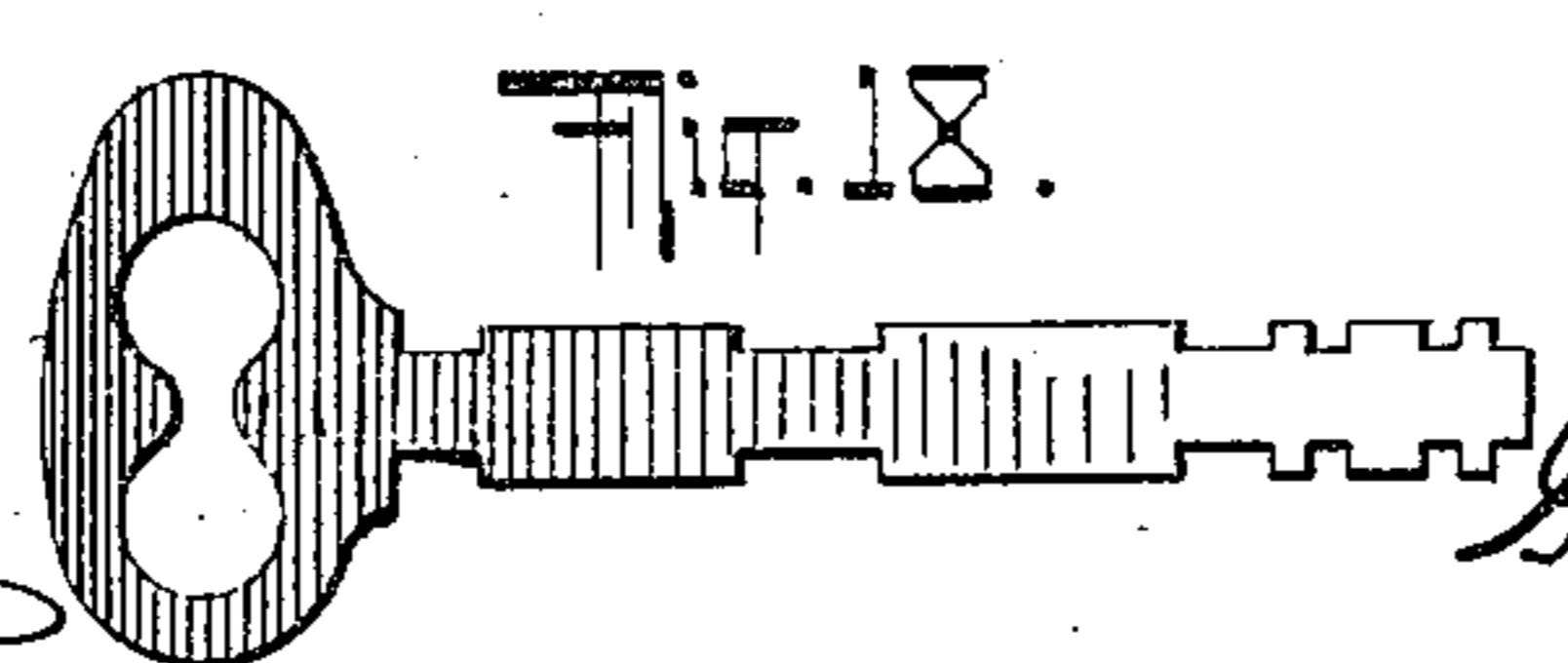
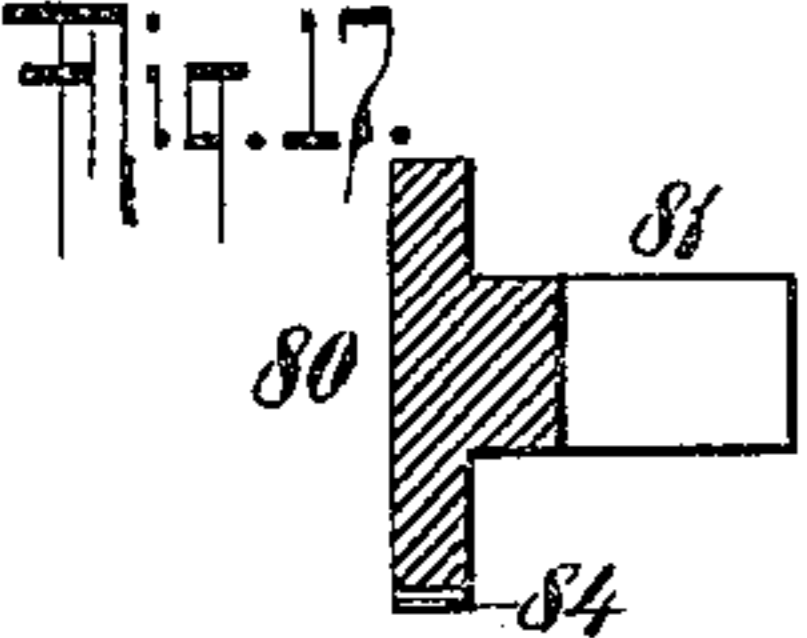
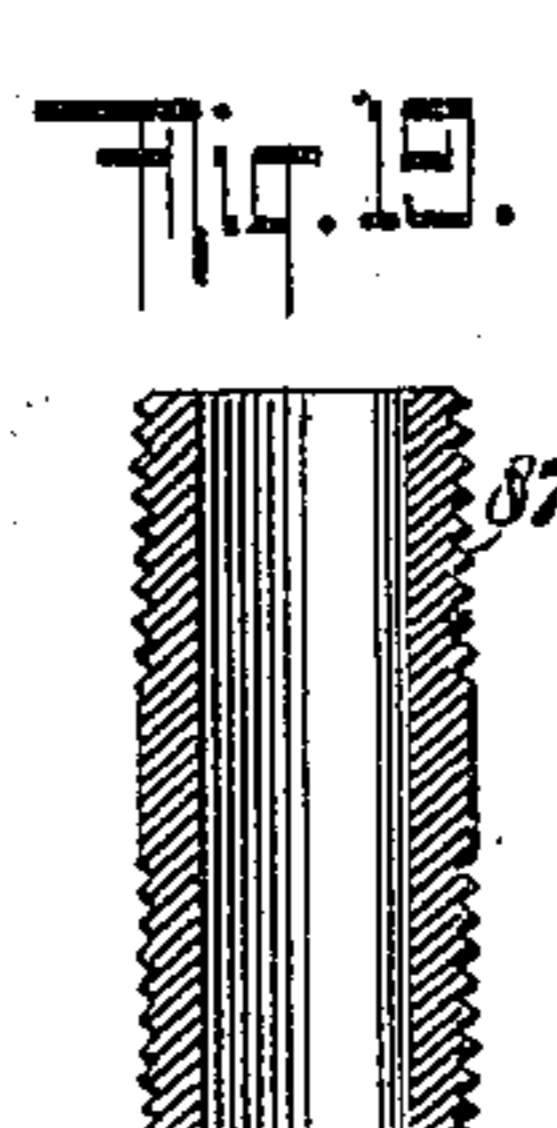
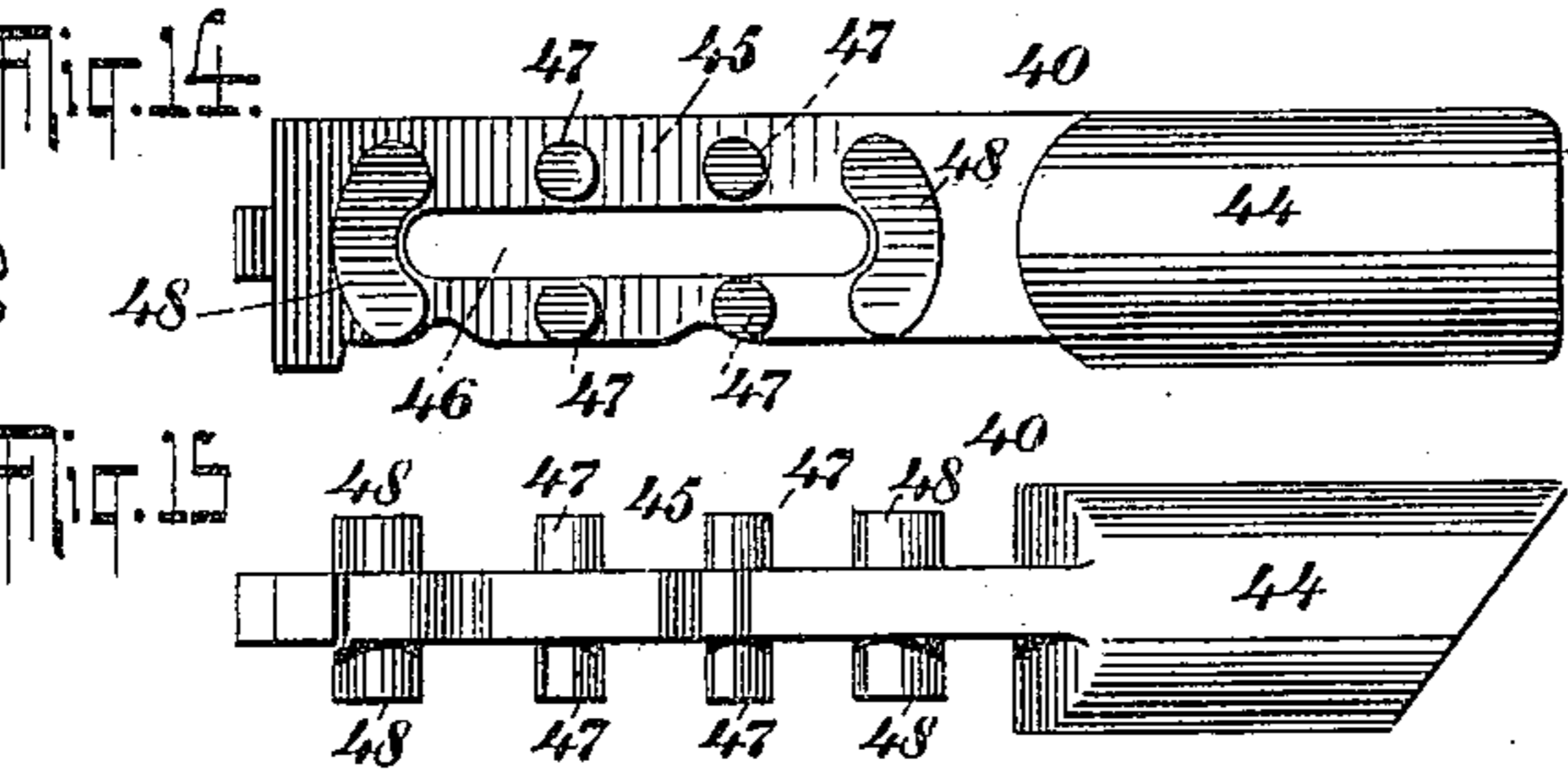
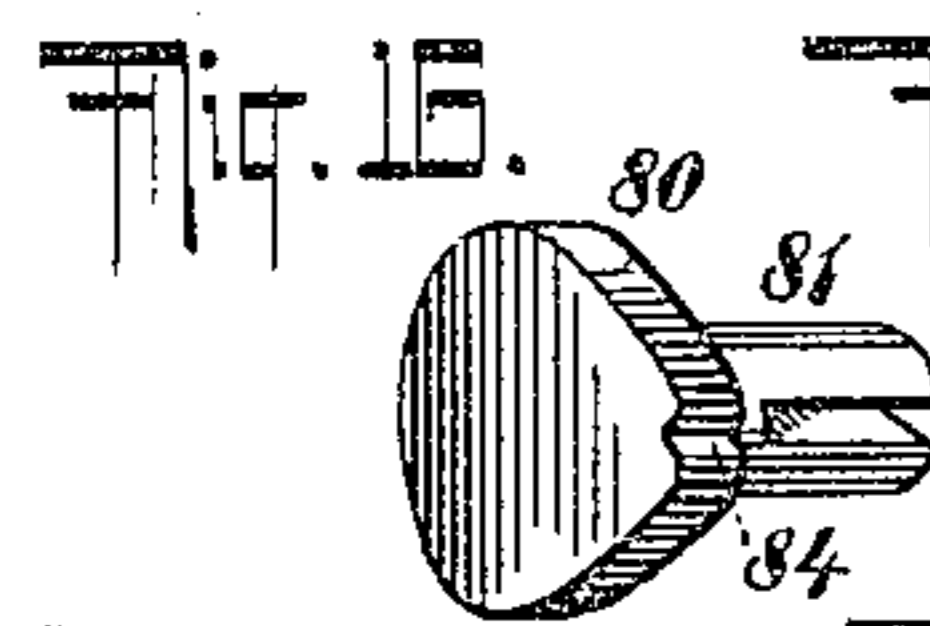
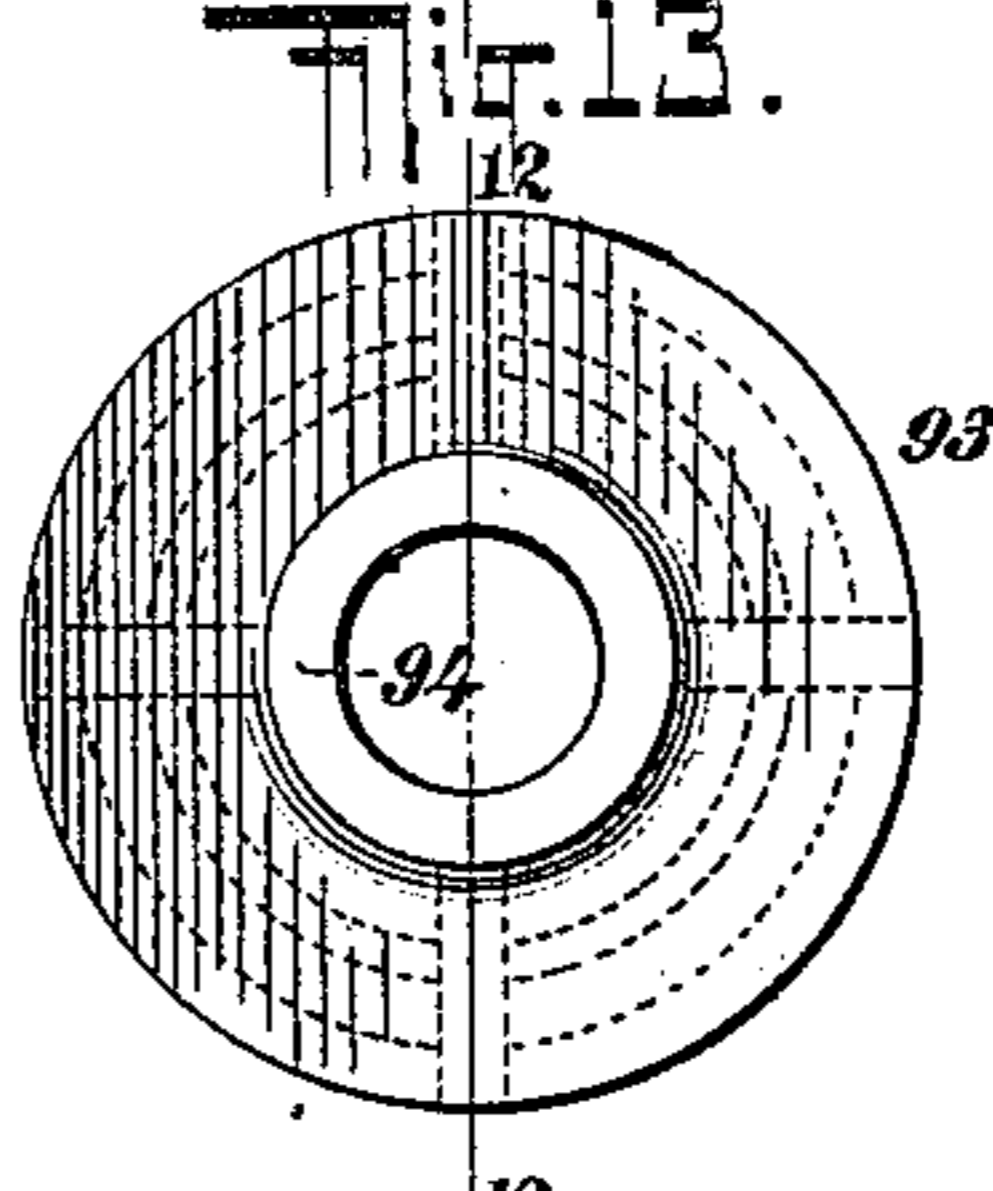
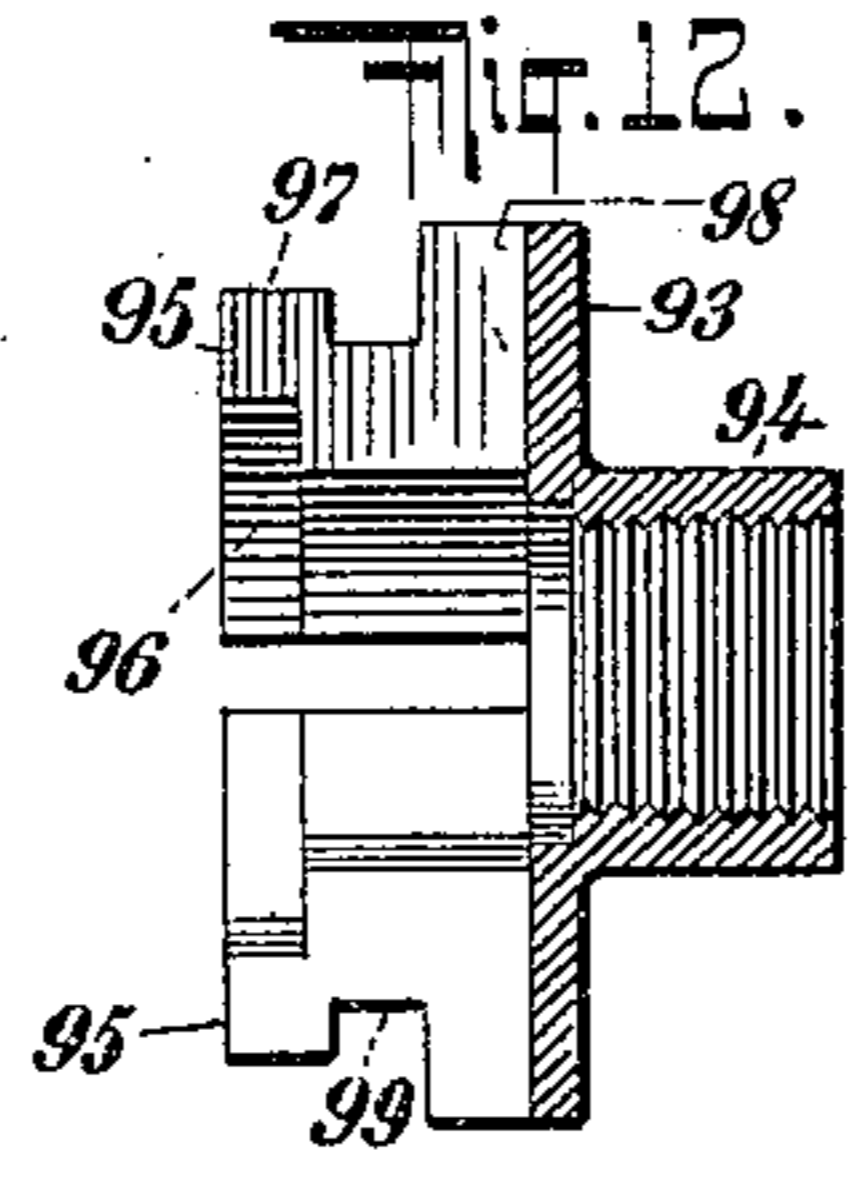
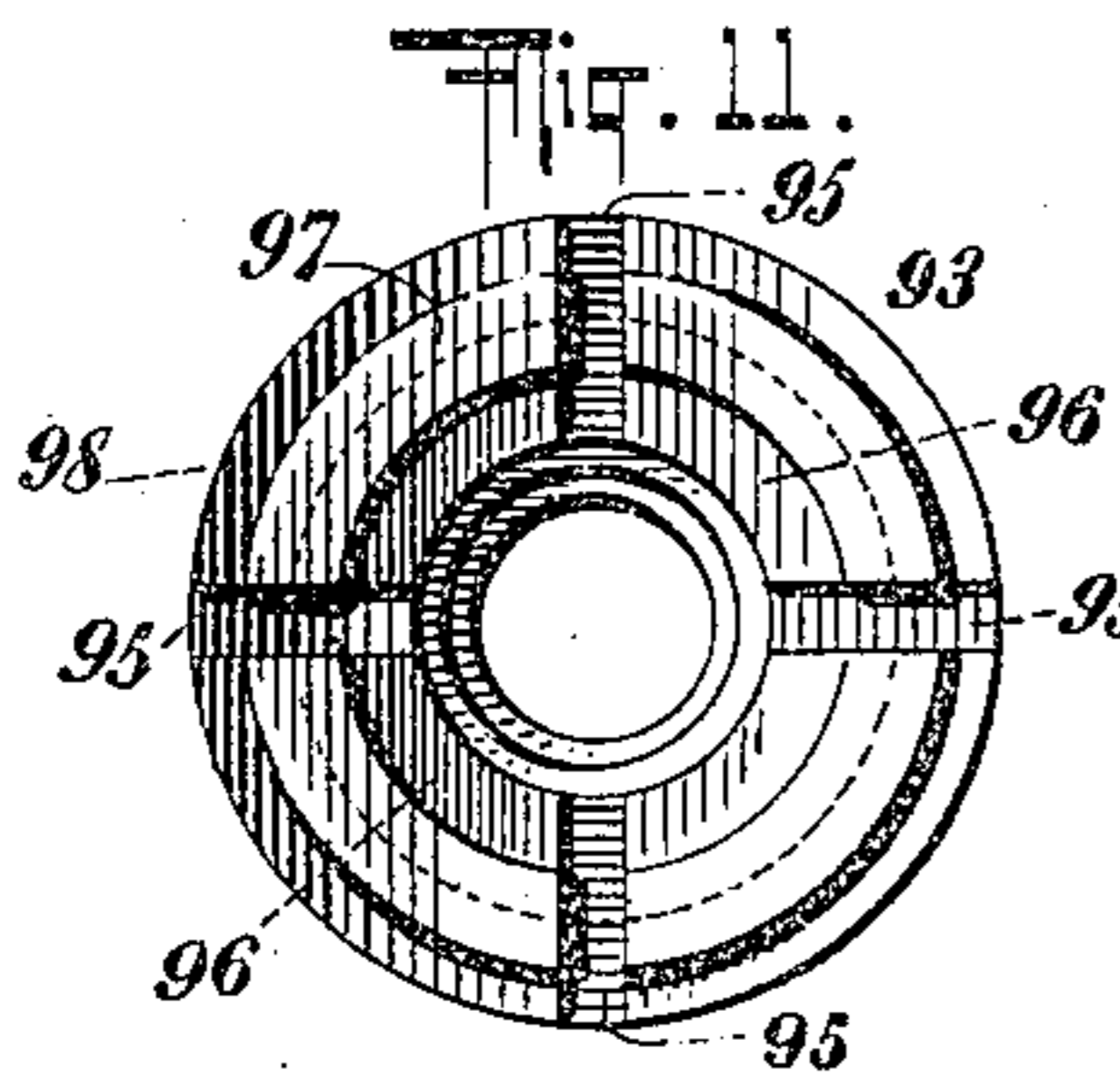
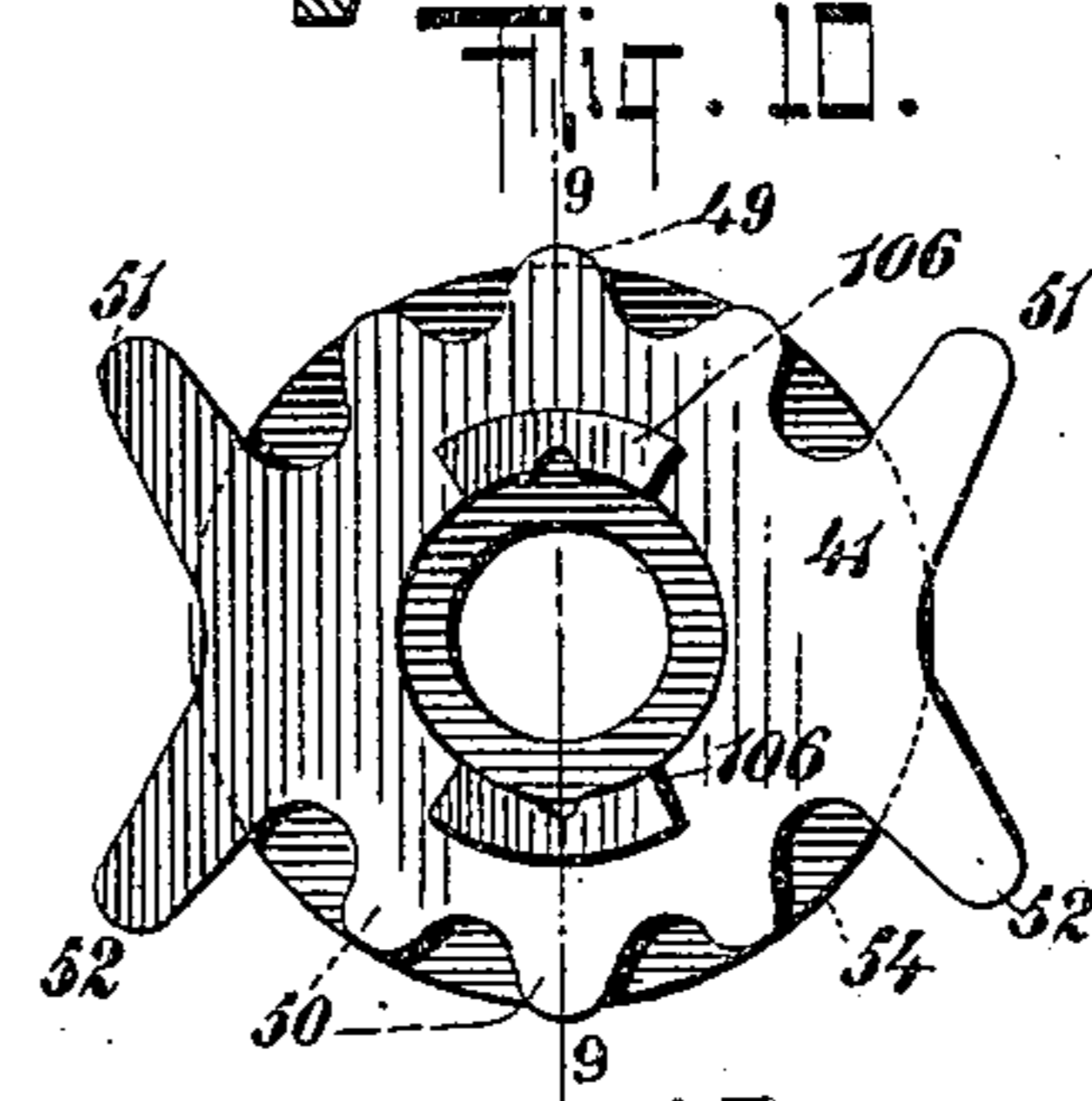
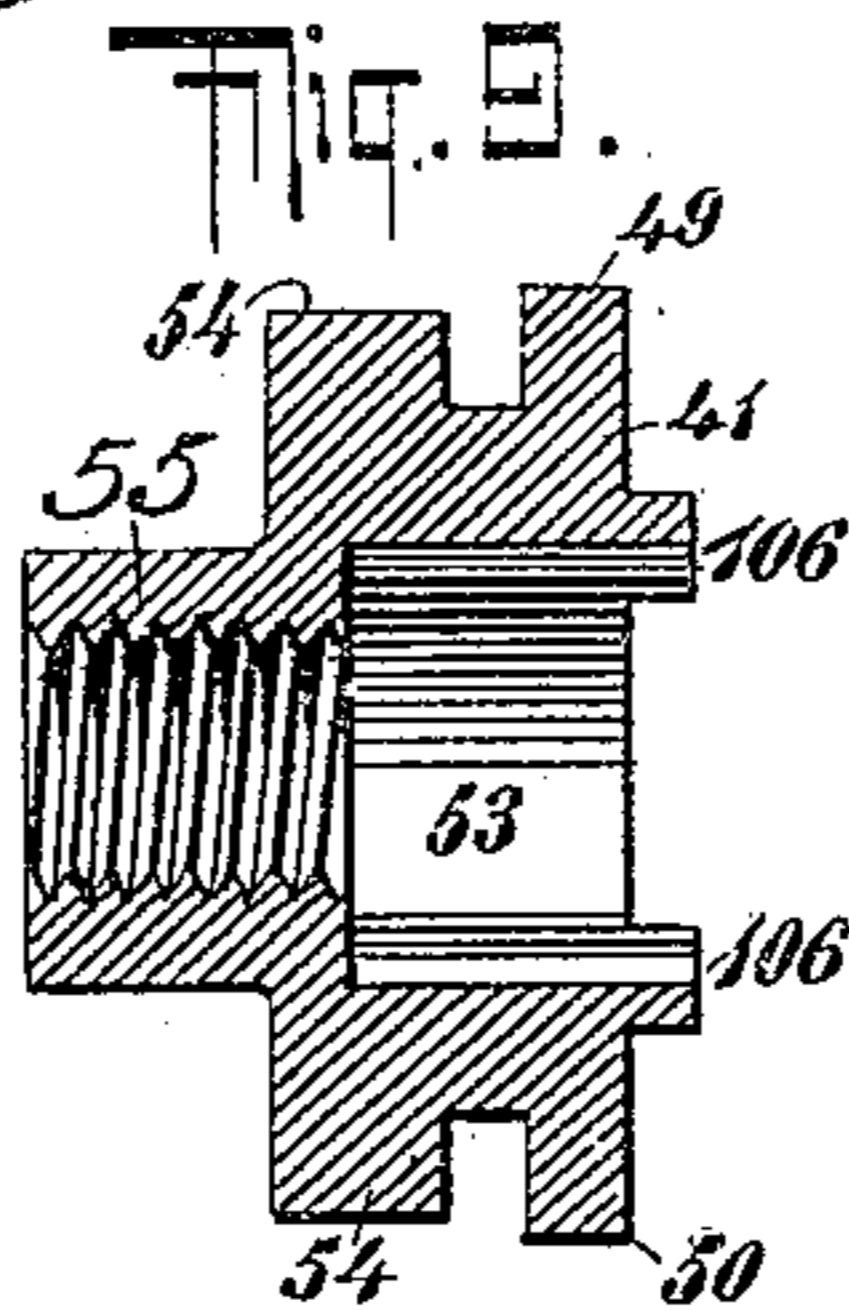
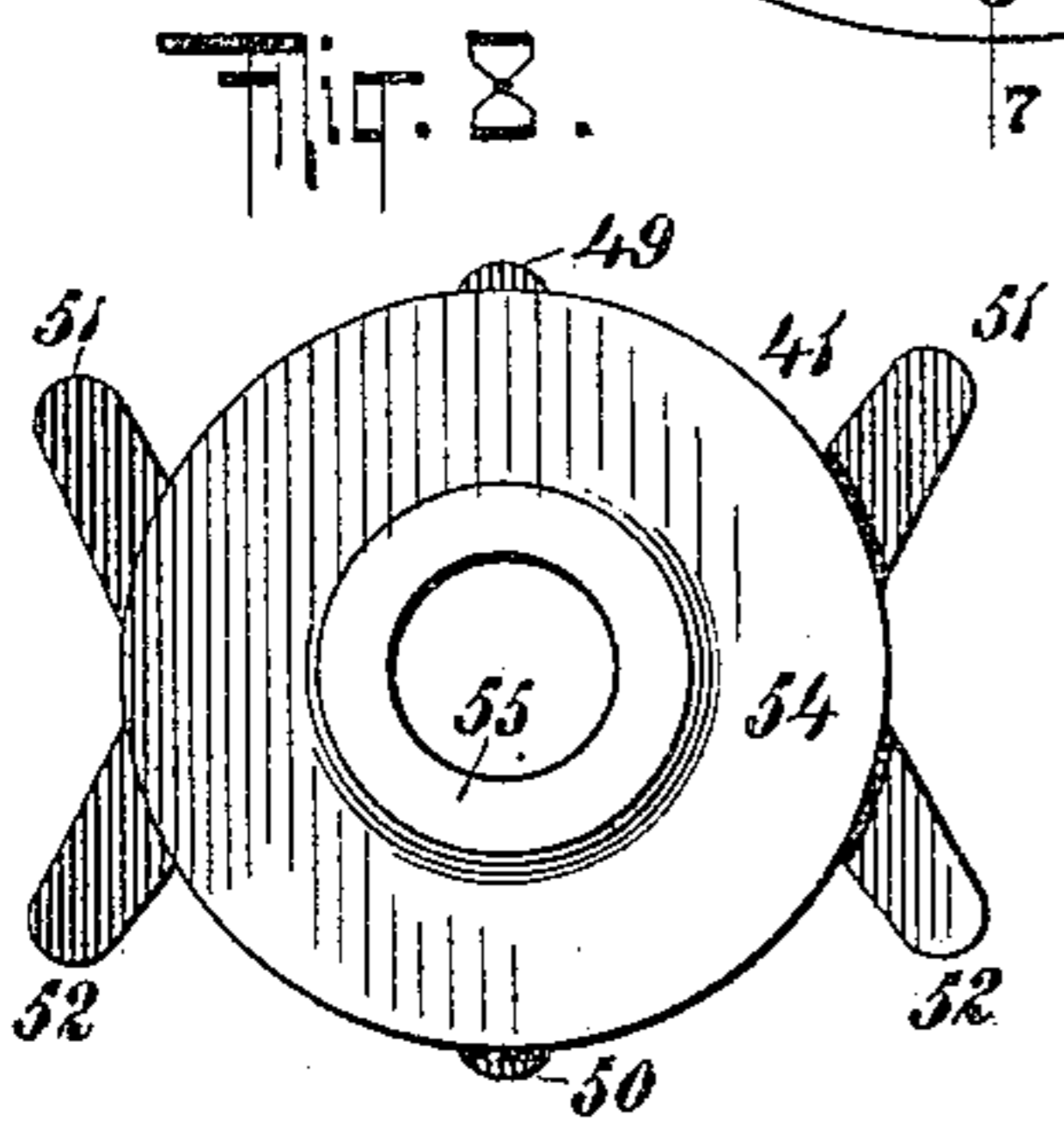
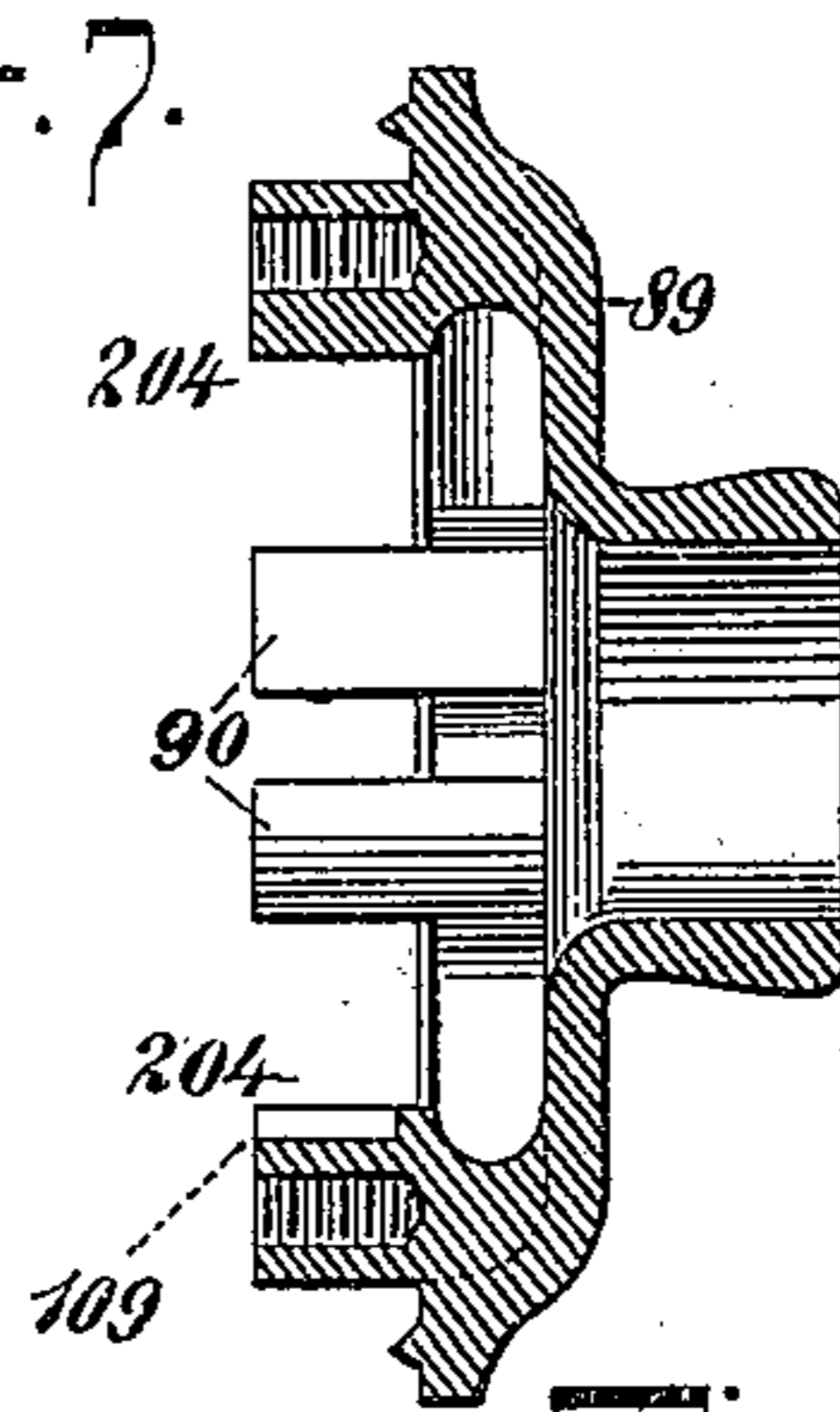
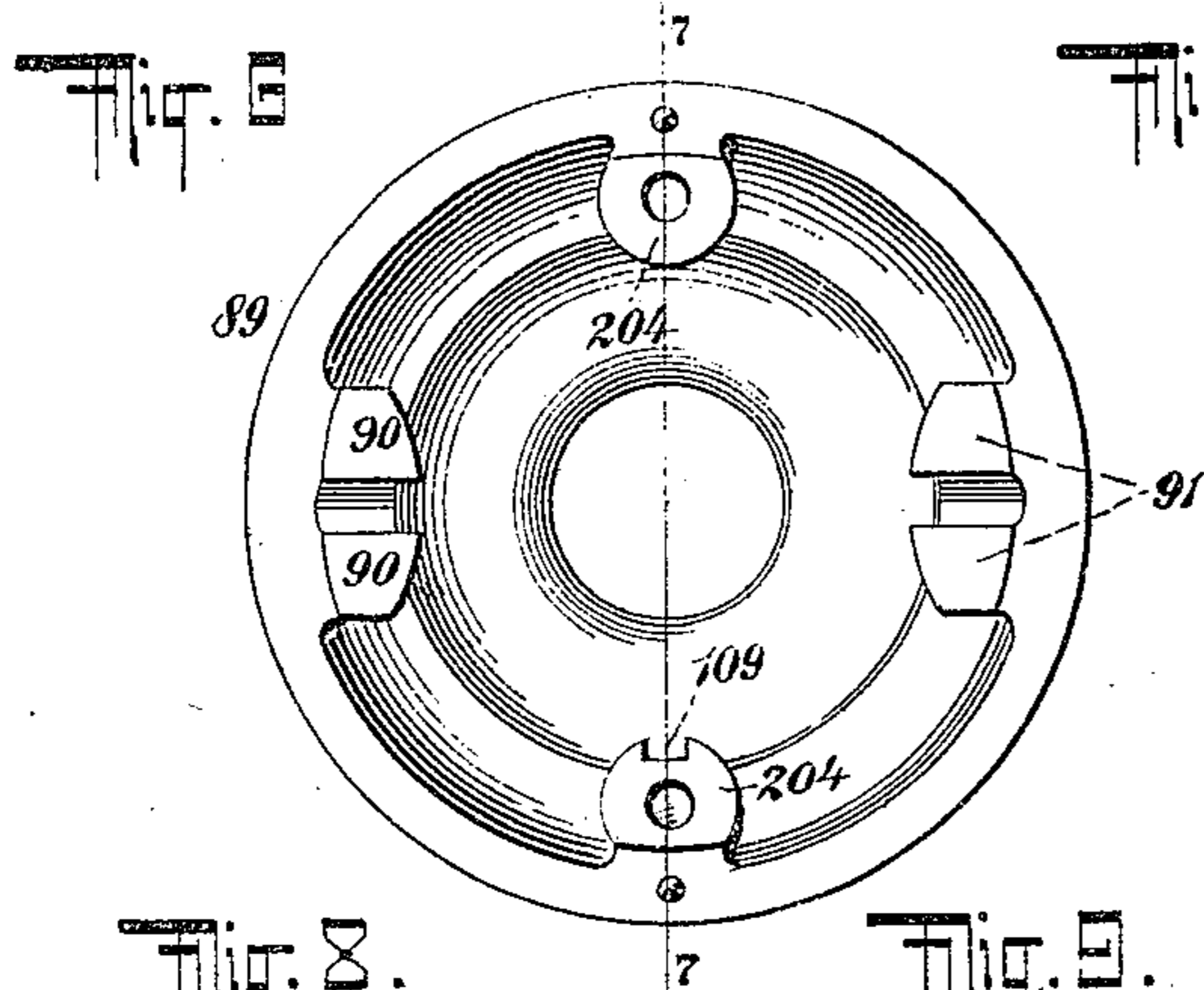


G. G. LAUREYNS.
LOCK.

(Application filed June 13, 1899.)

(No Model.)

4 Sheets—Sheet 2.



WITNESSES:

Gustav Kitterick
John Kehlbeck

INVENTOR

Gustav G. Laureyns
BY
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ATTORNEY

No. 663,503.

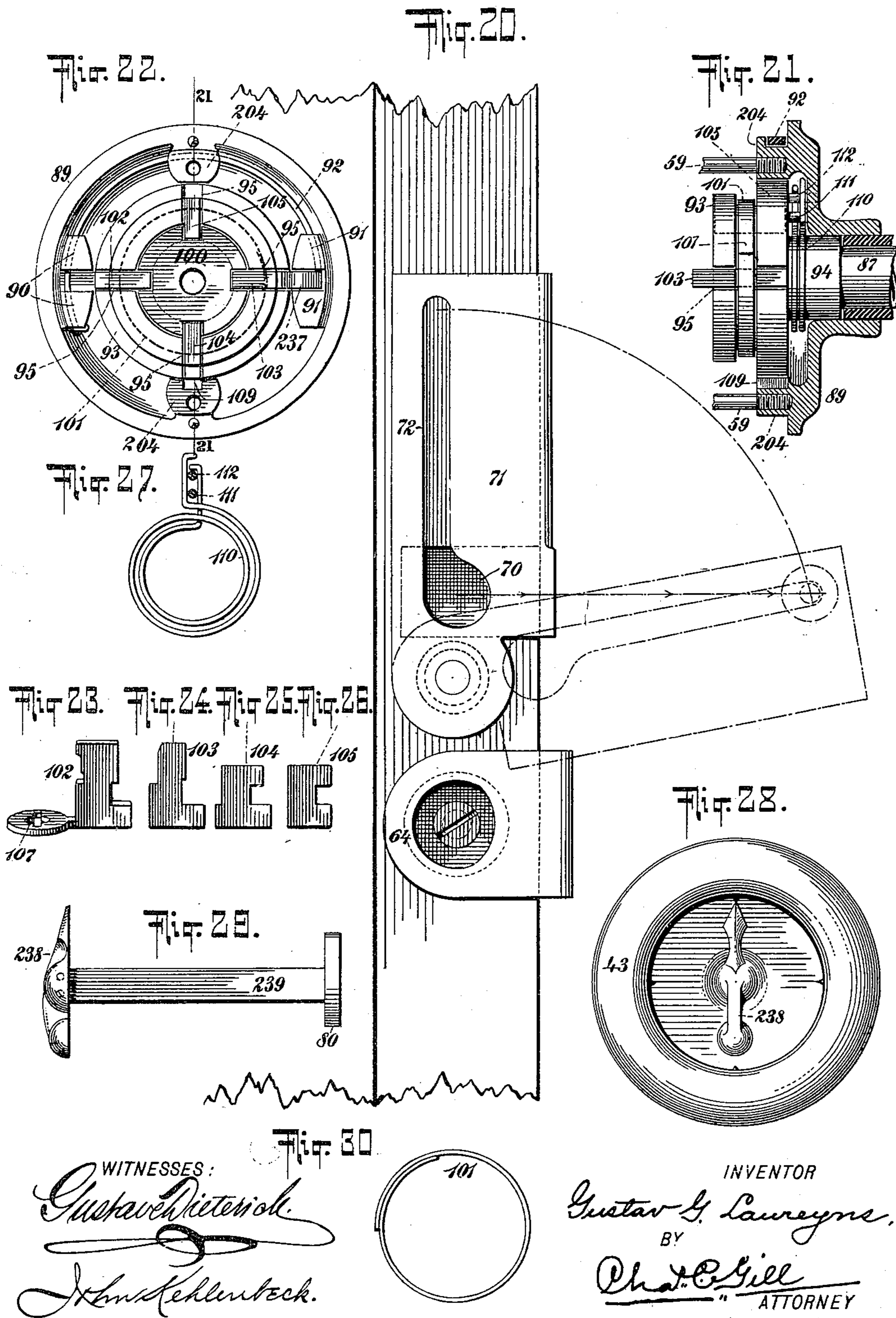
Patented Dec. 11, 1900.

G. G. LAUREYNS.
LOCK.

Application filed June 13, 1899.)

(No Model)

4 Sheets—Sheet 3.



WITNESSES:

Gustav Dietrich.
Hans Kehlbeck.

INVENTOR

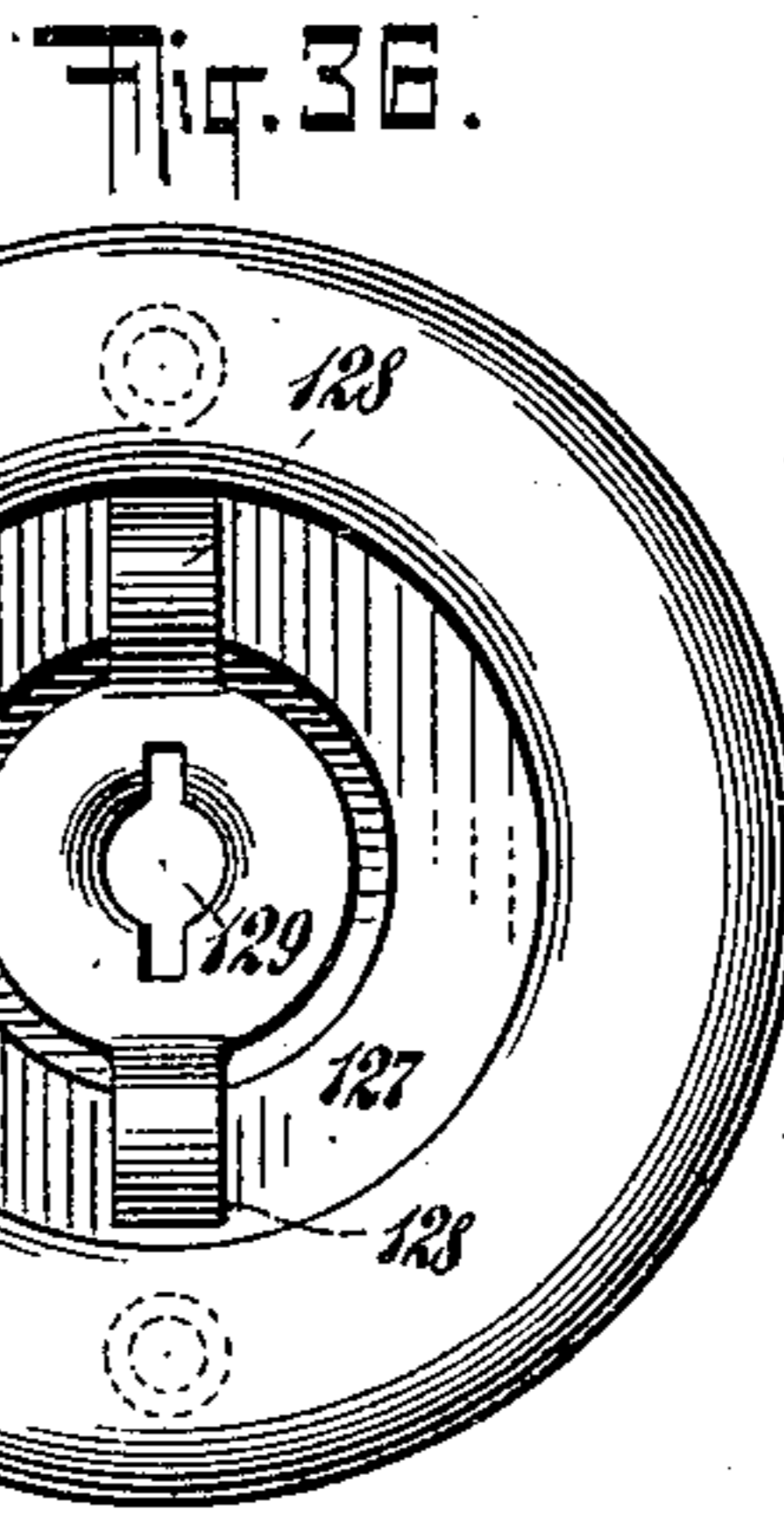
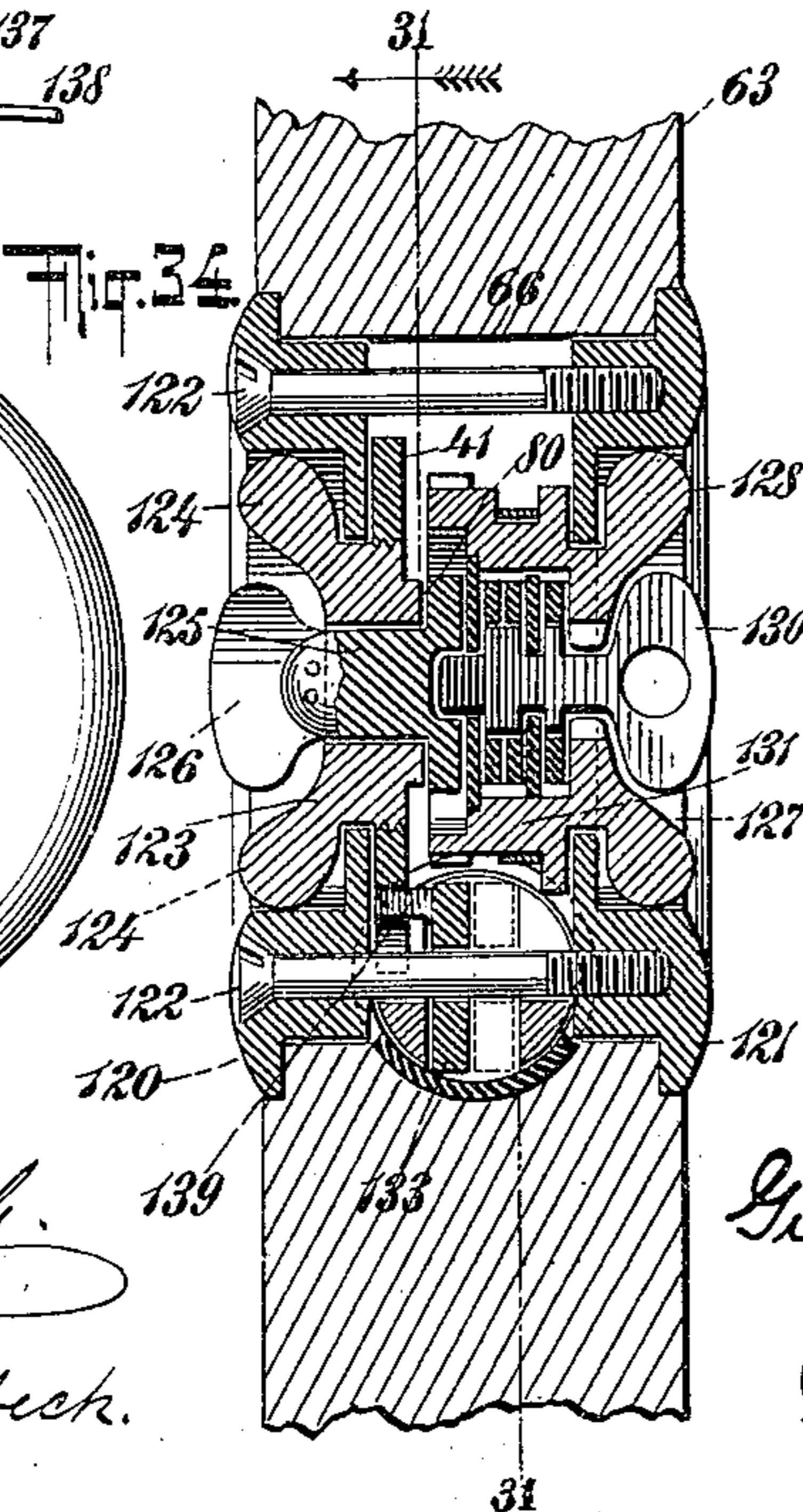
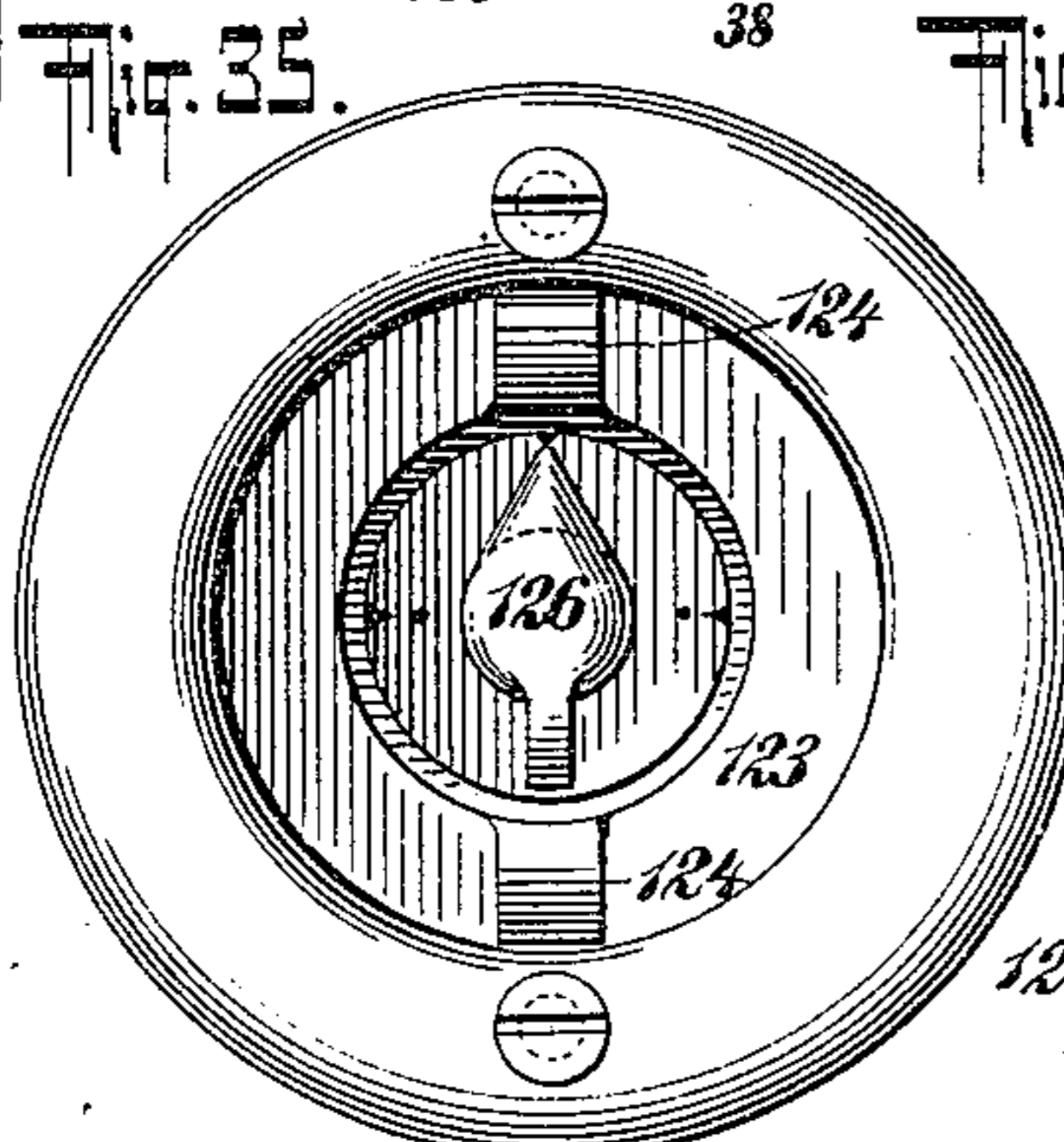
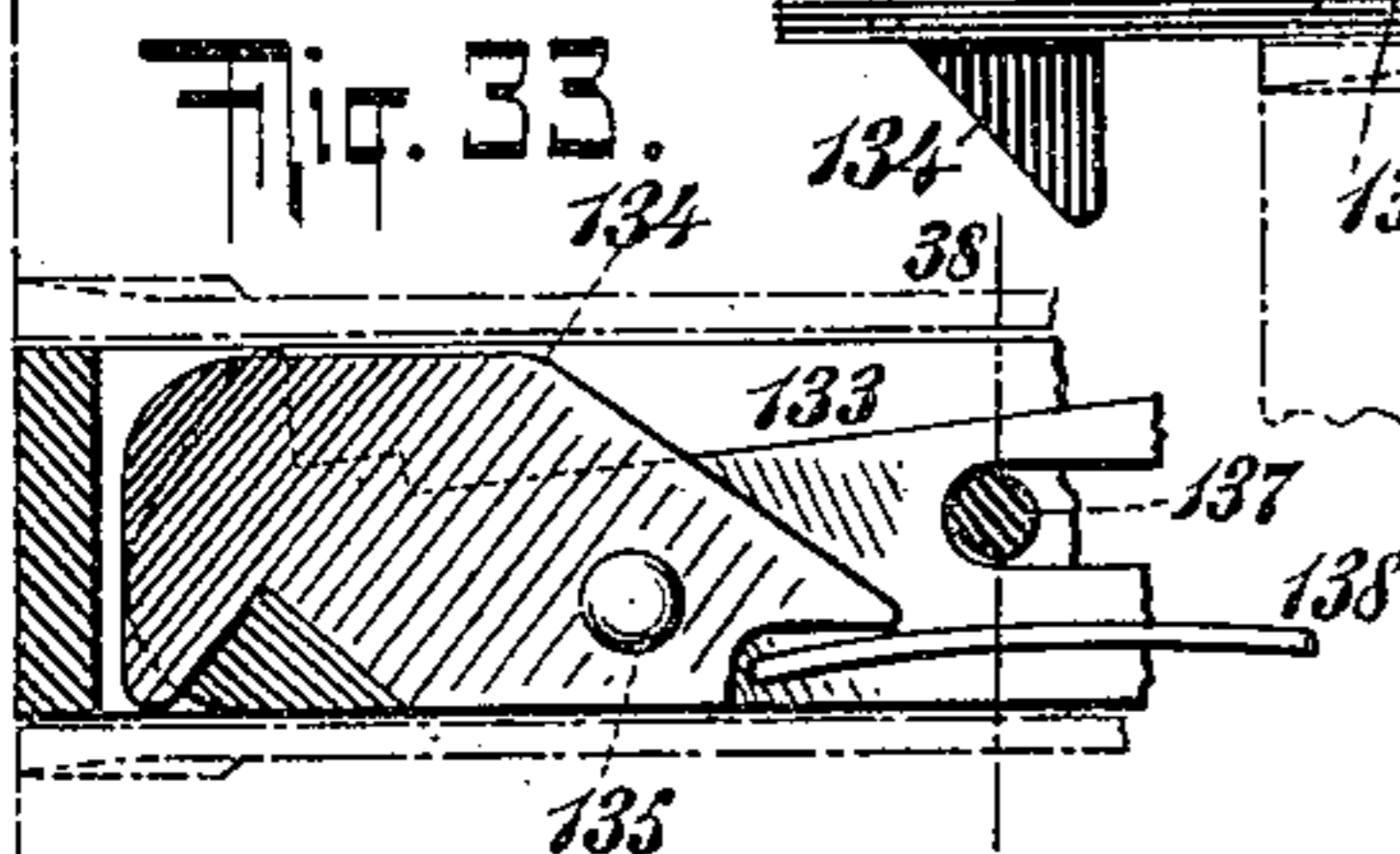
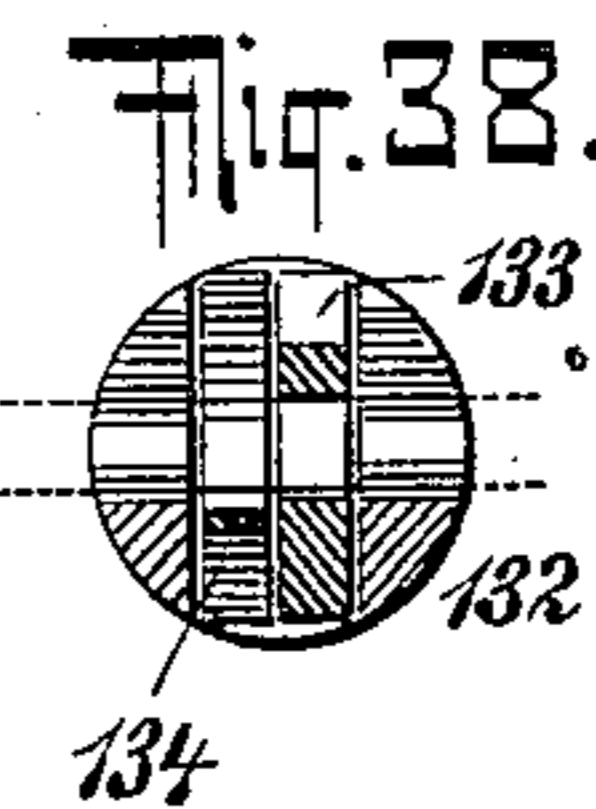
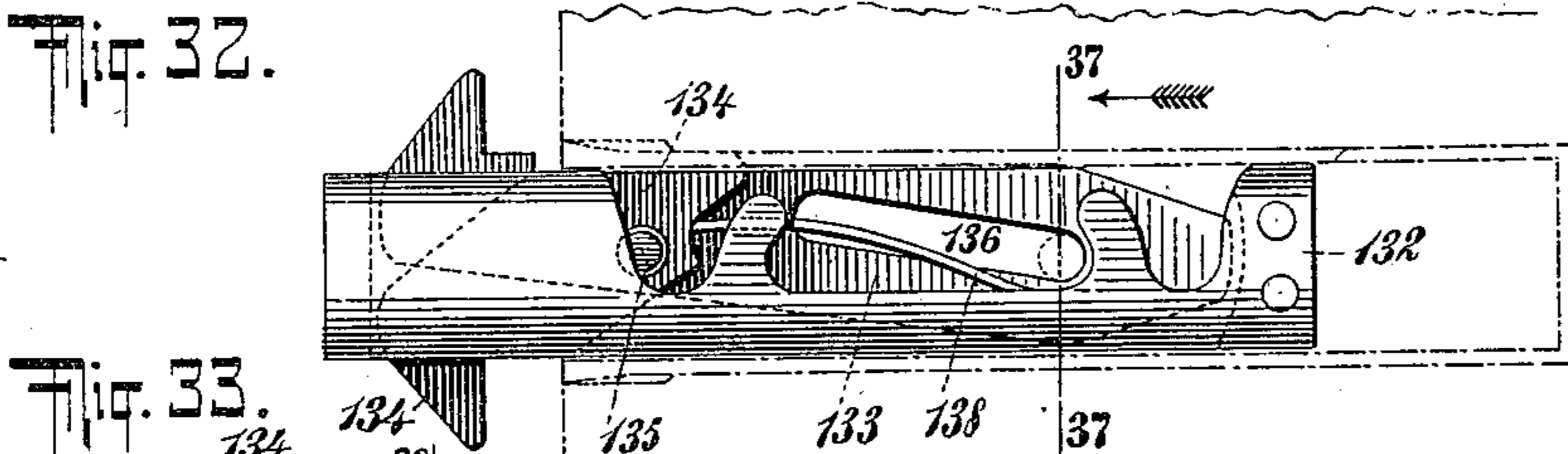
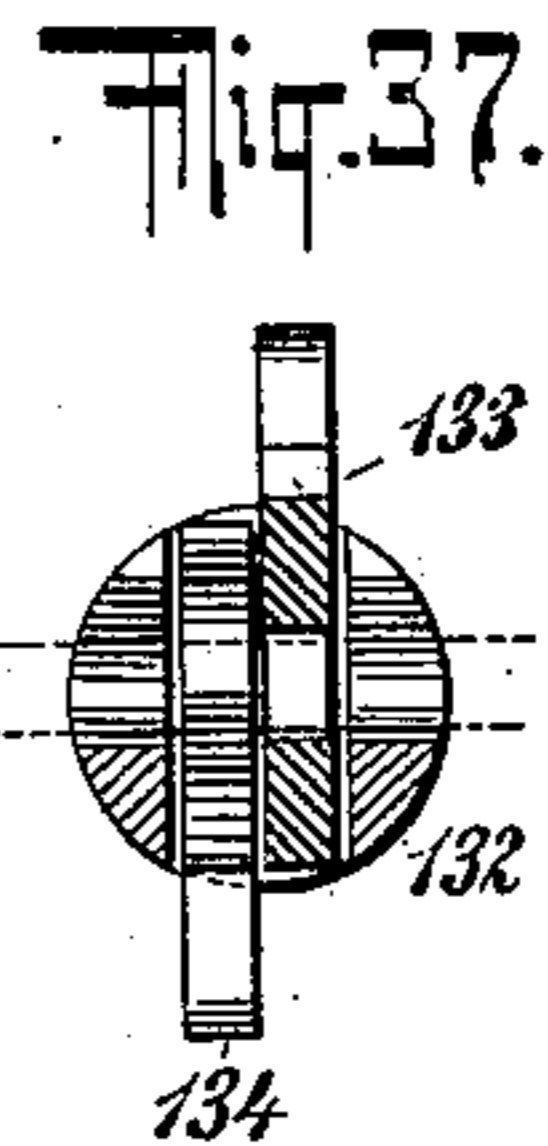
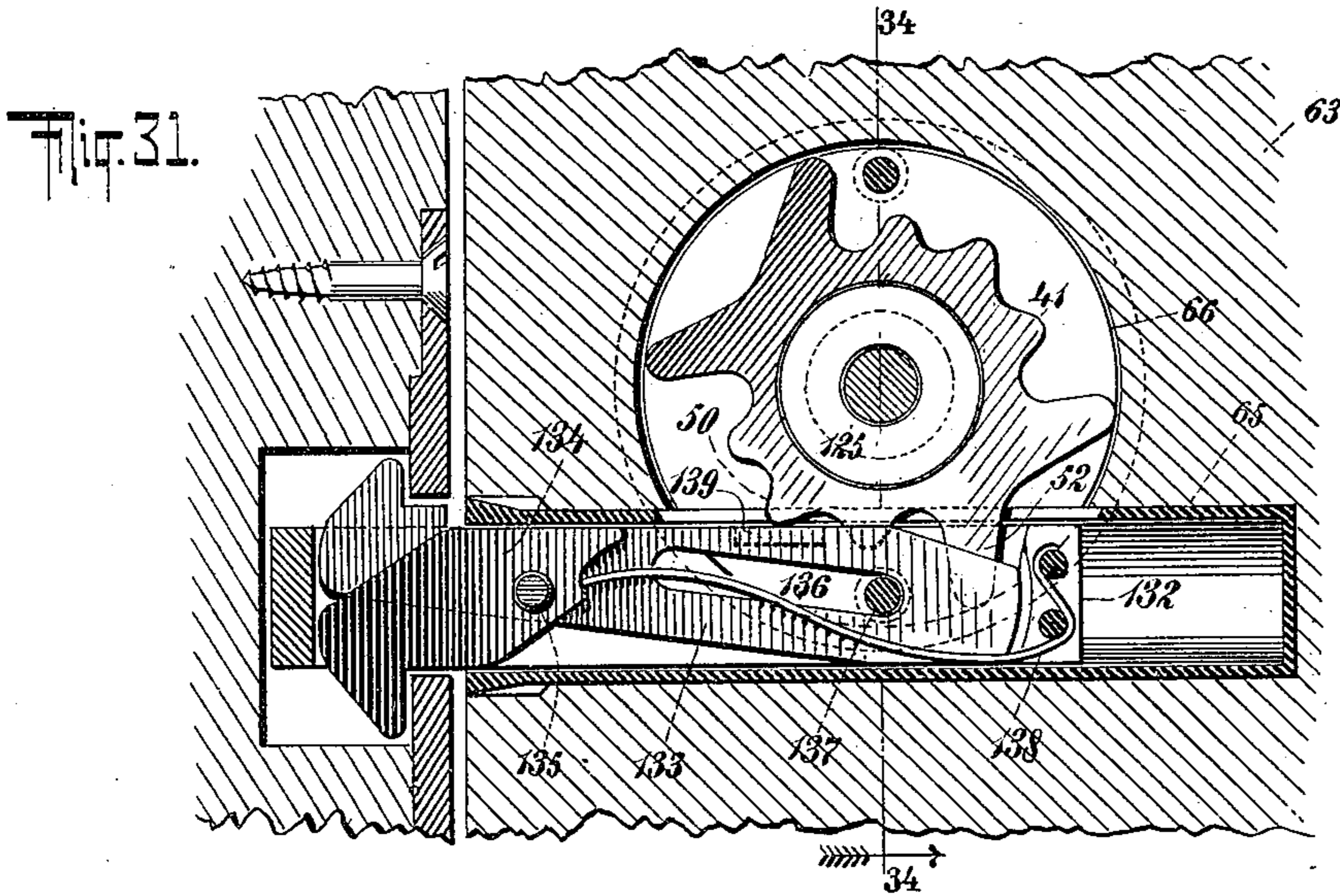
Gustav G. Laureyns.
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G. G. LAUREYNS.
LOCK.

(Application filed June 13, 1899.)

(No Model.)

4 Sheets—Sheet 4.



WITNESSES:
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John Kehlenbeck

INVENTOR
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ATTORNEY

UNITED STATES PATENT OFFICE.

GUSTAV G. LAUREYNS, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO CHARLES F. SIMES AND HENRY C. TUM SUDEN, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 663,503, dated December 11, 1900.

Application filed June 13, 1899. Serial No. 720,383. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV G. LAUREYNS, a citizen of the United States, and a resident of New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Locks, of which the following is a specification.

The invention relates to improvements in locks, and embraces the novel features hereinafter described, and more especially designated in the claims.

My invention comprises, in general terms, two special features, one being a new lock construction and the second being the arrangement, relation, and construction of the features of a lock whereby in mortise-locks the lock may be inserted into mere auger-holes bored in the door to receive the same.

The first feature of the invention comprises a number of novel elements capable of performing novel functions, and these will appear in full in the detailed description hereinafter presented.

It is well known that the application of mortise locks, latches, and bolts to doors could only be satisfactorily accomplished heretofore by skilled mechanics and with the aid of wood-chisels or other mortising-tools, and to overcome this inconvenience and expense I have invented a mortise-lock embracing in concentrated form all of the desirable features and results of the latches, locks, and bolts heretofore known, as well as new features and results, and which, with all of its parts, is capable of being readily slipped into auger-holes bored into the door to receive the same.

In carrying my invention into effect I have discovered that if shafts or spindles in the form of keys or otherwise are inserted within and through the door-knobs and their spindles they can be used to accomplish in a superior manner the results which have ordinarily heretofore been performed in other locks and latches by means of separate handles, knobs, buttons, slides, thumb-pieces, and other accessories and in addition thereto will enable the accomplishment of other results not common to the locks and latches as heretofore made. I have further discovered that when the said shafts or spindles or keys are thus made use of they can be made to ful-

fil a number of purposes in accordance with the angle or direction in which the same may be turned, and in this connection it is preferable that indicating-marks be applied to the face of preferably the inner door-knob, so that the user of the lock may be kept instructed thereby as to the correct position to which to turn the shaft or key when desiring to accomplish specific results.

The nature and objects of the invention, together with satisfactory means for carrying the same into practical effect, will appear in full in the detailed description hereinafter presented, taken in connection with the accompanying drawings, in which—

Figure 1 is a central vertical longitudinal section through a lock constructed in accordance with and embodying the invention, a portion of the door being shown in vertical transverse section. Fig. 2 is a central vertical section of same on the dotted line 2 2 of Fig. 1, the dotted line 1 1 in Fig. 2 representing the section on which Fig. 1 is taken. Figs. 3, 4, and 5 are detached elevations of certain tumbler-disks removed from the tumbler-cylinder of the lock and hereinafter designated by reference-numerals. Fig. 6 is a detached plan view of the outer escutcheon looking at the inner face thereof. Fig. 7 is a vertical longitudinal section of same on the dotted line 7 7 of Fig. 6. Fig. 8 is a detached plan view of the plate for actuating the bolt or bolts and the hub or sleeve carrying the said plate. Fig. 9 is a central vertical longitudinal section of same. Fig. 10 is a detached plan view of same, taken from that side of the plate opposite to that illustrated in Fig. 8; and in Fig. 10 the dotted line 9 9 denotes the section on which Fig. 9 is taken. Fig. 11 is a detached face view or elevation of the tumbler-cylinder which in use faces the actuating-plate shown in Fig. 10 and is secured upon the spindle of the outer knob, while said plate shown in Fig. 10 is secured to the spindle of the inner knob. Fig. 12 is a central vertical longitudinal section of same. Fig. 13 is a face view of same, taken from the opposite face of said cylinder to that shown in Fig. 11; and in Fig. 13 the dotted line 12 12 denotes the section on which Fig. 12 is taken. Fig. 14 is a detached side

elevation of the main bolt to be actuated by the plate shown in Fig. 10. Fig. 15 is a top view of same. Fig. 16 is a detached perspective view of the rotatory governing-plate or governor which is to be actuated from the inner side of the door by a key or spindle and lies close to the actuating-plate shown in Fig. 10, and in use said governing-plate lies within the circular recess in the inner face of the tumbler-cylinder shown in Figs. 11 and 12 to act upon the radial tumblers to be arranged in longitudinal grooves in said cylinder. Fig. 17 is a vertical longitudinal section through the governor shown in perspective in Fig. 16. Fig. 18 is a detached face view of one of the keys for the lock. Fig. 19 is a detached longitudinal sectional view through one of the tubular spindles for the knobs. Fig. 20 is an edge elevation of a portion of the casing of the door to which my lock is applied and illustrates the keeper for the bolt shown in Figs. 14 and 15 and also a pivotal plate (to be employed as a substitute for the ordinary chain on doors) to receive the upper bolt illustrated at the upper part of Fig. 2 and which plate when the door is partly opened will turn outward to the position indicated by dotted lines in Fig. 20, while being held by the said upper bolt shown in Fig. 2. Fig. 21 is a detached vertical longitudinal section through the outer escutcheon and illustrates in side elevation the tumbler-cylinder and also the spring intermediate said escutcheon and said cylinder and by which the said cylinder and the outer knob are returned after every operation of said knob to their normal "at-rest" position. Fig. 22 is a face view looking at the inner face of the outer escutcheon and tumbler-cylinder, this figure showing the radial tumblers in position within the radial slots or grooves in said cylinder. Figs. 23, 24, 25, and 26 are detailed views of the several radial tumblers carried within the radial slots or grooves of the tumbler-cylinder to be acted upon by the governor shown in Fig. 16. Fig. 27 is a detached plan view of the spring for returning the outer knob to its normal at-rest position. Fig. 28 is a detached face view of the inside knob, the central arrow-shaped device shown being the handle for the shaft or key, which may be used for turning the governor Fig. 16 against any one of the radial tumblers of the tumbler-cylinder, the four indicating points or marks denoting the normal position of said tumblers within the lock. Fig. 29 is a detached side elevation of the governor shown rigidly connected with a non-detachable spindle or key and whose handle end appears in Fig. 28. Fig. 30 is a detached plan view of the yielding band-spring which encircles the tumbler-cylinder and exerts yielding pressure against the outer edges of the radial tumblers carried thereby. Fig. 31 is a central vertical section of a modified form of the lock and its bolt, this modified construction being adapted for sliding doors. Fig. 32 is a detached side elevation of the

bolt shown in Fig. 31. Fig. 33 is a detached view, partly in section, of a portion of the bolt shown in Figs. 31 and 32. Fig. 34 is a vertical section on the dotted line 34 34 of Fig. 31 of the lock adapted for sliding doors, and in this figure the dotted line 31 31 denotes the section on which Fig. 31 is taken. Fig. 35 is a detached outer face view of the inside escutcheon of the lock and showing in position the handle of the key, shaft, or spindle for controlling the position of the interior governor, hereinafter described. Fig. 36 is a face view of the outside escutcheon of the lock; and Figs. 37 and 38 are detailed vertical sectional views through the bolt mechanism of the lock shown in Figs. 31 to 34, inclusive, the sections being on the dotted lines 37 37 and 38 38, respectively.

I will first describe in detail the mechanism shown in Figs. 1 to 30, inclusive, and then specifically refer to that illustrated in Figs. 31 to 38, inclusive.

In the description of the mechanism shown in Figs. 1 to 30, inclusive, I will first refer to the bolt, the plate or cog-wheel for actuating the same, the inside escutcheon, and the inside knob, with their incidental features, since these elements in themselves comprise an operative combination and employ a portion of my invention.

In the drawings the numeral 40 designates the bolt; 41, the actuating-plate for cooperation with said bolt; 42, the inside escutcheon, and 43 the inside knob.

The bolt 40 is shown in operative position in Figs. 1 and 2 and in detail in Figs. 14 and 15, in which it will be seen that the bolt 40 in its preferred form comprises the head 44 and shank 45, the said head being substantially circular in cross-section and the said shank being in the form of a flat plate provided with the guiding-slot 46 and at its opposite sides with the corresponding studs 47 and cam-shaped studs 48. The reason for the special construction of bolt shown will appear hereinafter.

The actuating-plate 41 for throwing the bolt 40 is shown in Figs. 1, 2, 8, 9, and 10 and is preferably formed at its upper and lower edges with the cogs 49 50 and at its ends with the upper and lower lever-arms 51 52, the said upper and lower edges being in every respect duplicates of one another and for purposes which will be hereinafter explained.

The actuating-plate 41 is preferably in one integral piece with the hollow hub 53, on which are formed the annular flange 54 and sleeve 55, the latter receiving the inner end of the tubular spindle or shaft 56, Fig. 1, upon whose outer end is secured the sleeve 57 of the inner knob 43, the joint between the sleeves 55 and 57 being covered by the sleeve 58 of the escutcheon 42, which is secured by bolts or screws 59 and at its inner end is formed with the shoulders 60 to form a suitable bearing within which the annular flange 54 on the hub 53 may turn and which bear-

ing serves to aid in supporting and guiding said hub 53 and the parts connected therewith.

In respect of the features above designated by reference-numerals it is to be observed that the turning of the knob 43 will result in the plate 41 receiving a partial rotary motion and the throwing of the bolt 40 by the engagement of the cogs 50 on the plate 41 with the studs 47 on one side of the upper edge of the bolt 40. While the cogs 49 at the upper edge of the plate 41 are of great utility, it is sufficient for present purposes to simply refer to the lower cogs 50, which, as shown in Fig. 2, act upon the said studs 47 of the bolt 40. The manual turning of the knob 43 may in accordance with its direction of motion throw the bolt 40 either outward or inward, and in the construction presented the bolt 40 may serve simply as a latch or as a secure locking-bolt and has three motions—to wit, first, inwardly as a latch; second, outward automatically under the force of the spring 61, Fig. 2, as a latch, and, third, a second or further outward motion as a bolt.

The spring 61 is a simple coiled spring pressing against the inner end of the bolt 40 to force the latter outward. A friction-spring 62, Fig. 2, is employed to steady the bolt 40 to prevent its too-free movement, and to hold the bolt when on its third movement above referred to its inner end passes outward from the influence of the spring 61.

The spring 61 independently of any power applied to the knob 43 will permit the bolt 40 to have the inward and outward usual latch movements during the closing of the door 63; but when it is desired to open the door the bolt 40 is drawn inward by the manual turning of the knob 43. The third motion of the bolt 40, or its further outward motion, results from the turning of the knob 43 sufficiently for the inner lever-arm 52 of the plate 41 to engage and press outward upon the inner cam-shaped stud 48 of the said bolt, whereby the said bolt may be drawn outward into the keeper 64, Fig. 20, about twice as far as when moved outward by the spring 61 as a latch. Thus the bolt 40 moves outward to one extent when used as a latch and to a far greater extent when used as a safety-bolt, and in the latter instance it will be observed that the bolt effectually secures the door even against the action of any prying-tool which might be used in an attempt to "spring" the door open. After the bolt 40 has been moved outward to its fullest extent by the action of the knob 43 and that of the inner arm 52 against the inner lug 48 on the bolt the bolt must be moved inward again to its normal latch position by the turning of the knob 43 sufficiently for the outer lever-arm 52 of the plate 41 to engage and press inward against the outer cam-shaped lug 48 on the said bolt.

I may here explain that one reason for the special form of bolt 40 presented with the studs 47 and 48 at opposite sides of its shank

is that when constructed as shown the said bolt is reversible in four directions at will, thus rendering it adaptable for either a right-hand outside latch, a right-hand inside latch, a left-hand outside latch, and a left-hand inside latch.

A very good reason for having the upper and lower edges of the plate 41 correspond with one another is that the said plate is thereby rendered reversible, so that should the lower edge of the plate become worn by its frequent contact with the studs on the bolt 40 the said plate may be turned to bring its upper edge downward for direct coöperation with said bolt.

With respect to the features above designated by reference-numerals I would call attention to the fact that I do not confine the invention thus far described to the throwing of the bolt 40 from the inside knob 43, since, as will appear hereinafter, the plate 41 and bolt 40 may also be operated from the outer side of the door by a key or other suitable turning medium.

In the present construction, Figs. 1 and 2, the lower screw 59 passes through the guide-slot 46 of the bolt 40 and coöperates with said slot in guiding and sustaining the bolt. Upon the temporary removal of the said screw 59 the bolt 40 may be withdrawn from the door without disturbing any of the other parts of the lock, and this, I think, will be recognized as an advantage in lock mechanism.

Another advantageous feature may be here mentioned, and it is that simply a round auger-hole 65 suffices to receive the bolt 40 and that another auger-hole 66 receives the parts above described for manually throwing the said bolt. Thus the parts of the lock are so constructed and disposed with relation to one another that when forming a mortise-lock they may be quickly and readily slipped into and secured within two auger-holes which an apprentice could quickly bore, instead of, as heretofore, with other locks requiring the service of a skilled mechanic to cut or chisel the mortise-recesses in the door.

The auger-hole 65 will be of a size to snugly receive the metal tubular socket 67, Fig. 2; for the bolt 40, and it is to be observed that this socket 67 has only its outer edge exposed and that this edge is very narrow, with the consequent advantage that upon the removal of the bolt 40 the said edge may be readily filed down to any required bevel.

Having thus fully referred to one legitimate combination of parts in connection with the bolt 40 without going into the details of tumblers, keys, and other features which enter into the composition of the complete structure in its entirety, I desire to refer to an element which may be adopted for one or more classes of locks and is actuated by the said inner knob 43 or its equivalent and the plate 41, and this element (shown more fully in Fig. 2) is the rod 68, which may be thrown outward by the plate 41 upon the turning of

the inner knob 43 in a direction to move the bolt 40 inward. The head 69 of the rod 68 when thrown outward enters the receiving-aperture 70, Fig. 20, of a plate 71, pivoted on the door-casing and having a slot 72 leading from said aperture 70. The throwing outward of the rod 68 and the moving inward of the bolt 40, together with an opening force applied to the door, result in the outward turning of the plate 71 and the traveling along the slot 72 of the rod 68, whereby although the door may be opened somewhat it is prevented from opening beyond the length permitted by the slot 72, since the head 69 on the rod 68 is wider than said slot and prevents the slipping of the rod from the slot while the door is partly open. The rod 68 and pivoted plate 71 are of utility, and they form a desirable substitute for the usual chain placed on doors to prevent the latter from being fully opened by a force applied to the outer side of the door. The plate 71 being close against the door-jamb is practically invisible when the door is closed, and it need only to be used when desired, since, as will appear hereinafter, the rod 68 only moves outward to engage the plate 71 when the parts of the lock are manually set to permit that result.

The rod 68 need only move outward a distance a little greater than the thickness of its head 69, and this movement is imparted to it by the inner upper lever-arm 51 on the plate 41 coming into contact with and exerting outward pressure on the stud 73, Fig. 2, on the sliding bar 74 after the latter has been tilted upward, (by the means hereinafter described,) so that its upwardly-extending inner end may during the outward movement of said bar 74 press outward upon the inner end of the said rod 68 and drive said rod outward and its head 69 into engagement with said plate 71. During the ordinary turning of the plate 41 the bar 74 will slide freely within its socket without affecting the rod 68, since under normal conditions the inner end of said bar 74 will pass below the rod 68; but when the bar 74 is tilted upward by the said means to be hereinafter described, its inner end is compelled, during the outward movement of the bar, to meet and press outward against the inner end of the rod 68. The front or outer end of the bar 74 carries a guiding-head 75, and through an aperture in this head the rod 68 freely passes, as shown. The springs 76 and 77 serve to withdraw the sliding bar 74 and rod 68 into their socket in normal position, and upon the closing of the door after the turning outward of the plate 71 the plate 71 turns upward and inward again, and the springs 76 and 77 relieve the head 69 of said rod 68 from said plate, and thereupon, if desired, the door may be fully opened. The rod 68 may slide freely through the stop-plate 78 for the springs 76 and 77, and the rod 79, carrying the spring 76, is stationary and the inner end of the bar 74 may slide freely upon it.

In the foregoing description I have not referred to keys or tumblers, since the actuating-plate 41 may be operated, as we have seen, from the inside knob or its spindle, or anything else, such as a key, for turning the said plate 41, but in the further description of the lock as an entirety I will refer to the tumblers, the outside knob, the keys, and the governor.

The "governor," as I have termed it, should first be referred to, since it is more directly connected with the parts hereinbefore specifically described, and this governor (numbered 80) is shown in detail in Figs. 16 and 17 and in its operative position in Fig. 1, in which it will be seen that the bifurcated shank 81 of said governor enters and is revoluble within a sleeve 82, secured within the aforesaid hub 53, carrying the plate 41. The bifurcation of the shank 81 is to receive the point of a key 83, Fig. 1, inserted directly through the knob 43 and tubular spindle 56. The governor 80 is preferably of oval shape, as shown in Fig. 16, and is formed at its narrower end with the biting recess 84. The governor 80 in its various positions to which it may be turned by the key 83 controls certain features and operations of parts of the lock which have not thus far been described, and hence the special functions of the said governor will be pointed out in an appropriate place hereinafter. The said governor 80 simply has a turning action under the influence of the key 83, and this key may be of any suitable construction and is always inserted into the lock from the inner side of the door. I have provided a series of slotted plate-tumblers 85 for the key 83, so as to compel the use of the proper key and in the proper manner; but the feature of the tumblers 85 I do not regard as of great importance, and they may be varied at will in ways well-known to those skilled in the art, or they may be entirely omitted.

The removable key 83 need only be used when the lock is located in doors which separate rooms, such as in a hotel, and when a removable key 83 is not necessary for the turning of the governor 80 I shall have the said governor secured upon a permanent shaft 239, Fig. 29, extending through the tubular spindle 56 of the knob 43 and having a pointer or arrow-shaped handle 238, by which said governor may be turned in the same manner and for the same purpose that it is turned, Fig. 1, by the handle of the key 83. The shaft 239, Fig. 29, has the same operation as the key 83, Fig. 1, upon the governor 80, and the handle of the key 83 has a pointer end, the same as the handle 238 for the shaft 39, said pointer end being used in connection with the series of indicator-marks, Fig. 28, on the knob 43 to guide the user in turning the shaft 239 or key 83 to the proper position for effecting the various results to be accomplished, as hereinafter pointed out, by the setting of the governor 80.

Substantially all of the features connected with that half of the lock located toward the inner side of the door having been hereinbefore described, I will proceed to describe those features of that half of the lock located toward the outer side of the door.

The outer knob is designated by the numeral 86, and it is mounted on the outer end of a tubular spindle 87, through which (and said knob) the outer key 88 is to be passed, Fig. 1, for unlocking the door. The outer escutcheon 89 is held in place by the screws 59, and its details of form and construction are shown in Figs. 6, 7, 21, and 22. The outer escutcheon 89 is very similar to the inner escutcheon 42, but has the slotted arms 90 and 91 and spring 92, the latter being in the present instance simply a leaf-spring at one end hooked upon the arms 90 and extending from the said arms 90 to the arms 91, between which its effective portion, bent into loop form, is located, the said effective portion of said spring forming a spring-catch 237 for locking the tumbler-cylinder 93 in a normal position, as will appear hereinafter and as is shown in Fig. 22.

Upon the inner end of the outer knob-spindle 87 is secured the tumbler-cylinder 93, whose sleeve 94 is directly upon said spindle, as shown in Figs. 1 and 21. The details of the cylinder 93 are illustrated in Figs. 11, 12, 13, and 21, in which it will be seen that the cylinder is hollow, that it contains the series of longitudinal radial slots 95, that its face has formed in it the annular recess 96, and that its periphery bears the annular shoulders 97 and 98 and the annular groove 99. Within the recess 96 is placed a disk-plate 100, Figs. 1 and 22, to close the inner end of the chamber formed within the cylinder 93, but not filling said recess, which, as shown in Fig. 1, receives the governor 80, hereinbefore described. Within the annular groove 99 of said cylinder 93 is placed a band-spring 101, which is simply a strip of spring metal wrapped into said groove, but at no point rigidly fastened to said cylinder 93. The spring 101 is more clearly shown in Figs. 1, 21, and 30 and is in the nature of a section of clock-spring. Within the slots 95 of the cylinder 93 are placed a series of plate-tumblers 102, 103, 104, and 105 (shown in Figs. 23, 24, 25, and 26,) and which are held normally inward within the slots 95 by the spring 101, located within the annular groove 99 of said cylinder 93. The tumblers 102 to 105, inclusive, in operation are adapted to move radially within the slots 95 and to be independently set in motion or moved outwardly radially by the governor 80 in the manner and for the purposes hereinafter explained. The tumblers 102 and 103 extend outward from the inner vertical face of the cylinder 93 to or nearly to the inner vertical face of the actuating-plate 41, so that during the rotary motion of said tumbler-cylinder 93 (under the action of the outer key 88) one or the other or both of the

tumblers 102 and 103 will move against the end of the shoulder or shoulders 106 on the face of said plate 41, Figs. 2, 9, and 10, and communicate the motion of said cylinder 93 to said plate 41, with the purpose of causing the latter to move the bolt 40 into the socket and freeing the door. The tumblers 104 and 105 at their outer ends are flush with the vertical end face of the cylinder 93.

The tumblers 102, 104, and 105 are normally flush with the outer horizontal edges of the slots 95; but the tumbler 103, as shown in Fig. 22, is normally set inward from the outer horizontal edge of the slot 95, thereby leaving a portion of said slot to be occupied by the spring-catch 237, which by engaging said slot automatically retains the tumbler-cylinder 93 and outer knob 86 in a normal proper position at rest and prevents the turning of the outer knob except when the proper outer key 88 is used or the governor 80 is so set as to permit of said outer knob being turned, as when the entire mechanism is transformed into a latch operable from either knob.

The tumbler 102 differs from the tumblers 103, 104, and 105 in that it carries on its inner end the slotted key-plate 107, Fig. 23, which extends inward and is located at or near the base of the set of irregular disk-tumblers 108, Fig. 1, inclosed within the chamber formed by the cylinder 93 and slotted to receive the outer key 88 and conform to the wards thereof. When the cylinder 93 is in a normal position at rest, the tumbler 102 will be in alinement with the slot between the arms 90 of the outer escutcheon 89, and when the said tumbler is pressed radially outward and there held by the governor 80 its outer edge will pass between said arms 90, and its plate 107 will be withdrawn from alinement with the key-slots in the tumblers 108, and under such condition the key-cylinder 93 would be prevented from turning at all and even the proper key 88 could not be introduced into the interior of the cylinder 93.

The tumblers 102, 103, 104, and 105 are each capable of being moved outward by the governor 80, and when released by said governor said tumblers move inward under the action of the spring 101. The tumbler 103 is also, under the action of the outer key 88, capable of being moved outward until its outer edge is flush with the outer horizontal edge of its slot 95, this being for the purpose of causing it to press the spring-catch 237 from said slot and in that manner free the cylinder 93, so that it may be turned and the door opened. When the key 88 is used to move the tumbler 103 outward to free the catch 237 from the cylinder 93, said key operates to turn the protruding or cam-shaped edge, Fig. 3, of one or more of the tumblers 108 against the inner edge of said tumbler 103, and thereby effects the desired result.

The outer annular flange 98 of the cylinder 93 fits within the outline defined by the shoul-

ders 204 and arms 90 and 91 of the outer escutcheon and turns within the same, said shoulders and arms serving as a bearing for said cylinder. The lower shoulder 204 has in its upper edge a recess 109 to receive and engage the lower horizontal edge of the tumbler 104 when said tumbler, as hereinafter described, is pressed downward by the governor 80.

In the full use of the complete lock shown it is essential that the tumbler-cylinder 93 return to its normal at-rest position and be there caught every time the door is opened from without, and to this end I provide a spring 110, Figs. 21 and 27, which encircles the sleeve 94 of said cylinder and is double-acting, so as to restore the cylinder 93 to its normal position whether the knob 86 is turned to the right or left on opening the door. The spring 110 has its two ends brought substantially together upon opposite sides of the pins 111 and 112, the former being carried by the cylinder 93 and the pin 112 being rigid with the escutcheon 89. The pin 111 will, when carried in one direction by the cylinder 93, draw on one end of the spring 110 and place the latter under proper tension and when carried in the reverse direction will draw on the other end of the spring 110 and again place the same under proper tension, the stationary end of the spring being meanwhile held by the pin 112. The spring 110 is employed to restore the cylinder 93 to its normal at-rest position, and upon reaching that position it (said cylinder) is automatically caught and held by the spring-catch 237, which following the surface of the annular flange 98 of the cylinder 93 springs into the slot 95 for the tumbler 103 as soon as said slot reaches said catch. The outer knob 86 will preferably be hollow and provided with a hinged cap or outer section 113, Fig. 1, which when pressed to closed position will snap upon the other section of the knob, the purpose of the cap 113 being to exclude dust or other foreign matter from the key slot or opening.

The features connected with and composing that half of the lock toward the outer side of the door have now been described, and I will proceed to an explanation of the operation of the lock as a whole, giving particular reference to the governor 80, whose position is wholly controlled by manual operation from the inner side of the door and regulates the performance of many of the useful functions of the lock.

It will be observed on reference to Fig. 1 that the inner half of the lock and the outer half of the lock are each in one connected set of mechanism carried by the knob-spindle and that these two halves or sets of mechanism are simply inserted into the auger-hole 66 from opposite ends of the latter and brought together, being then secured by the screws 59 and the governor 80 entering the recess 96 of the tumbler-cylinder 93 and the projecting ends of the tumblers 102 103 reach-

ing the face of the actuating-plate 41 at points intermediate the shoulders 106 on said plate. The parts of the lock having been thus brought together and secured by the screws 59, the lock will be ready for use, and since its various uses are governed by the position of the governor 80 I will first refer to the results due to the several positions of said governor, to wit:

First. Let us suppose that the governor 80 has been turned directly upward, so that its projecting end has pressed upward the tumbler 105, the latter being then in line with the slight recess or groove 84 of said governor. Under this condition the tumbler 105 will have moved against and tilted upward the bar 74, located over the actuating-plate 41, and the hold-rod 68 may be brought into use, and upon the turning of the inner knob 43 to draw the bolt 40 inward the rod 68 will be moved outward to engage the hold-plate 71, with the result that the door may first be opened a short distance under the protection of said rod and plate and then closed. If it should then be desired to open the door fully, the governor 80 will be turned to an inoperative position intermediate the tumblers 102, 103, 104, and 105, whose positions are indicated by the markings on the door-knob 43, Fig. 28.

Second. Should the governor 80 be turned against the tumbler 103, so as to press said tumbler outward, and thereby exclude the spring-catch 237 from the tumbler-cylinder 93, the outer knob 86 becomes effective to withdraw the bolt 40 as a simple latch-bolt, no outer key being required. Under this condition the projecting ends of the tumblers 102 103 engage the shoulders 106 of the plate 41, and the latter on being turned thereby will actuate the bolt 40.

Third. Should the governor 80 be turned directly downward against the tumbler 104, it will drive a portion of said tumbler into the recess 109 of the shoulder 204, Figs. 1, 6, and 22, and another portion of said tumbler intermediate two of the studs on the bolt 40, thus working two results, one being the locking of the cylinder 93 against rotation by any means and the other the locking of the bolt 40 stationary, whether at the time it be either inward or outward. If at this time the bolt should be inward, it will be there locked, and the door may be left unrestrained, so that there will be no danger of its latching even if it should close. If, on the other hand, the bolt 40 should at this time be in either of its outward positions, it will be there locked and cannot be unlocked either from the inside or outside of the door except after the governor 80 has been turned from said tumbler 104. At night the bolt 40 should be moved to its full outward safety position and be there locked by the engagement of the governor 80 with the tumbler 104.

Fourth. When the governor 80 is turned to press the tumbler 102 outward into the slot

between the arms 90 of the escutcheon 89, the cylinder 93 is held against all turning action, and neither the outer knob or outer key can operate the bolt 40, and in addition, if the tumbler 102 is furnished with the key-plate 107, Fig. 23, even the proper outer key is excluded from the lock.

Fifth. Should the governor be turned to any position intermediate the points denoted by the tumblers 102, 103, 104, and 105, it would be out of operation and the bolt 40 could be operated from the inside knob or by the outer key 88, but not from the outside knob alone, since the spring-catch 237 would then hold the tumbler-cylinder 93 and outside knob 86.

If it should not be desired to employ the hold-rod 68 and plate 71, the tumbler 105 could be omitted entirely, and then when the governor 80 was turned upward it would be in an inoperative position. It is my purpose to only use such of the tumblers 102, 103, 104, and 105 as may be necessary to secure the results it is desired the lock shall accomplish.

In some instances the outer key 88 would not be necessary for use and in such cases the outer knob 86 would be simply a solid knob. The governor 80 would even in such cases be retained, so that it might be used to render ineffective the outside knob, to lock the bolt 40 in either of its positions, and to bring into use the hold-rod 68.

The tumblers 85 for the inside key 83 and the tumblers 108 for the outside key 88 will vary at will. The form of the tumblers 102, 103, 104, and 105 may also vary in many respects, and the present invention is not limited to the shape of these tumblers nor to the number of them which may be employed.

In Fig. 1 I illustrate the invention as embraced in a lock having projecting door-knobs; but I do not limit the invention in every instance to the employment of projecting door-knobs, since there are many instances in which it may be desired to so construct and concentrate the parts of the lock that the knobs shall not project beyond the sides of the door—as, for illustration, in the case of sliding doors. In order, therefore, that my invention may be more fully understood, I illustrate in Figs. 31 to 38, inclusive, a construction of the lock adapted for sliding doors, the feature of introducing the parts of the lock into mere auger-holes formed in the door being preserved. In Figs. 31 and 34 the door is denoted by the numeral 63, and this door, corresponding with the door shown in Fig. 1, is formed with the auger-hole 66 for the lock mechanism proper and with the auger-hole 65 for the socket for the bolt. In Fig. 34 it will be observed that at the outer and inner sides of the door 63 are secured within the outer edges of the auger-hole 66 the escutcheons 120 and 121, these escutcheons being in the form of flush cups and secured together by means of the screws 122. Within the inside escutcheon 120 is arranged the knob 123, which is in the form of a plate

or disk having thumb-pieces 124 to facilitate its manual operation. Upon the hub of the disk knob 123 is secured the actuating-plate 41, corresponding in all respects with the actuating-plate 41 (shown in Fig. 2) for engaging the bolt. Within the hub of the disk knob 123 is placed the shaft 125, having at its outer end the handle 126 and at its inner end carrying the governor 80, corresponding with the governor provided in the lock shown in Figs. 1 to 28, inclusive.

The outer knob 127 of the lock shown in Fig. 34 corresponds with the disk inside knob 123 and is provided with the finger-pieces 128 to facilitate its manual operation. The outside knob 127 is formed with the key slot or opening 129 for the outer key 130, and said outer knob 127 will preferably be formed in one piece with the tumbler-cylinder 131, which corresponds substantially with the tumbler-cylinder shown in Figs. 11, 12, and 13, and will be equipped with the inside plate or disk tumblers 108, the radial tumblers 102, 103, and 104, and the band-spring 101 for said radial tumblers. The tumbler-cylinder 131 (shown in Fig. 34) may also, if desired, be provided with the radial tumbler 105 (shown in Fig. 22) should any occasion arise for the use of said tumbler. In instances in which the upper hold-rod 68 is not present the upper tumbler 105 need not be employed. The details of the tumblers of the tumbler-cylinder 131 (shown in Fig. 34) need not be specifically described at this place, since they correspond in every respect with the tumblers hereinbefore described with respect to the lock shown in Fig. 1. My main purpose in illustrating the modification shown in Figs. 31 to 38, inclusive, is to make it plain that the lock may be adapted for sliding doors and that the invention is not confined to all of the details shown in Figs. 1 to 30, inclusive. The governor 80 (shown in Fig. 34) has the same operation ascribed to it with respect to the lock of Fig. 1, and hence the operation of the knobs, key, and governor shown in Fig. 34 will be understood without further specific description.

The bolt shown in Figs. 31 and 32 differs in construction from the bolt shown in Fig. 2, the change being rendered necessary by the fact that the bolt of Figs. 31 and 32 is intended for sliding doors instead of hinged doors. The bolt shown in Figs. 31 and 32 comprises the exterior shell 132, the latch-plate 133, and the auxiliary latch-plate 134, both of said latch-plates being held within said exterior casing 132 on a pivot or pin 135, which is rigid with the latch-plate 133 and enters a free aperture in the plate 134. The main latch-plate 133 contains the cam-slot 136, through which passes the stationary pin 137. Within the shell 132 is also provided the spring 138, which exerts a normal upward tension to throw the outer ends of the latch-plates 133 and 134 in directions opposite to one another, so that they may when in their

outward position engage the upper and lower edges of the keeper on the door-casing, as shown in Figs. 31 and 32. When the bolt of Figs. 31 and 32 is drawn into its socket within the door, the outer ends of the latch-plates 133 and 134 will be held by the confinement of the said socket into the closed position illustrated in Fig. 33. The upper edge of the latch-plate 133 will be formed with a shoulder 139, against which one of the cogs or projections 50 on the actuating-plate 41 may strike when turned downward, and thereby depress the outer end of the latch-plate 133, and consequently the latch-plate 134, into alinement with the socket for the bolt. In Fig. 31 the bolt is shown in its outer position, and should it be desired to open the door 63 the actuating-plate 41 will be turned to cause its cog or projection 50 to press downward against the shoulder 139 of the latch-plate 133, thereby closing the front ends of the latch-plates 133 and 134 together, as shown in Fig. 33, and thereupon the continued turning motion of the actuating-plate 41 will cause the arm 52 of said plate to meet the rear end of the casing 132 and move said casing and the then closed latch-plates inward into their socket. During the inward motion of the bolt shown in Fig. 31 the edges of the cam-slot 136 riding on the pin 137 will operate to retain in their closed position and even to more closely close the latch-plates 133 and 134. During the outward motion of the bolt shown in Fig. 31 the cam-slot 136 riding on the pin 137 will allow the front portions of the latch-plates to gradually separate and finally become free, so that they may assume under the force of the spring 138 the position they occupy in Fig. 31. The actuating-plate 41 is utilized in the construction shown in Fig. 31 to throw the bolt both outward and inward, and the invention is not confined to the bolt shown in Figs. 31 and 32, this bolt having been shown merely to illustrate the main portion of the invention in its adaptation to sliding doors.

The various features of the invention have been so fully described hereinbefore that it is not believed that a further detailed description of the construction or operation of the parts of the lock is necessary.

I desire it to be understood that the invention in its broader scope is not confined to details of form or construction and that the form and construction of the parts hereinbefore described may vary in many ways without departing from the spirit of the invention. I have referred to one or two modifications of some of the parts of the lock; but it will be understood that the parts of the lock may be varied in other particulars at will in order to adapt the lock for different conditions and classes of doors and the particular results sought to be accomplished by means of the invention. For instance, a flush-cup escutcheon might be employed at one side of the door and a projecting knob

at the other side thereof; or the inside knob might be omitted altogether and only the handle of the governor 80 appear at the inner side of the door, the indicator-marks for the several positions of the governor being placed on an escutcheon surrounding said handle, or the outside knob might be omitted and the outside key passed through the face of the outside escutcheon.

Without limiting myself, therefore, to details of form or construction other than as may be indicated in the claims, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lock mechanism, the bolt having the projecting studs 47 and 48, combined with the rotary actuating-plate having the cogs 50 and arms 52 to engage said studs, and means for turning said plate to move said bolt, said arms 52 being disposed at the outer side of the end studs 48 for engagement therewith only, and said plate being adapted to coact with said bolt as a latch and also to move said bolt outward into a safety-bolt position; substantially as set forth.

2. In a lock mechanism, the main bolt, the actuating-plate for throwing the same, and the additional bolt adapted also to be thrown by said plate, combined with the pivoted slotted plate connected with the door-casing and to be engaged by said additional bolt; substantially as set forth.

3. In a lock mechanism, the inside rotatory knob, the actuating-plate connected therewith and set within a recess in the door, and the hold-rod bolt adapted to be thrown by said plate and knob, combined with the pivoted slotted plate connected with the door-casing and to be engaged by said bolt; substantially as set forth.

4. In a lock mechanism, the bolt, combined with the knob, and the plate carried by said knob for engaging and throwing said bolt, said bolt having the series of studs and said plate the series of arms to engage said studs and effect the movement of said bolt to a latch position or to a safety-bolt position; substantially as set forth.

5. In a lock mechanism, the bolt having projecting studs at its opposite sides, combined with the actuating-plate for engaging the studs at one side of the bolt for throwing the latter, and means for engaging the studs at the opposite side of said bolt for locking the bolt in fixed position; substantially as set forth.

6. In a lock mechanism, the bolt having projecting studs, combined with the rotary actuating-plate to engage said studs, said plate having corresponding upper and lower edges and being reversible so that when one edge of said plate becomes worn the other edge of said plate may be placed into engagement with the bolt; substantially as set forth.

7. In a lock mechanism, the bolt having the studs 47 and 48, combined with the actuating-plate for engagement with said studs and having at its lower edge the cogs 50 and arms

52 and at its upper edge the cogs 49 and arms 51, the said plate being reversible; substantially as set forth.

8. In a lock mechanism, the main bolt, and the actuating-plate for throwing the same, combined with an additional bolt adapted also to be thrown by said plate, said bolts moving in reverse directions, and means connected with the door-casing to be engaged by said additional bolt and with the latter to hold the door against being opened more than a short distance; substantially as set forth.

9. In a lock mechanism, the hold-rod bolt comprising the upper and lower members adapted to be placed into engagement with one another so that they may move outward together when desired, and the main bolt, combined with the actuating-plate intermediate of and for operating said bolts, and means for turning said plate; substantially as set forth.

10. In a lock mechanism, the tumbler-cylinder, and a radial tumbler member carried thereby, combined with the bolt, and means operable from the inner side of the door for setting said member to lock the bolt-actuating mechanism against movement from the outer side of the door; substantially as set forth.

11. In a lock mechanism, the tumbler-cylinder, and a radial tumbler member carried thereby, combined with the bolt, and means operable from the inner side of the door for setting said member to lock said cylinder and also said bolt; substantially as set forth.

12. In a lock mechanism, the tumbler-cylinder having tumblers for the outer key and also a radial tumbler member carrying a slotted plate normally in line with said tumblers, combined with the bolt, and means operable from the inner side of the door for setting said tumbler member to lock said cylinder and move said slotted plate across the key-slot to exclude the key; substantially as set forth.

13. In a lock mechanism, the tumbler-cylinder to receive the key, the bolt, the actuating-plate therefor, and radial tumblers carried by said cylinder, combined with means operable from the inner side of the door for setting any one of the said tumblers for effecting the result desired, such as locking said cylinder against rotation or permitting the operation of said bolt as a latch; substantially as set forth.

14. In a lock mechanism, the tumbler-cylinder to receive the key, the bolt, means for actuating the bolt, and a radial tumbler set within a slot in said cylinder and normally only partly filling said slot, combined with the spring-latch 237 for entering said slot and locking said cylinder, means for actuating the bolt from said cylinder, and means operable from the inner side of the door for moving said radial tumbler outward to exclude said latch, thereby permitting the opening of the door from the outer knob; substantially as set forth.

15. In a lock mechanism, the tumbler-cylinder to receive the key and operable from the outer knob, the bolt, the actuating-plate for said bolt, means connected with said cylinder for moving said bolt from the outer side of the door, the spring for restoring said cylinder to its normal at-rest position, a spring-latch for retaining said cylinder in its normal at-rest position, a radial tumbler for relieving said latch-spring from engagement with said cylinder, and a radial tumbler for locking said cylinder against rotation, combined with means operable from the inner side of the door for setting said last-named tumbler to lock said cylinder or to move the first-named tumbler to free said latch-spring and permit the free rotation of said cylinder for moving inward the bolt; substantially as set forth.

16. In a lock mechanism, the tumbler-cylinder to receive the key and having a radial tumbler member, the bolt, the actuating-plate therefor, and means for placing said cylinder and said plate into engagement with one another for operating the bolt from the outer side of the door, combined with the governor operable from the inner side of the door for setting said radial tumbler to lock said cylinder against rotation; substantially as set forth.

17. In a lock mechanism, the tumbler-cylinder to receive the key, the bolt, the actuating-plate for said bolt, the inner knob connected with said plate, means for engaging said tumbler-cylinder with said plate for operating said bolt from the outer side of the door, the outer knob connected with said tumbler-cylinder and having the key-opening for the outer key, and the radial tumbler member carried by said cylinder, combined with the governor, and the shaft extending therefrom through the inner knob-spindle and having a handle by which it may be turned, said governor being adapted to be turned against said radial tumbler member for setting the same; substantially as set forth.

18. In a lock mechanism, the tumbler-cylinder to receive the key and connected with the outer knob through which the outer key is to pass, the bolt, the actuating-plate therefor connected with the inner knob, means for placing said cylinder into engagement with said actuating-plate for operating the bolt from the outer side of the door, and radial tumblers carried by said cylinder, combined with the governor for setting any one of said radial tumblers and having its shaft extending through the inner knob, the handle for said shaft for operating said governor, and indicating-marks on the inner knob to denote the position of the said radial tumblers; substantially as set forth.

19. In a lock mechanism, the tumbler-cylinder to receive the key and connected with the outer knob through which the outer key passes, the bolt, the actuating-plate therefor

connected with the inside knob, means for engaging said cylinder with said plate for operating the bolt from the outer side of the door, the spring for restoring said tumbler-cylinder
5 to its normal at-rest position, the latch for engaging said cylinder when at its normal at-rest position, and radial tumblers carried by said cylinder, combined with the governor for setting any one of said radial tumblers and
10 having its shaft extended through the spindle of the inside knob and provided with an exposed handle; substantially as set forth.

20. In a lock mechanism, the bolt, the actuating-plate therefor connected with the inner knob and provided with the shoulders
15 106, combined with the tumbler-cylinder connected with the outside knob and operable by the outside key, the radial tumblers 102, 103, for engaging said shoulders of said plate for
20 imparting the motion of said cylinder to said plate, the spring for restoring said cylinder to its normal at-rest position, the spring-latch for engaging said cylinder when at its normal at-rest position, and means operable from the
25 inner side of the door for setting said tumblers either to lock said cylinder against rotation or to permit the rotation of said cylinder and the operation of the bolt thereby, as a latch; substantially as set forth.

30 21. In a lock mechanism, the bolt, and the actuating-plate therefor connected with the inside knob, combined with the tumbler-cylinder connected with the outside knob and adapted to receive the key, the recess at the

inner-facing end of the said cylinder, the radial tumblers carried by said cylinder and
35 projecting into said recess, the yielding spring operating against said radial tumblers, and the governor rotatable within said recess and operable from the inner side of the door to
40 set any one of said tumblers; substantially as set forth.

22. In a lock mechanism, the bolt, the actuating-plate therefor, and the inside knob
45 connected with said plate, combined with the tumbler-cylinder connected with the outside knob and adapted to receive the outer key, the tumblers within said cylinder for engagement with said key, a radial tumbler member
50 carried by the said cylinder for locking the latter against rotation, the governor operable from the inner side of the door to set said radial tumbler member, and the escutcheons
55 for said lock mechanism, said escutcheons being set into recesses in the door, and said knobs being set into the recesses of said escutcheons, so as to leave the outer surfaces of the lock mechanism as nearly as may be
60 flush with the sides of the door; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 9th day of June, A. D. 1899.

GUSTAV G. LAUREYNS.

Witnesses:

CHAS. C. GILL,
E. JOS. BELKNAP.