spring being

The means for rotating the plate 62 for winding the spring 57 from either end, or in other words, for rotating the plate 62 in either direction, is the key-portion 60 connected with the toothed plate 54, which portion 60 passes downwardly through the hub 50 of the cap 57, and the central opening in the plate 64 and enters recesses 79 (Fig. 15) at opposite sides of the bore of the plate 62, said key-portion 60 engaging the shoulders formed at the ends of said recesses 79 and becoming locked, so far as rotary movement is concerned, with said plate 62, so that any rotary movement imparted to the plate 54 by the pawl 53 and by the plate 54 to the key-portion 60 thereof, will be communicated to the plate 62, which, when moved in one direction or to the left (looking at Fig. 7), will turn the cap-frame 61 to wind the spring 57 from its lower end and when turned in a reverse direction will rotate the upper plate 64 to wind the spring 57 from its upper end.

The collar 71 formed integrally with the partition 33 separating the liquid and spring chambers, is threaded on its inner surface or bore to receive the lower threaded portion of a cylindrical bearing 80 for the spindle 40, said bearing 80 being screwed into the collar 71 and preferably formed with an annular shoulder 81 to engage the upper edge of said

collar. The lower end of the bearing 80 extends downwardly into the liquid chamber and in close relation to the upper surface of the crank-arm 39. The upper end of the bearing 80 is recessed, as at 82, to receive packing material and a gland-nut 83. Below the recess 82 the interior of the bearing 80 is formed with annular recesses 84, which are left empty and which aid materially in preventing oil or other liquid from creeping upwardly around the spindle 40. The bearing 80 is of considerable length in proportion to the length of the spindle 40, and its purpose is not only to afford a bearing for said spindle but to effectually seal the liquid within the liquid chamber, it being my intention to exclude the liquid from the spring chamber. The cap-frame 61 affords a housing for the bearing 80 and gland-nut 83 and is applied to position after the bearing 80 and spindle 40 have been given their positions.

The lever arm 52 from which motion is communicated to the piston 34 and closing spring 57, is in itself of usual construction with the exception of the provision thereon of the arm 58 for cooperation with the plate 46. To the outer end of the lever arm 52 is pivotally secured on a vertical pin a short arm 85 (Fig. 24) to which is pivotally secured the outer forked end of the adjustable section 86 of the connecting rod 87 by which the lever 52 is connected with the door or the casing over the door as the case may be, said arm 85 freely fitting between the members of said forked section 86 and being held therein on a horizontal pin, as indicated in Fig. 1. The section 86 of the connecting rod 87 has a threaded hub 88 at one end, and this hub receives the externally threaded rod 89, upon whose outer end is a forked head 90 which is pivotally secured to a link 91 (Fig. 23) on a vertical pin 92 (Fig. 5), the end of said link being held between the members of the forked head 90 and said members and link 91 being vertically apertured to receive the pivot pin 92. The link 91 has, at opposite sides of its outer end laterally extending integral trunnions 93 which have a bearing in the bracket 94 to be secured to the door casing by screws, as indicated in Fig. 1. The bracket 94 is elongated horizontally and contains bearings 95 for the trunnions 93, and said bracket at its outer face is slotted to permit the projection therethrough of the outer end of the link 91. The object in pivotally securing the outer end of the connecting rod 87 to the arm 85 pivoted to the lever arm 52 and of connecting the inner end of said rod with the swiveled link 91, is to permit of the adjustment of said rod with the varying conditions of doors, the features referred to creating flexible joints and permitting the rod 87 to be inclined with relation to the lever-arm 52 when occasion requires. I regard it as of considerable importance that the con-

necting rod at its end adjoining the door casing is jointed to permit of the adjustment of that end of the rod, since door casings, due to moldings over the doors, present various conditions necessary to be met in securing the rod 87 thereto.

In assembling the parts of the door closer and check, the spring 57 will be given an initial tension by means of the plate 54 and its key portion 60, the winding of the spring 75 in providing its initial tension taking place from the upper end of the latter and during which the right hand edge of the lug 63 of the plate 62 will be carried (toward the right, looking at Fig. 7) against the lug 65 of the plate 64 until the shoulder 66 of said plate 64, passes behind the stop 69 carried by the spring 70 or to the position shown in Fig. 8. During the winding of the spring 57 for imparting to it its initial tension, the lug 63 of the plate 62 will at first be at the left of the pivoted stop bar 76 carried by the frame 61, and as said plate 62 is rotated in a direction toward the right (looking at Fig. 7), its beveled edge will move against the beveled edge of and tilt the stop bar 76 so as to pass by the same, and thereupon after the turning action of the plate 54 to adjust the spring is released, the lug 63 will return against and be held stationary by the stop bar 76 and the plate 64 will be held stationary by the engagement of its lug 65 with the lug 63 of the plate 62, and the frame 61 will be held stationary by the engagement of its shoulder 73 with the rigid stop 72 at the bottom of the spring chamber. If the frame 61 has the stop rod 22 instead of the bar 76, the lug 63 when moved toward the right, as just above described, will depress the said rod in passing it and the spring 29 will restore said rod to its upper position as soon as the said lug has moved beyond it, said rod then serving as a stop for said lug and performing the same functions as the bar 76.

I illustrate the general casing 30 as secured to the door 96 (Fig. 1) and the connecting rod 87 as secured to the lintel or framing 97 over the door, with said rod and the lever-arm 52 arranged for a right hand door. In this condition of the parts, when the door is opened, the lever-arm acting through the plate 46 and spindle 40, will retract the piston 34 inwardly, the liquid then passing through the opening 35 to the outer end of the cylinder, and at the same time the said lever-arm 52 acting through the plate 54, key-portion 60 thereof, and plate 62, will effect the rotation of the plate 64 to wind the spring 57 from its upper end, the shoulder 66 on said plate 64 then receding from the stop 69 therefor, and the cap-frame 61 being rigidly held against following the plate 62, 64 by the engagement of its shoulder 73 with the stop 72. When the door is released, the spring 57 acting through the plate 64, plate 120

62, plate 54, pawl 53, lever-arm 52 and rod 87, will close the door, and, while doing so, cause the lever-arm 52 to impart reverse rotary movement to the spindle 40 whereby, through the crank-arm 39 and piston rod 37, the piston 34 will be forced against the liquid confined at its outer end and thereby check the closing action of the door.

When the mechanism is to be applied to a left hand door, the lever-arm 52 and connecting rod 87 will be given the position in which they are shown by dotted lines in Fig. 1, and thereupon during the opening of the door the spring will be wound from its lower end through the plate 62 and frame 61 in the manner hereinbefore described, and the piston 34 and cylinder 31 will perform exactly the operation above described with respect to a right hand door. The only change necessary in adapting the mechanism from its arrangement from a right hand door to that required for a left hand door is simply to swing the lever-arm 52 to the proper side of the center line of the actuating spindle 40 and reverse the pawl 53.

When a door closer and check is applied to a door the person applying the mechanism will be facing the door and the lever-arm 52 will be pointed toward him, and if he is applying the mechanism to a right hand door he will swing the lever-arm 52 toward his right, while if he is applying the mechanism to a left hand door he will swing the lever arm 52 toward his left, these being the two positions shown in Fig. 1. The appropriate additional tension may be placed on the closing spring 57 by adjusting the pawl 53 with relation to the notches or teeth of the plate 54. During the use of the door closer and check on a right hand door, the arm 58 of the lever-arm 52 will act against the abutment 48 of the plate or member 46 in turning the spindle 40 and thereby moving the piston 34, and during the employment of the mechanism on a left hand door, the arm 58 will engage the abutment 49 of said plate 46 in operating the spindle 40 and piston 34. During the first application of the mechanism to a door the arm 58 of the lever-arm 52 may be against either abutment 48, 49 or midway between the two abutments without detriment to the proper application or operation of the check, since upon the first opening and closing of the door after the check and closer have been applied thereto, the arm 58 will move against its proper abutment. If preferred, however, the lever-arm 52 may be adjusted to move its arm 58 against the proper abutment 48 or 49 and be held in such relation by means of the screw 59. The screw 59 is not necessary, however, since in the natural operation of the check the arm 58 will find its proper abutment the first time the door is opened and closed. If, for illustration, when the mechanism is applied to a right hand

door, as illustrated in Fig. 1, the arm 58 of the lever 52 should stand between and free of both abutments 48, 49, the spindle 40, due to the friction between it and the other moving parts of the mechanism, will on the door being opened, be turned by the lever 52 and retract the piston 34, then unresisted by the liquid in the cylinder 31, and thereupon on the closing of the door the resistance offered by the confined liquid in the outer end of the cylinder 31 to the outward movement of the piston 34 will result in the spindle 40 being momentarily arrested and in the arm 58 moving to and against the abutment 48, said arm thus reaching its correct position and at once cooperating with the plate 46 in moving the piston 34 outwardly. Should, under like conditions, the closer and check be applied to a left hand door, the latter on opening and acting through the lever 52 and movable parts about the spindle 40 will move the latter to retract the piston, and then during the closing of the door the confined liquid at the outer end of the cylinder will, as before, retard the movement of the piston and spindle until the arm 58 of the lever 52 reaches the abutment 49 of the plate 46, and thereupon said arm having reached its correct position for a left hand door, will through the plate 46 and spindle 40 move the piston 34 outwardly.

While it is preferable to employ the raised abutments 48, 49 on the plate 46, it is obvious that with less convenience they may be omitted and the walls of the recesses 50, 51 cooperating with the screw 59 used as substitute abutments therefor, since after any special adjustment of the lever-arm 52 the person applying the mechanism may turn the plate 46 until the recess 50 or 51 is below the arm 58 of said lever-arm and enter the screw into said recess for connecting the lever-arm and plate 46 together. The plate 46 is keyed to and rotates the spindle 40, and said plate and spindle may be adjusted to meet the position of the lever-arm 52, after which they will be moved by said lever-arm. While it is also preferable to employ the arm 58 on the lever-arm 52, said arm 58 is not essential, since the abutments 48, 49 may straddle the main body of said lever-arm instead of a reduced part thereof.

I do not confine my invention to the exact form of plate 46 shown, since the chief purpose of said plate, keyed on the spindle, is to enable the changing of the angular relation of the crank on the lower end of said spindle to the lever-arm 52 by which the spring is operated.

One of the purposes of my invention is to render the closer and check applicable to either right or left hand doors without change in its interior structure and requiring simply the adjustment of the lever-arm 52 and pawl 53 in the manner indicated in Fig. 1.

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

1. In a door-closer and check, a casing forming a spring-chamber and a liquid-cylinder, an actuating spindle extending through said chamber and carrying a crank, a checking piston in said cylinder and connected with said crank, a lever-arm for operating said spindle and spring, and a member keyed to said spindle for changing the angular relation of said crank to said lever-arm; substantially as set forth.

2. In a door-closer and check, a casing forming a spring-chamber and a liquid-cylinder, an actuating spindle extending through said chamber, a member keyed on said spindle above said casing for actuating said spindle and having oppositely disposed abutments, the operating lever-arm between said abutments to be engaged with one or the other thereof in accordance with the direction of motion to be imparted to said member and spindle therefrom, a double-acting spring in said chamber, and means intermediate said lever-arm and the ends of said spring for winding said spring at its respective ends from said lever-arm in accordance with its direction of motion, combined with the checking-piston in said cylinder and means operatively connecting said spindle and piston; substantially as set forth.

3. In a door closer and check, a casing forming a spring-chamber and a liquid-cylinder, an actuating spindle extending through said chamber, a member keyed on said spindle above said casing for actuating said spindle and having oppositely disposed abutments, the operating lever-arm between said abutments to be engaged with one or the other thereof in accordance with the direction of motion to be imparted to said member and spindle therefrom, means for securing said arm in its relation to said abutments, the double-acting spring in said chamber, and means intermediate said lever-arm and the ends of said spring for winding said spring at its respective ends from said lever-arm in accordance with its direction of motion, combined with the checking-piston in said cylinder and means operatively connecting said spindle and piston; substantially as set forth.

4. In a door-closer and check, a casing forming a spring-chamber and a liquid-cylinder, an actuating spindle extending through said chamber, a plate keyed on said spindle above said casing and having oppositely disposed abutments and a vertical hub, the operating lever-arm mounted on said hub between said abutments to be engaged with one or the other thereof in accordance with the direction of motion to be imparted to said plate and spindle therefrom, a double-acting spring in said chamber, and means intermediate said lever-arm and the

ends of said spring for winding said spring at its respective ends from said lever-arm in accordance with its direction of motion, combined with the checking-piston in said cylinder and means operatively connecting said spindle and piston; substantially as set forth.

5. In a door-closer and check, a casing forming a spring-chamber and a liquid-cylinder, an actuating spindle extending through said chamber, a plate keyed on said spindle above said casing and having oppositely disposed abutments, a vertical hub and recesses adjacent to said abutments, the operating lever-arm mounted on said hub between said abutments to engage one or the other thereof in accordance with the direction of motion to be imparted to the plate and spindle therefrom, a screw carried by said arm to enter said recesses for locking said lever-arm in relation to said abutments, the double-acting spring in said chamber, and means intermediate said lever-arm and the upper and lower ends of said spring and free of said spindle for winding said spring at its respective ends from said lever-arm in accordance with its direction of motion, combined with the checking-piston in said cylinder and means operatively connecting said spindle and piston; substantially as set forth.

6. In a door-closer and check, a casing forming a spring-chamber and a liquid-cylinder, an actuating spindle extending through said chamber, a toothed plate freely mounted on said spindle above said casing and having a depending key-portion entering said chamber, a plate keyed on said spindle above said casing for actuating said spindle and having oppositely disposed abutments, the operating lever-arm between said abutments and to be engaged with one or the other thereof in accordance with the direction of motion to be imparted to said plate and spindle therefrom, means adjustably connecting said lever-arm with said toothed plate, a double-acting spring in said chamber, and means intermediate said key-portion and the upper and lower ends of said spring and free of said spindle for winding said spring at its respective ends from said key-portion, combined with the checking-piston in said cylinder and means operatively connecting said spindle and piston; substantially as set forth.

7. A door check comprising a liquid-cylinder, a checking piston in said cylinder, an actuating spindle having on one end a crank within said cylinder connected with said piston, a lever-arm for operating said spindle and a member rigid on said spindle for changing the angular relation of said crank to said lever arm and through which said lever arm acts in operating said spindle; substantially as set forth.

8. In a door closer and check, a casing

forming a spring-chamber and a liquid-cylinder, an actuating spindle extending through said chamber, a plate keyed on said spindle above said casing for actuating said spindle and having oppositely disposed abutments, the operating lever-arm having at its inner end an arm between said abutments to be engaged with one or the other thereof in accordance with the direction of motion to be imparted to said plate and spindle therefrom, a double-acting spring in said chamber, and means intermediate said lever-arm and the ends of said spring for winding said spring at its respective ends from said lever arm in accordance with its direction of motion, combined with the checking-piston in said cylinder and means operatively connecting said spindle and piston; substantially as set forth.

9. In a door-closer and check, the liquid cylinder having a recess (43) in its wall, combined with the actuating spindle and the piston connected with said spindle, said piston having in it a port (44) leading from its front end through its side in position to communicate with said recess when the door is reaching its closed position, and said piston uncovering a portion of said recess in such condition of the door to release the liquid from the outer end of the cylinder; substantially as set forth.

10. In a door-closer and check, a casing affording a spring-chamber and a liquid-cylinder, a main lever-arm (52), the spindle to which said lever-arm is operatively connected, a double-acting spring in said chamber and free of said spindle, a plate (54) loosely mounted upon the upper end of said spindle and having a downwardly extending key-portion, means detachably connecting said plate with said lever-arm so that the latter may rotate said plate in either direction, an intermediate plate (62) also loosely mounted on said spindle and engaged by said key portion and having a lug (63), a plate (64) mounted on and connected with the upper end of said spring and having a downwardly extending lug (65) to cooperate with said lug 63 and a shoulder (66) to engage a stop (69) on said casing, and a rotary frame (61) connected with the lower end of said spring and having a shoulder (73) to engage a rigid stop (72) on said casing and a movable stop (76) to cooperate with said lug 63, combined with the piston in said cylinder, and means operatively connecting said piston and spindle; substantially as set forth.

11. In a door-closer and check, a casing affording a spring-chamber and a liquid-cylinder, a main lever-arm (52), the spindle to which said lever-arm is operatively connected, a double-acting spring in said chamber and free of said spindle, a plate (54) loosely mounted upon the upper end of said spindle and having a downwardly extending

key-portion, means detachably connecting said plate with said lever-arm so that the latter may rotate said plate in either direction, an intermediate plate (62) also loosely mounted on said spindle and engaged by said key-portion and having a lug (63), a plate (64) mounted on and connected with the upper end of said spring and having a downwardly extending lug (65) to cooperate with said lug 63 and a shoulder (66) to engage a stop (69) on said casing, and a rotary frame (61) connected with the lower end of said spring and having a shoulder (73) to engage a rigid stop (72) on said casing and a movable stop (76) to cooperate with said lug 63, said frame 61 being in the form of a cylindrical cap encircling said spindle and extending upwardly to the plates 62, 64 which are at the upper end of said spring, combined with the piston in said cylinder, and means operatively connecting said piston and spindle; substantially as set forth.

12. In a door-closer and check, a casing affording a spring-chamber and a liquid-cylinder, a main lever-arm (52), the spindle to which said lever-arm is operatively connected, a double-acting spring in said chamber and free of said spindle, a plate (54) loosely mounted upon the upper end of said spindle and having a downwardly extending key-portion, means detachably connecting said plate with said lever-arm so that the latter may rotate said plate in either direction, an intermediate plate (62) also loosely mounted on said spindle and engaged by said key-portion and having a lug (63), a plate (64) mounted on and connected with the upper end of said spring and having a downwardly extending lug (65) to cooperate with said lug 63 and a shoulder (66) to engage a stop (69) on said casing, and a rotary frame (61) connected with the lower end of said spring and having a shoulder (73) to engage a rigid stop (72) on said casing and a movable stop (76) to cooperate with said lug 63, said shoulder (66) and stop (69) cooperating to prevent reverse movement of the plate (64) from its initial position and one of which is yielding to permit the other to pass by it in one direction, combined with the piston in said cylinder, and means operatively connecting said piston and spindle; substantially as set forth.

13. In a door-closer and check, a casing affording a spring-chamber and a liquid-cylinder, a main lever-arm (52), the spindle to which said lever-arm is operatively connected, a double-acting spring in said chamber and free of said spindle, a plate (54) loosely mounted upon the upper end of said spindle and having a downwardly extending key-portion, means detachably connecting said plate with said lever-arm so that the latter may rotate said plate in either direction, an intermediate plate (62) also loosely

mounted on said spindle and engaged by said key-portion and having a lug (63), a plate (64) mounted on and connected with the upper end of said spring and having a downwardly extending lug (65) to cooperate with said lug (63) and a shoulder (66) to engage a stop (69) on said casing, a spring (70) fastened to the top of the casing and yieldingly holding said stop (69) in its lower position and a rotary frame (61) connected with the lower end of said spring and having a shoulder (73) to engage a rigid stop (72) on said casing and a movable stop (76) to cooperate with said lug (63), said shoulder (66) and stop (69) cooperating to prevent reverse movement of the plate (64) from its initial position, combined with the piston in said cylinder, and means operatively connecting said piston and spindle; substantially as set forth.

14. In a door-closer and check, a casing affording a spring chamber and a liquid cylinder separated by a partition having a central opening, a vertically elongated tubular bearing (80) screwed into said opening and having a plurality of annular grooves (84) in its bore and a gland nut and packing at its upper end, the actuating spindle extending through said bearing (80) and closing said grooves, the piston in said cylinder, and means operatively connecting said piston and spindle, combined with an operating lever-arm for actuating said spindle, a closing-spring in said chamber, and means connecting said spring and lever-arm; substantially as set forth.

15. In a door-closer and check, a casing affording a spring-chamber and a liquid-cylinder separated by a partition having a central opening, a vertically elongated tubular bearing screwed into said opening and having suitable packing and a plurality of annular grooves, the actuating spindle extending through said bearing and closing said grooves, the vertical cylindrical frame in said chamber and encompassing said bearing, the intermediate plate on said frame and the top plate engaging said intermediate plate, combined with a spring in said chamber and engaging at its respective ends the said frame and top plate, a main lever-arm for actuating said spindle and spring, and a checking piston connected with said spindle, combined with means connecting said intermediate plate with said lever arm, said casing, frame and plates being formed with suitable cooperating stops; substantially as set forth.

16. In a door-closer, a spring-chamber, spring, spindle, and the main lever-arm con-

nected with said spindle, combined with the connecting rod (87) pivotally secured at one end to said lever-arm and at its other end having means for securing it to a door-frame, said means comprising a bracket affording an interior bearing and a link secured at its outer end by a vertical pin to said rod and at its inner end held in said bearing, whereby said link may rock vertically and permit said rod to swivel horizontally; substantially as set forth.

17. In a door-closer, a spring-chamber, spring, spindle, and the main lever-arm connected with said spindle, combined with the connecting rod (87) pivotally secured at one end to said lever-arm and at its other end having means for securing it to a door-frame, said means comprising a bracket affording an interior bearing and a link secured at its outer end by a vertical pin to said rod and at its inner end having laterally projecting trunnions held in said bearing, whereby said link may rock vertically and permit said rod to swivel horizontally; substantially as set forth.

18. In a door-closer, a spring-chamber, spring, spindle, the main lever-arm connected with said spindle and having a short arm (85) secured to its outer end on a vertical pivot, and the connecting rod (87) comprising a bifurcated section (86) having a threaded hub at one end and at the other end straddling said short arm and pivotally secured thereto by a horizontal pin and a threaded section (89) adjustable in said hub and having at its outer end means for securing it to a door-frame; substantially as set forth.

19. In a door-closer, a spring-chamber, spring, spindle, and the main lever-arm connected with said spindle and having a short arm (85) secured to its outer end on a vertical pivot, combined with the connecting rod (87) pivotally secured at one end by a horizontal pin to said arm (85) and at its other end having means for securing it to a door-frame, said means comprising a bracket affording an interior bearing and a link secured at its outer end by a vertical pin to said rod and at its inner end having horizontally extended portions held in said bearing, whereby said link may rock vertically and permit said rod to swivel horizontally; substantially as set forth.

Signed at New York city, in the county of New York, and State of New York, this 29th day of September A. D. 1908.

JOSEPH BARDSLEY.

Witnesses:

ARTHUR MARION,
CHAS. C. GILL.