

No. 777,885.

PATENTED DEC. 20, 1904.

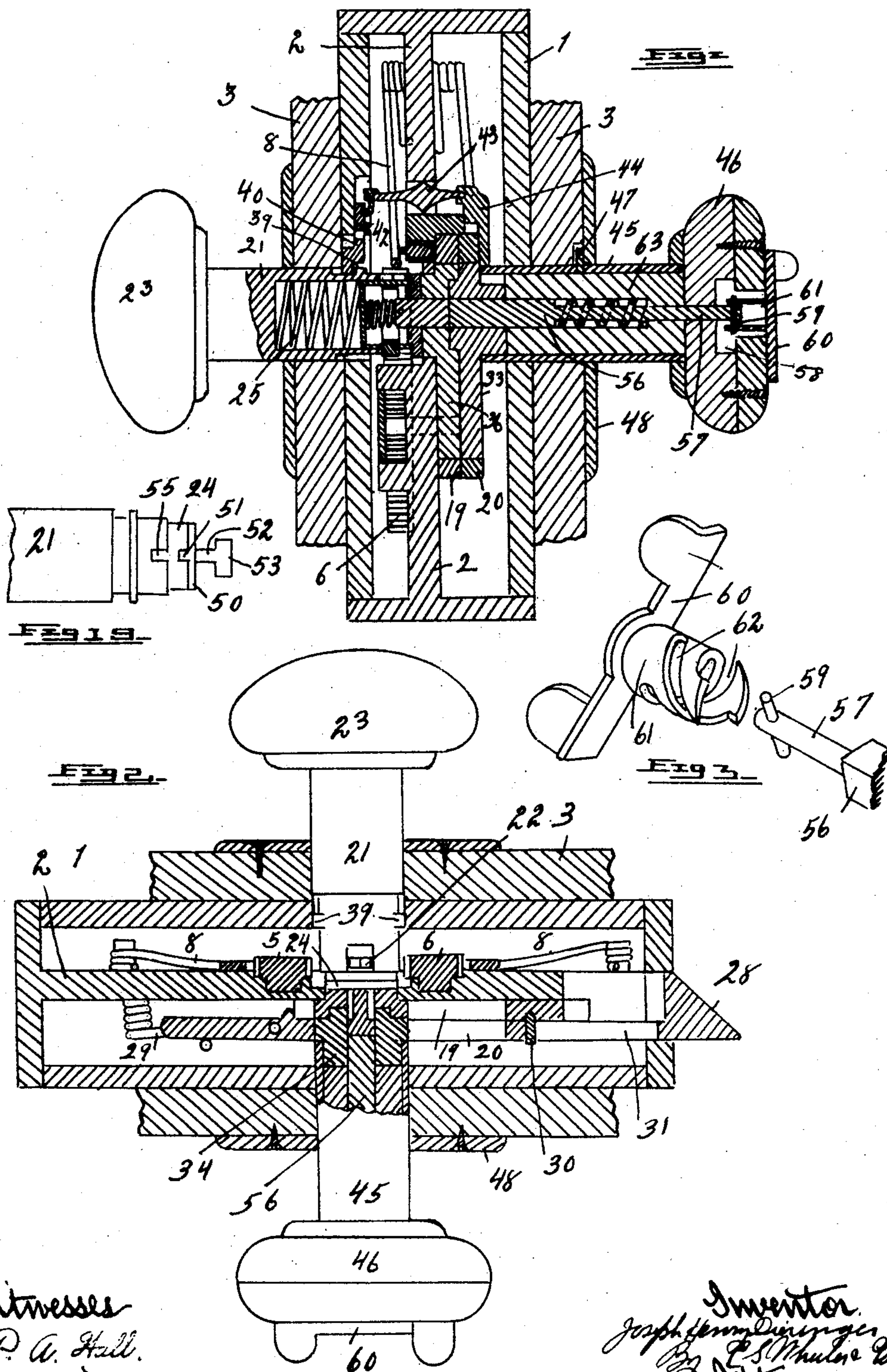
J. H. DIERINGER.

LOCK.

APPLICATION FILED MAY 21, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



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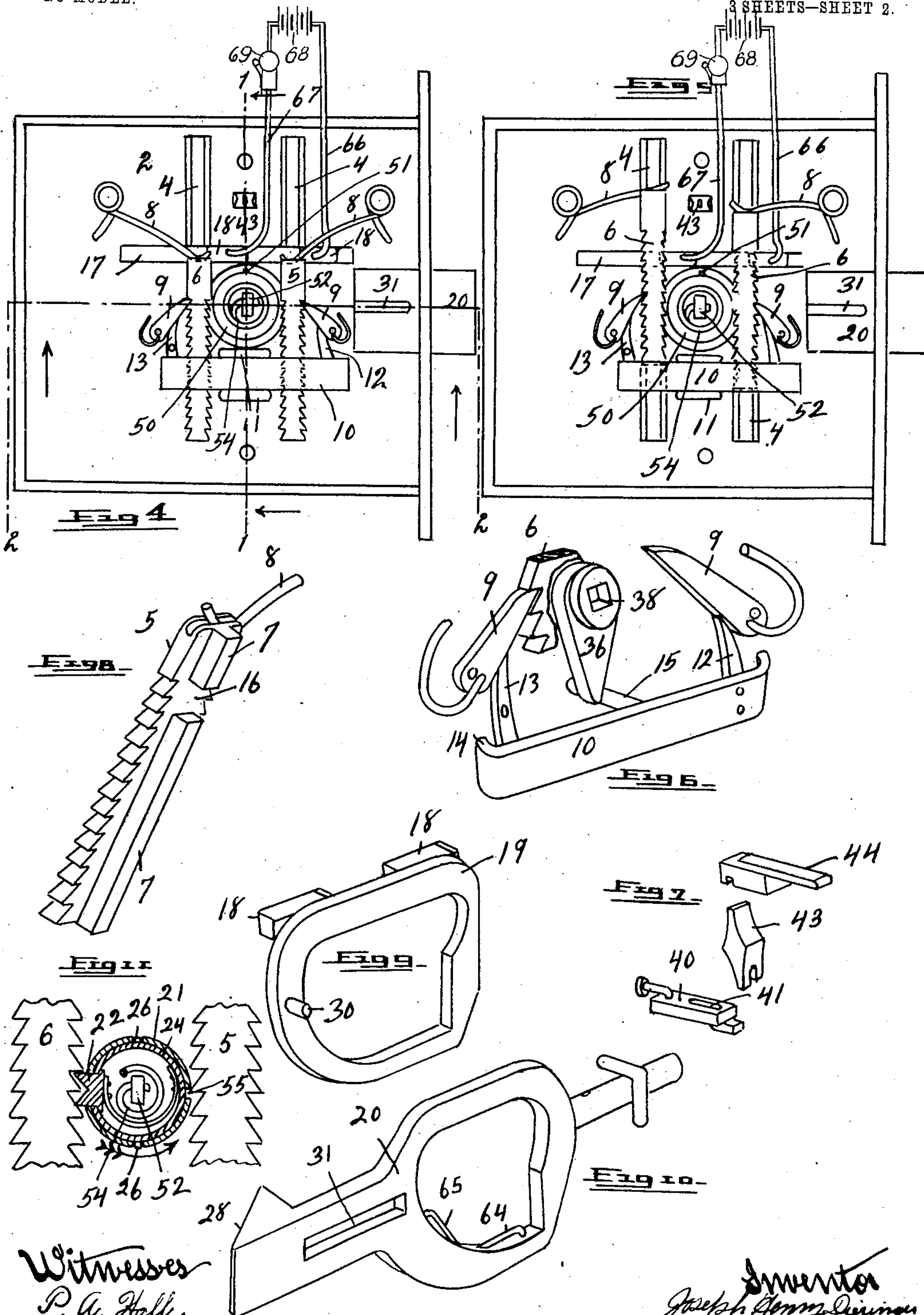
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

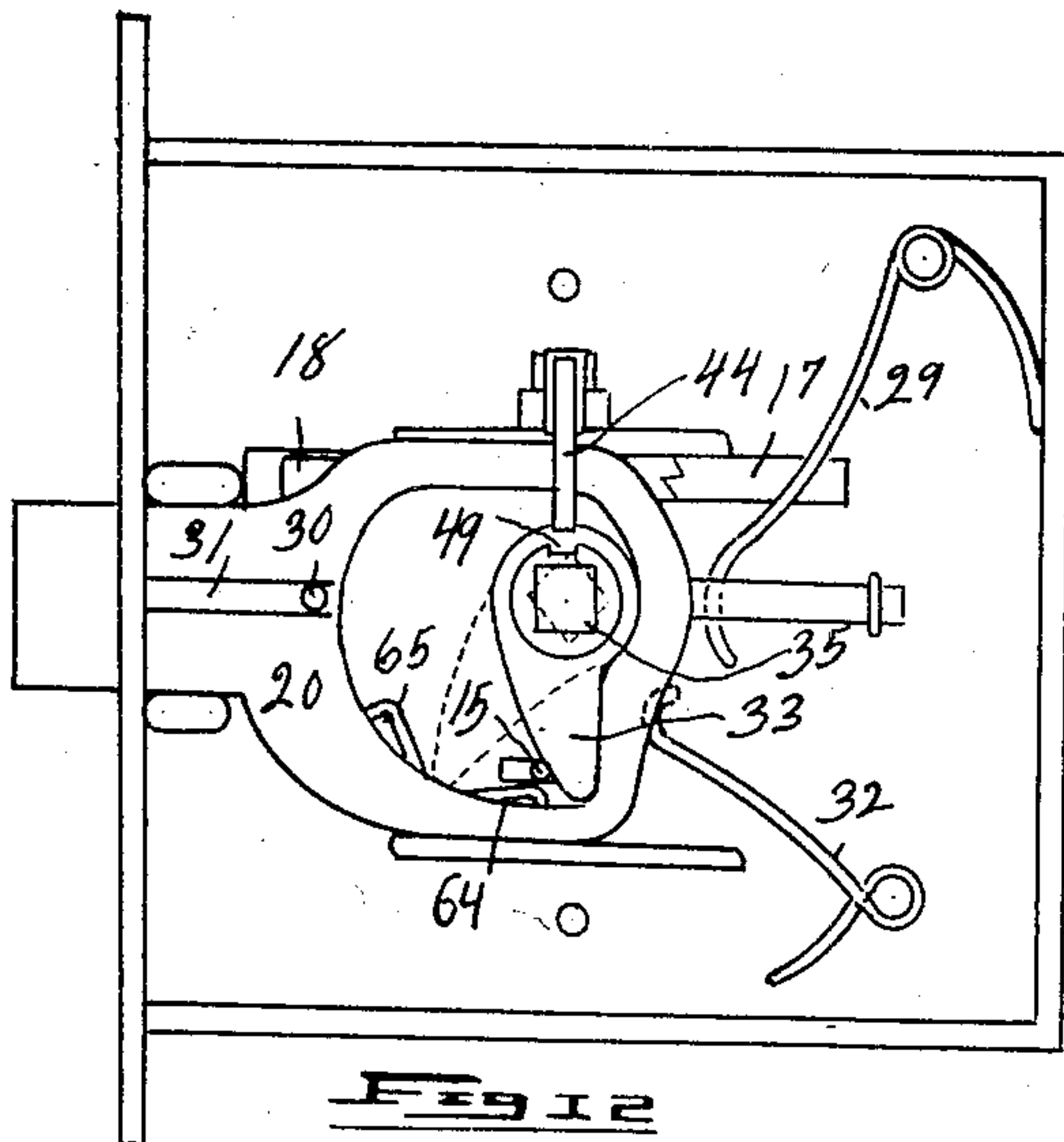


Fig 12

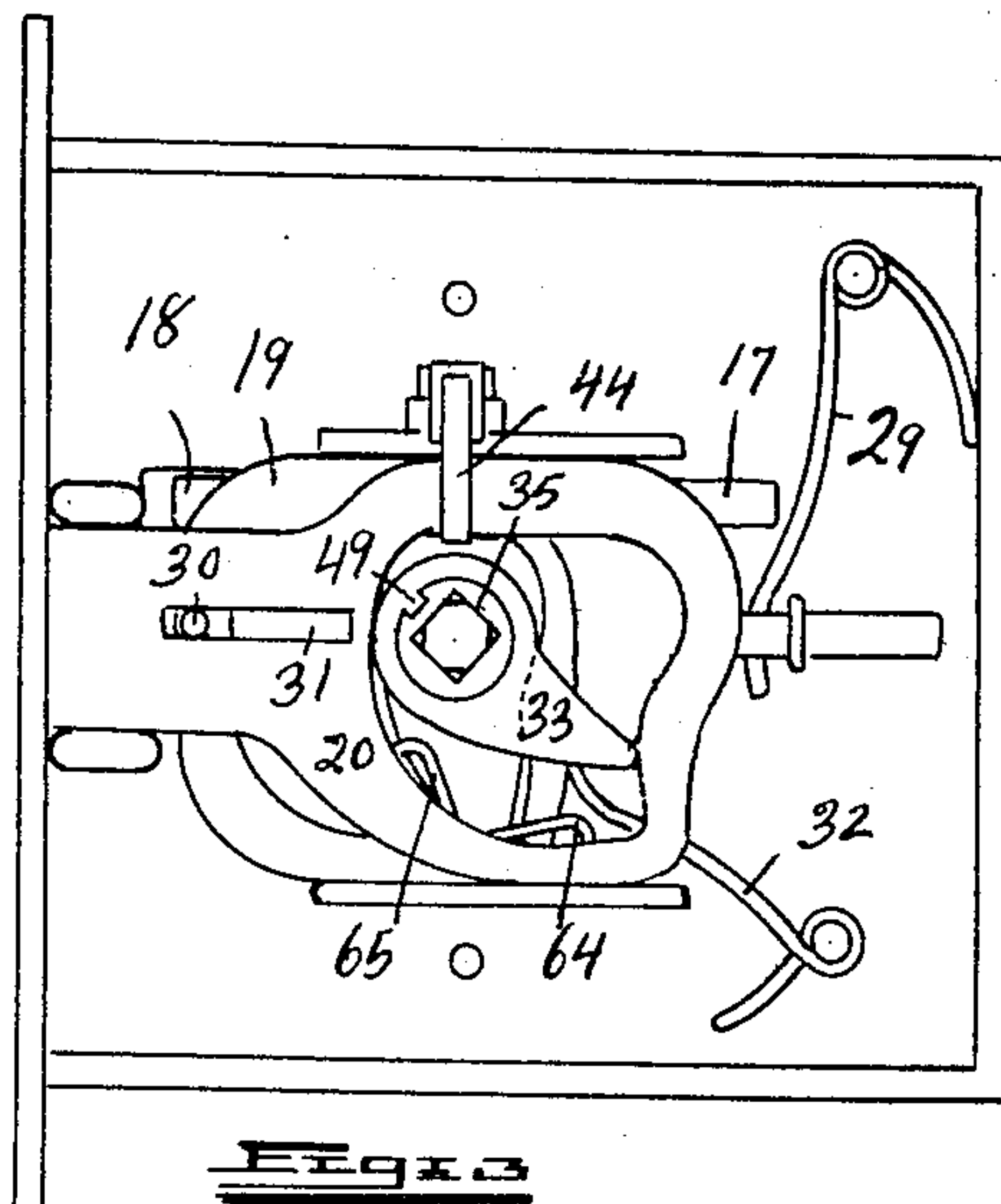


Fig 13

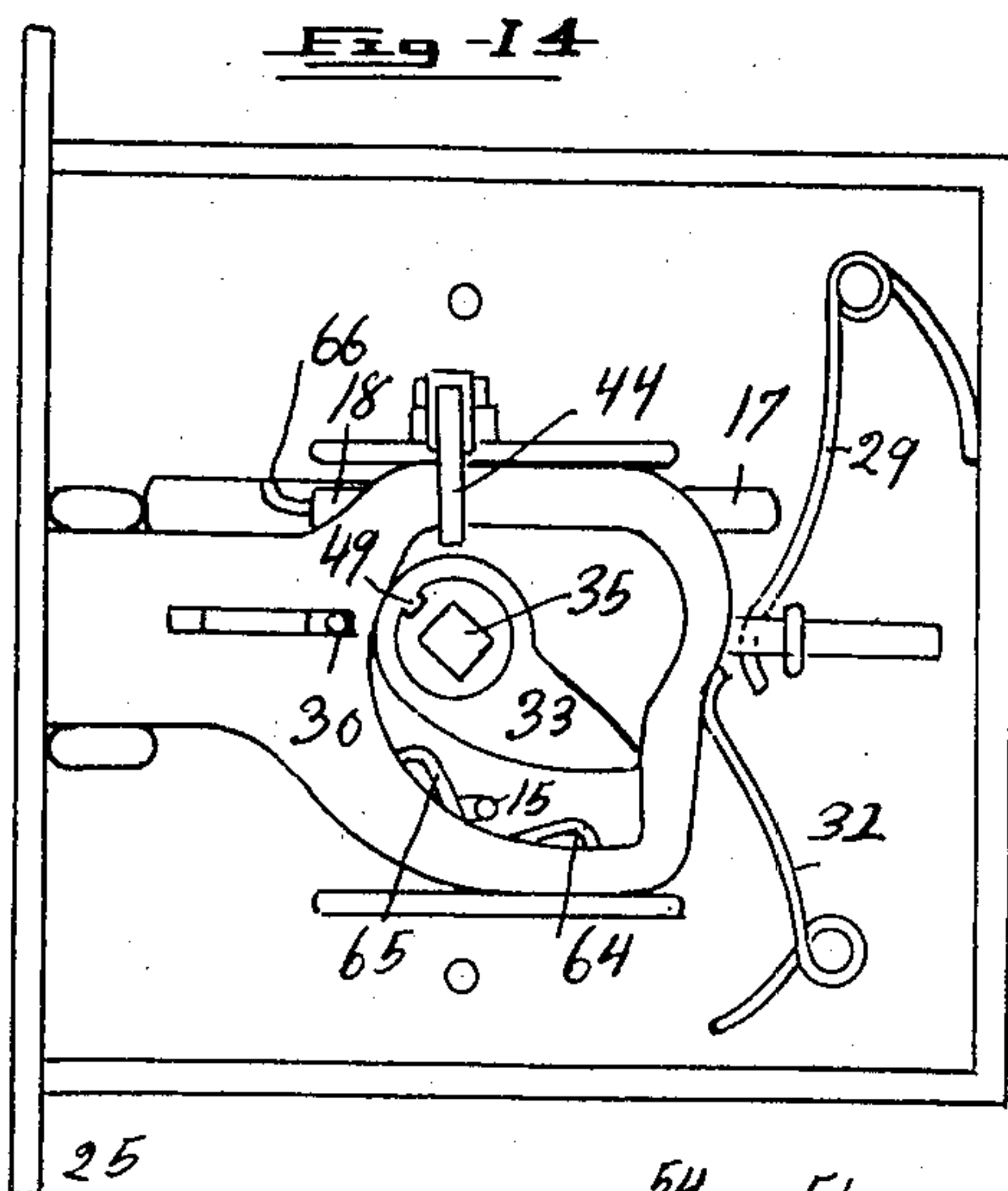


Fig 14

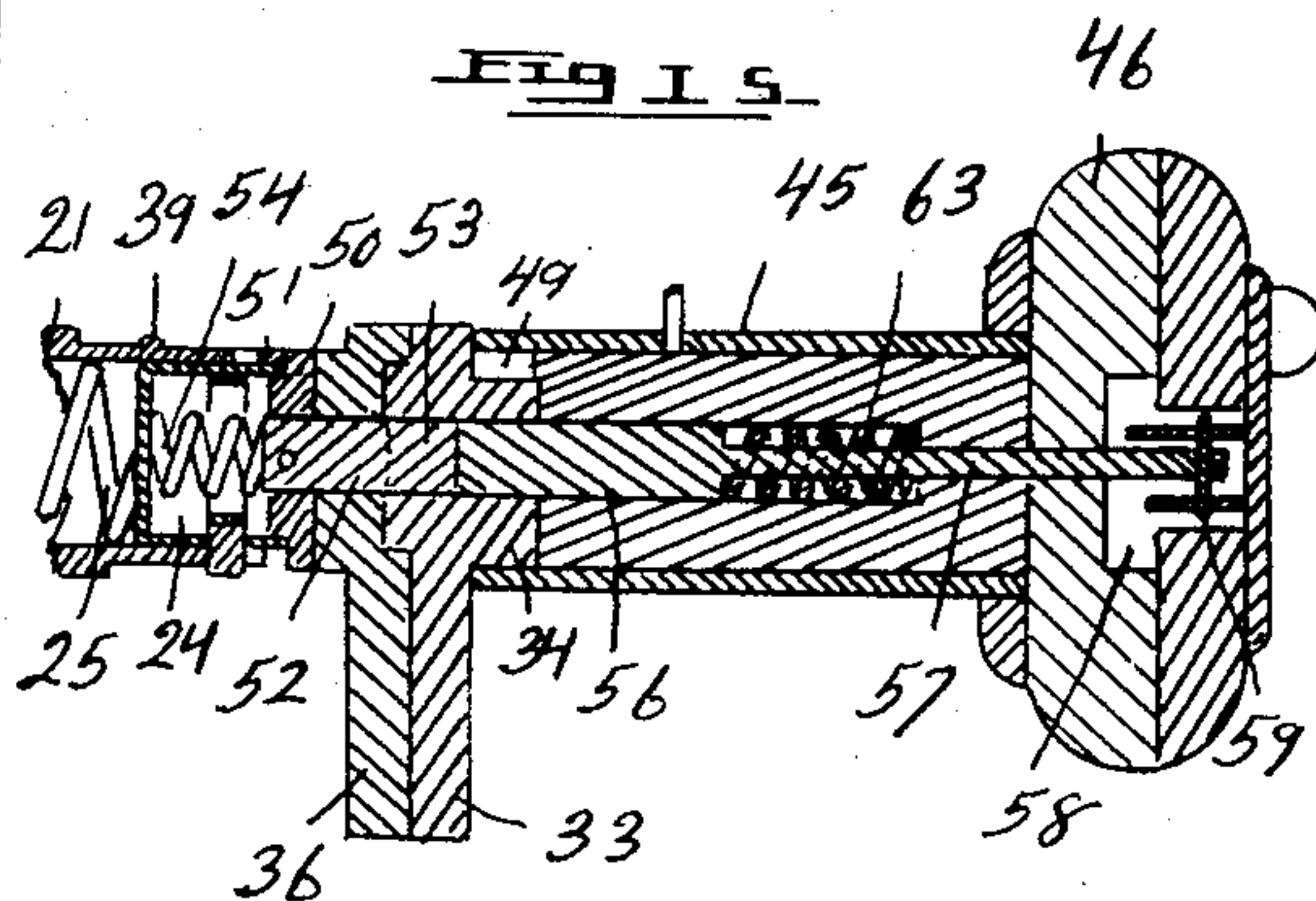


Fig 15

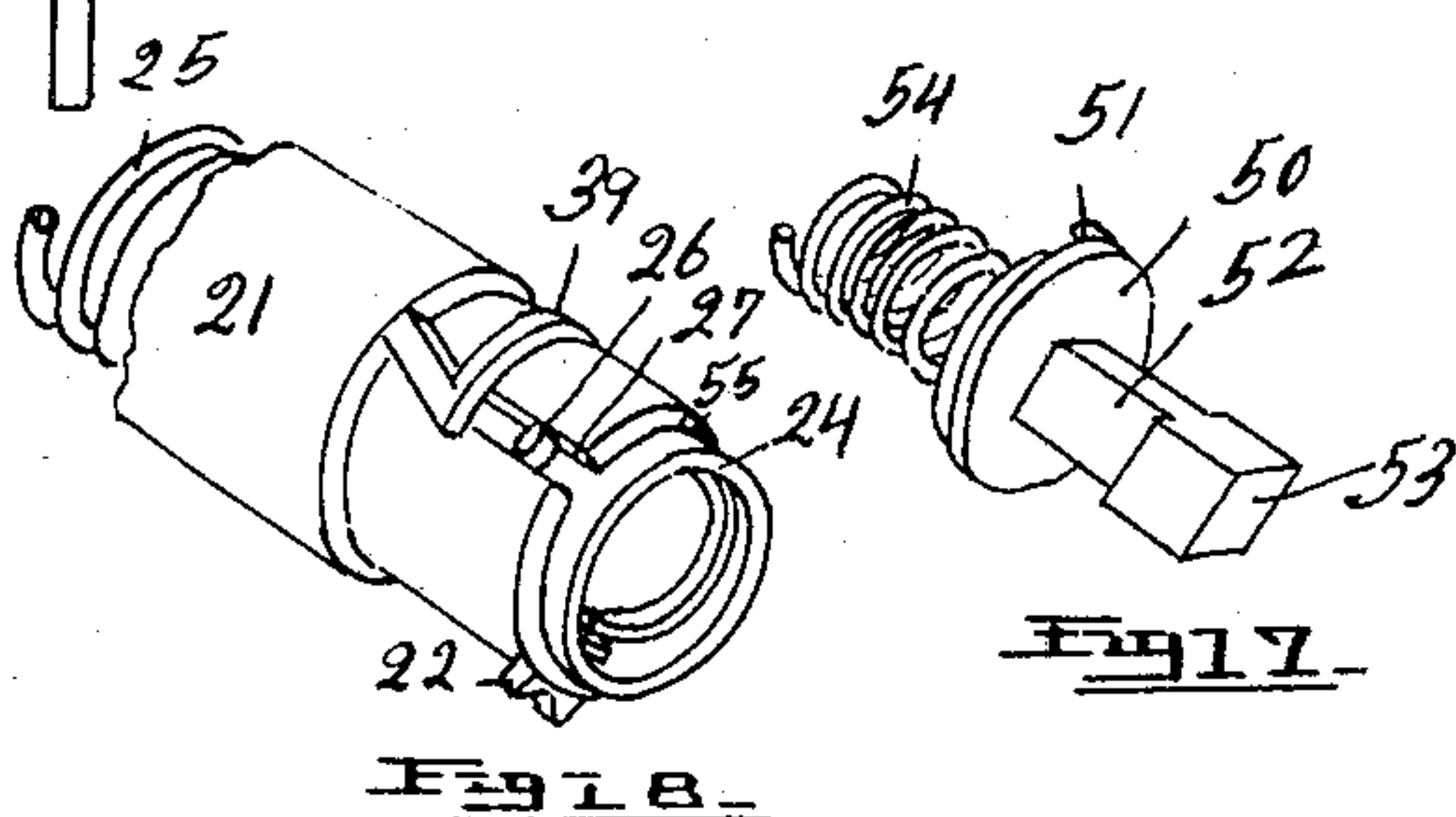


Fig 16

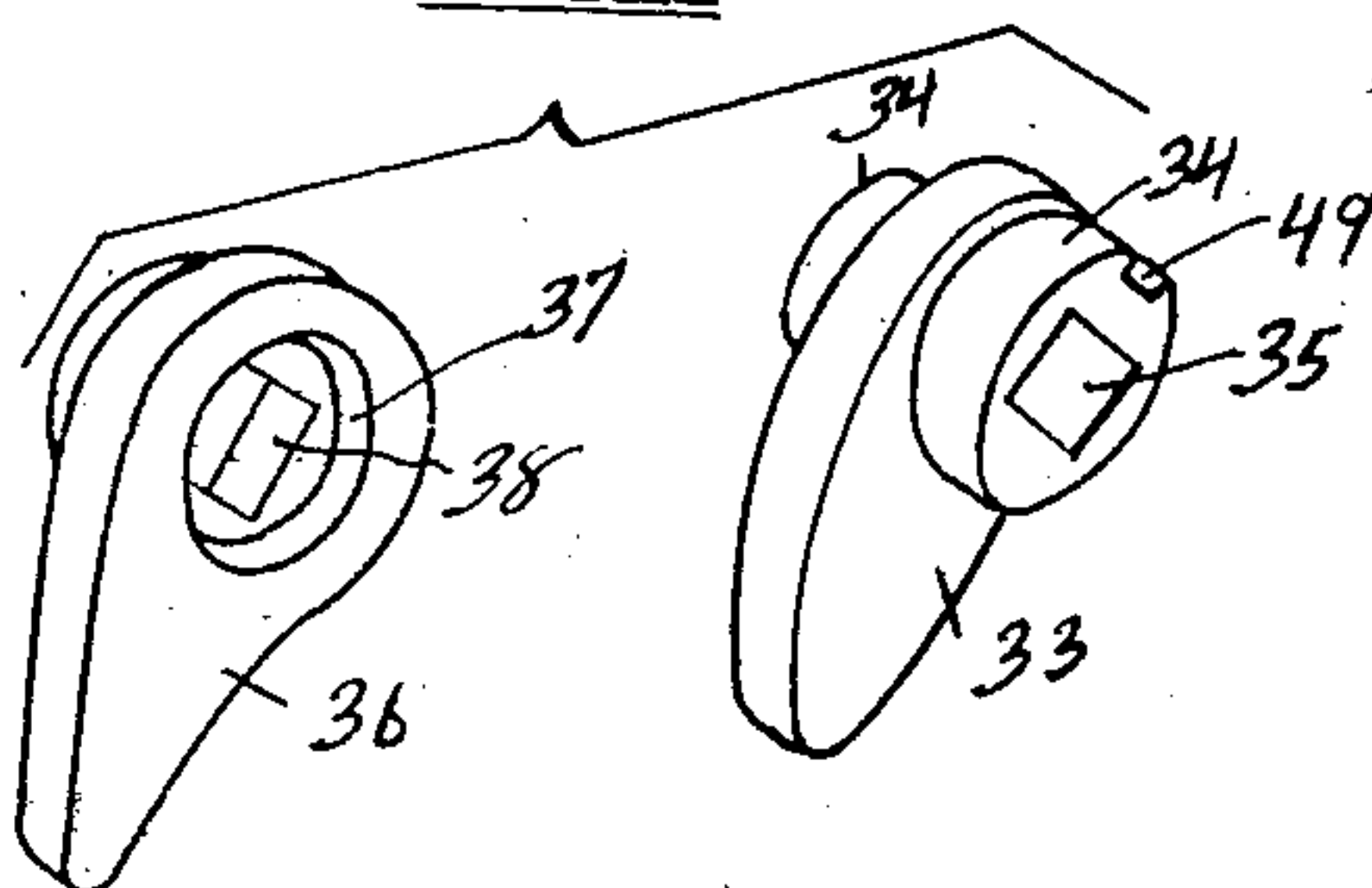


Fig 17

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UNITED STATES PATENT OFFICE.

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LOCK.

SPECIFICATION forming part of Letters Patent No. 777,885, dated December 20, 1904.

Application filed May 21, 1903. Serial No. 158,076.

To all whom it may concern:

Be it known that I, JOSEPH HENRY DIERINGER, a citizen of the United States, residing at Bridgeport, in the county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Door-Locks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to door-locks; and it consists in combining in a single operative structure a combination keyless night-latch, door-bolt, and burglar-alarm, as will be hereinafter more fully set forth, and pointed out particularly in the claims.

The object of the invention is to produce a combination keyless lock wherein provision is made for a night-latch, for bolting the door against a possible opening thereof without breaking the lock, and for an alarm which will be sounded should any one attempt to open the door who is not familiar with or who does not employ the proper combination.

The above object is attained by the structure illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section through the lock and case within the mortise of a door and through both the knob-stem and one of the knobs, as on line 1 1 of Fig. 4. Fig. 2 is a horizontal section through the lock and case and a portion of one knob-stem, as on line 2 2 of Fig. 4. Fig. 3 is an enlarged perspective view in detail of a turn-button adapted to actuate the spindle of the inner knob-stem for purposes hereinafter explained. Fig. 4 is an elevation of the outer part of the lock with the side of the case removed, showing the normal position of the combination-tumblers. Fig. 5 is a similar view showing the tumblers in position to enable the latch-bolt to be operated by the outside door-knob, said tumblers having been previously placed in said

position by a manipulation of the outside door-knob, as hereinafter explained. Fig. 6 is a perspective view in detail of certain parts of the lock adapted to be operated to restore the tumblers to their normal position after the door has been opened through the proper working of the combination. Fig. 7 is a view of some enlarged details in perspective of the operative parts of the lock. Fig. 8 is an enlarged perspective view of one of the tumblers detached from the lock. Fig. 9 is a perspective view of the sliding frame, which is adapted to be moved with the latch-bolt when the door is opened from the outside. Fig. 10 is a perspective view of the latch-bolt. Fig. 11 is a detail in section showing the fish-tail nib which is in the stem of the outer door-knob and by means of which the ratchet-tumblers may be actuated when setting said tumblers for the purpose of opening the door through the operation of the combination. Fig. 12 is an elevation of the reverse or inner side of the lock with the plate of the case removed, showing the normal position of the latch-bolt and other parts. Fig. 13 is a similar view showing the latch-bolt retracted through the operation of the inner door-knob. Fig. 14 is a like view showing the latch-bolt retracted through the operation of the outer door-knob. Fig. 15 is a longitudinal sectional view through the inner knob and stem and some of the operative parts of the lock. Fig. 16 is a perspective view of the inner and outer fingers. Fig. 17 is a perspective view of the rotary disk and outer knob-spindle passing therethrough, showing the spring for actuating said spindle. Fig. 18 is a fragmentary view in perspective of the inner end of the outer knob-stem. Fig. 19 is a fragmentary view in detail of the inner end of the outer knob-stem and the disk at the end of said stem carrying the short reciprocatory spindle.

Referring to the characters of reference, 1 designates the case, which will be similar to that of the ordinary mortise-lock case, with the exception that it is divided by a central partition 2, extending centrally therethrough

parallel with the sides of the case. This case is adapted to fit within a mortise in the door 3, as clearly shown in Figs. 1 and 2.

Formed in the partition 2 are the channels 4, which serve as guideways in which the ratchet-tumblers 5 and 6, respectively, are adapted to lie and to move longitudinally, said tumblers having upon their inner faces the projecting ribs 7, which extend into said channels and assist in directing said tumblers in their movement, at the same time maintaining them in place. Bearing upon the upper end of each of said tumblers is a spring 8, suitably secured within the case, whose tension is normally exerted downwardly upon said tumblers to hold them in or return them to the normal position. (Shown in Fig. 4.) Pivoted within the case adjacent to said tumblers are the spring-actuated pawls 9, adapted to engage the notches in the outer edges of said tumblers and to hold said tumblers when raised or moved upwardly in their guiding-channels against the action of the springs 8. Lying across the tumblers is a reciprocatory plate 10, held in a guide 11 and having fixed at one end a projecting finger 12, which engages one of said pawls. Engaging the opposite pawl is a short pivoted lever 13, whose free end is adapted to be engaged by a lip 14 on said plate, as clearly shown in Fig. 6, whereby by a longitudinal movement of the plate 10 the pawls are simultaneously disengaged from the tumblers, allowing said tumblers to drop back into place or to move downwardly through the action of the springs 8. Projecting inwardly from the plate 10 is a pin 15, which passes through a slotted opening in the partition 2 and extends into the path of the outer finger, whereby through the manipulation of the outer door-knob the plate 10 may be shifted to release the pawls and allow the tumblers to drop back, so as to reset the combination after each operation.

The combination of the lock illustrated herein is "65," and the tumblers are actuated to enable the door to be opened from the outside by making a quarter-turn of the outside knob six times to the right and then reversing the movement and making a quarter-turn five times to the left, when the tumblers will have been raised so as to cause the openings 16, formed through the ribs 7 thereof, as clearly shown in Fig. 8, to register with the channel 17 in the partition 2, in which the sliding lugs 18, carried on the movable frame 19, travel as said frame is moved with the latch-bolt 20, when the door is opened from the outside through the operation of the combination, allowing the latch-bolt and the sliding frame 9 to move together as said bolt is retracted in opening the door. Should a mistake be made in working the combination, the tumblers will be so positioned that the opening 16, cut through the ribs 7 thereon, will

not register with the channel 17, therefore causing the lugs to strike against the ribs on the tumblers and preventing the bolt from being withdrawn from the keeper. To provide for operating the ratchet-tumblers through the partial rotation of the outer knob-stem, said stem 21 is provided in the inner end thereof with a fish-tail nib 22, (see Fig. 11,) which when the outer knob-stem is in place is adapted to engage the teeth of said tumblers and raise them a notch at a time as the knob-stem is partially rotated in either direction.

To allow of a manipulation of the outside knob 23 for the purpose of actuating the tumblers without operating the lock mechanism, the stem 21 of said knob is provided in the inner end thereof with a cup 24, slidably located therein, which is held in place by the fish-tail nib 22, which projects through an opening in the wall of the stem. Located within the hollow chamber of said stem is the spring 25, which normally forces said cup outwardly. (See Fig. 18.) Projecting from opposite sides of said cup are the pins 26, which lie in channels 27 in the inner end of the knob-stem 21 and cause said cup to turn with said stem, but allowing said cup to reciprocate, so as to enable the knob-stem to be forced inwardly into working relation with other parts of the knob, as hereinafter explained.

The latch-bolt 20 projects through the case in the ordinary manner and has the beveled end 28 to engage the keeper and force the bolt inwardly when the door is closed. A suitable spring 29 engages the rear end of said bolt to normally hold it projected. The frame 19, which lies against the outer face of the latch-bolt 20, has a pin 30, which projects into the guide-slot 31 in said bolt. Said frame 19 is normally held in its forward position by a suitable spring 32. When the combination is set, this frame must be retracted simultaneously with the bolt-latch to enable the door to be opened from the outside. The latch-bolt is adapted to be operated by the inner finger 33, which has an annular hub 34 projecting from the opposite faces thereof, through which is a square aperture 35. The frame 19 is adapted to be actuated by the outer finger 36, having an annular recess 37 in the face thereof, which receives the annular hub of the outer finger, and having a square hole 38 there-through leading from said recess. These fingers are adapted to be operated separately and in unison by means hereinafter explained.

Upon the inner end of the knob-stem 21 is a bead 39, extending about half-way around said stem, and over which the lower end of the vertical sliding bolt 40 (see Fig. 1) is adapted to engage, said bolt having a slot 41 there-through (see Fig. 7) through which passes a screw 42, whereby said bolt is retained in place and is allowed to reciprocate longitudi-

nally. Engaging the upper end of said bolt is a lever 43, which is fulcrumed in and extends through the partition 2 and whose inner end is engaged by a steel arm 44, the lower end of which rests upon the stem 45 of the inner knob 46. The inner knob-stem 45 is held in place by a pin 47, which engages the rose-plate 48, surrounding said stem, and is secured to the face of the door by suitable screws. By removing the rose-plate 48 the inner knob-stem may be withdrawn from the lock, thereby allowing the lower end of the steel arm 44 to drop into the notch 49 in the hub of the inner finger, when the connected lever 43 will raise the bolt 40 from engagement with the bead 39 on the outer knob-stem and allow the outer knob to be removed.

In Fig. 17 is shown a rotary disk 50, having on the periphery thereof a projecting pin 51 and having mounted therein and adapted to reciprocate centrally therethrough a spindle 52, carrying at its outer end an enlarged square portion 53, which is adapted to fit the squared opening through the hub of each of the fingers 33 and 36. Attached to the inner end of the spindle 52 is a coiled spring 54, which is seated in the cup 24 in the inner end of the outer knob-stem.

In the end of the outer knob-stem is a slot 55, which is adapted to receive the pin 51 on the disk 50 when said stem is pushed inwardly, thereby enabling the disk 50 to be rotated with the knob-stem and the spindle 52 to be turned therewith.

With the parts in the position shown in Figs. 1 and 4, wherein the combination is set ready for operation through the manipulation of the outer door-knob, the door may be opened from without by turning the outer knob a quarter-way around six times to the right until a click is heard at each quarter-rotation. The clicking sound is caused by the pawl 9 dropping from tooth to tooth in the ratchet-tumbler 6, as the fish-tail nib 22 raises said tumbler a notch at a time by the quarter-rotation of the knob just described. The knob is then given a quarter-turn to the left five times until a click is heard at each quarter-rotation, indicating the raising of the tumbler 5 a notch at a time and the dropping of the pawl 9 over the teeth of the ratchet thereon. When said operation has been completed, the tumblers will have been raised so that the openings 16 in the ribs 7 thereof will register with the lugs 18 on the frame 19, when by pushing the outer knob inwardly until the notch 55 in the knob-stem engages over the pin 51 on the plate and turning said knob to the right the finger 36 will be actuated by the square end of the spindle 52, which extends into the square opening thereof, and the frame 19 will be actuated, thereby actuating the latch-bolt by the engagement of the pin 30 therewith to withdraw

said bolt from the keeper and permit the door to be opened from without. After the tumblers have been actuated by the manipulation of the outer door-knob, as described, they will stand in the raised position. (Shown in Fig. 5.) To restore said tumblers, the outer knob is pushed inwardly until the pin 51 on the disk 50 is again engaged by the notch in the end of the knob-stem 21, when the outer knob is turned to the left, thereby throwing the finger 36 against the pin 15 of the plate 10 and moving the plate longitudinally to disengage the pawls 19 from the teeth of their respective tumblers, when the springs 8 will restore said tumblers to their normal position.

It will be observed that the door can always be opened by the inner door-knob, as the square spindle 56 passing through the stem thereof is always in engagement with the square opening in the finger 33, which actuates the latch-bolt. It will also be observed that the spindle 56 of the knob-stem 45 is longitudinally movable within said stem and is provided with a reduced portion 57, which passes into a recess 58 in the knob 46 and carries a pin 59. Upon the outer face of the outer knob is the turn-button 60, having a hollow shank 61, which extends into the recess 58 of the knob, and in which is formed the spiral ways 62, adapted to engage the opposite ends of the pin 59, whereby by a rotation of said turn-button to the right said pin will be caused to travel outwardly in said spiral ways and the knob-spindle retracted within the knob-stem. Embracing the reduced portion 57 of said spindle within the knob-stem is a coiled spring 63, which upon the turning of the button 60 to the left will force the spindle 56 inwardly to the position shown in Fig. 1, which is the normal position of the lock. Should it be desired to leave the door unlocked, so that it can be opened from the outside without working the combination, the turn-button upon the inner knob is turned to the right, thereby retracting the knob-spindle and permitting the square end of the short outer knob-spindle 52 to follow and lie in the square opening of the finger 33, when by pushing the outer knob inwardly, so as to cause its stem to engage the pin on the disk 50, and turning said knob the finger 33 may be actuated from the outside to withdraw the latch-bolt from the keeper independently of the finger 36, which does not move, owing to the fact that the small portion of the spindle 52 is lying within the square opening 38 therein, which position of parts is illustrated in Fig. 16.

Should it be desired to bolt the door so that it cannot be opened from without under any circumstances, the inner knob is turned to the right sufficiently to carry the finger 33 past the raised shoulder of the small spring 64, so as to be engaged by the opposite spring-shoulder.

der 65 within the central opening in the latch-bolt, as shown by dotted lines in Fig. 12, when the latch-bolt will be held against retraction by any possible manipulation of the outer door-knob.

To provide a burglar-alarm in connection with the operation of the combination, the lugs 18 upon the frame 19 are insulated from said frame and the other parts of the lock, and bearing upon said lugs, so as to form an electrical contact, are the terminal wires 66 and 67, which lead from the lock and through the inner side of the door in any suitable manner and include in the circuit formed thereby a source of electric energy 68 and an alarm-bell 69. The circuit formed by said wires is normally open; but should some one attempt to open the door without a knowledge of the combination or should they attempt to work the combination and fail the effort to slide the bolt by manipulation of the outer knob would cause the exposed ends of said contact-lugs to strike the sides of the ribs 7 on the ratchet-tumblers, thereby closing the electric circuit through said tumblers and metal parts of the lock and sounding the alarm.

Having thus fully set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a door latch and lock, the combination of the latch-bolt, a member associated therewith carrying engaging lugs, ratchet-tumblers having ribs normally standing in the path of said lugs, a rotary knob-spindle, means for actuating said tumblers operating by a movement of said spindle to carry them from the path of said lugs, and means for actuating the latch-bolt by a manipulation of the outer door-knob after the tumblers have been properly placed.

2. In a door-lock, the combination of the ratchet-tumblers, means upon the stem of the outer knob for actuating said tumblers, the latch-bolt, the movable frame contiguous to the latch-bolt and movable therewith, the fingers engaging the latch-bolt and frame independently, and adapted to be actuated by the knob-spindles, the latch-bolt being movable by the outer knob through the medium of said frame, upon the arrangement of the tumblers to allow the lugs thereon to pass through the openings in the ribs of said tumblers.

3. In a door-lock, the combination with the knobs and stems, of the latch-bolt, the movable frame contiguous thereto, adapted to move the latch-bolt by a movement thereof, but said latch-bolt being movable independently of said frame, the inner and outer fingers engaging the latch-bolt and frame respectively, the inner finger being always movable by the stem of the inner knob, projections on said movable frame, ratchet-tumblers in the path of said projections having openings which allow said projections to pass

through, the outer door-knob having means of actuating said tumblers to allow of a movement of said frame, and means connecting the outer knob-stem with the outer finger, whereby the frame and latch-bolt may be moved by the outer door-knob when the tumblers have been properly arranged.

4. In a door-knob, the combination with the latch-bolt, of the inner and outer knobs, the inner knob being always connected with and adapted to move the latch-bolt, a movable member mounted on the latch-bolt adapted to be actuated by the outer door-knob, vertically-movable tumblers normally locking said member against movement, and means for actuating said tumblers vertically through the manipulation of the outer knob to allow of a movement of said member and latch-bolt through the turning of the outer door-knob.

5. In a lock, the combination of the lock mechanism, the inner and outer door-knobs, each having a stem carrying a knob-spindle, the latch-bolt, the finger engaging said latch-bolt and adapted to actuate it, the spindle of the inner knob engaging said finger, the spindle of the outer knob being normally held from engagement with said finger and means mounted upon the inner knob for retracting the inner knob-spindle to allow the outer knob-spindle to engage said finger and permit the opening of the door by the turning of the outer door-knob.

6. In a lock, the combination with the lock-case, of the knobs each having a stem provided with a spindle, a spring in each of the knob-stems normally projecting each spindle, the latch-bolt, an actuating-finger engaging said bolt and receiving the spindle of the inner knob, means upon the inner knob for retracting its spindle to allow the spring-pressed spindle on the outer knob to engage in said finger.

7. In a lock, the combination with the lock mechanism, of the latch-bolt, a member movable with the latch-bolt, vertically-movable spring restrained tumblers which normally prevent the movement of said member, means for raising said tumblers by a manipulation of the outer door-knob to release said movable member, and means actuated by a manipulation of the outer door-knob for restoring said tumblers to their normal position.

8. In a door-lock, the combination with the latch-bolt, of the movable tumblers which prevent the operation of said latch-bolt by the outer door-knob, a movable agent connected with the latch-bolt adapted to be actuated by the outer knob when the tumblers have been correctly moved, contact-lugs on said member adapted to engage said tumblers when improperly placed, conductor-wires in electrical contact with said lugs forming a normally open circuit, a source of electric energy and an alarm included in said circuit.

9. In a combination door-lock, the combination with the lock mechanism, of a movable agent having contact-lugs thereon, movable tumblers in the path of said lugs, electric conductor-wires connected with said lugs and including a source of electric energy and an alarm, means for moving said tumblers to carry them from the path of said contact-lugs

to enable the opening of the door without closing the electric circuit.

In testimony whereof I sign this specification in the presence of two witnesses.

JOSEPH HENRY DIERINGER.

Witnesses:

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