

Oct. 7, 1930.

F. J. VAN DOOREN

1,777,776

DOOR LOCK

Filed Oct. 21, 1927

3 Sheets-Sheet 1

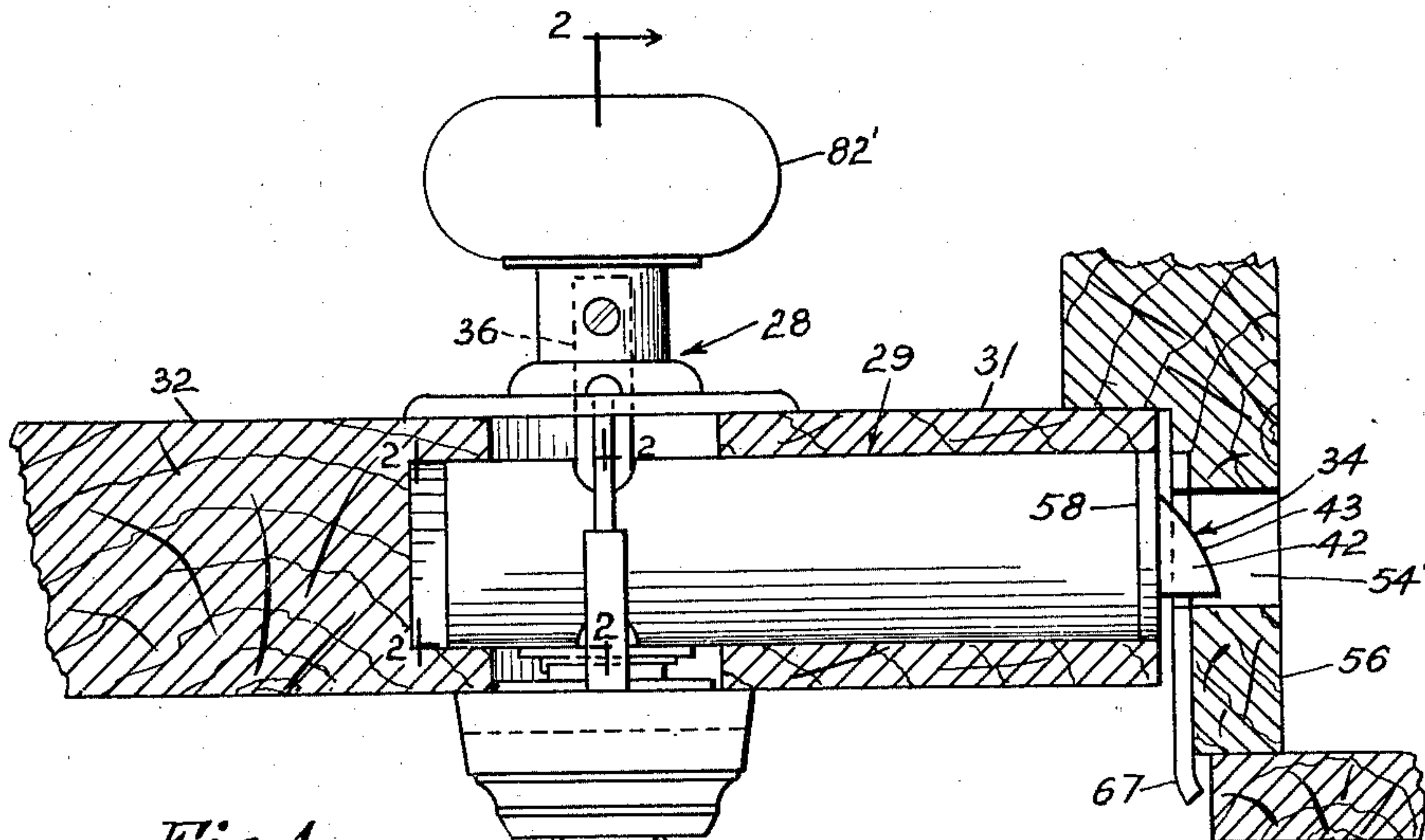


Fig. 1

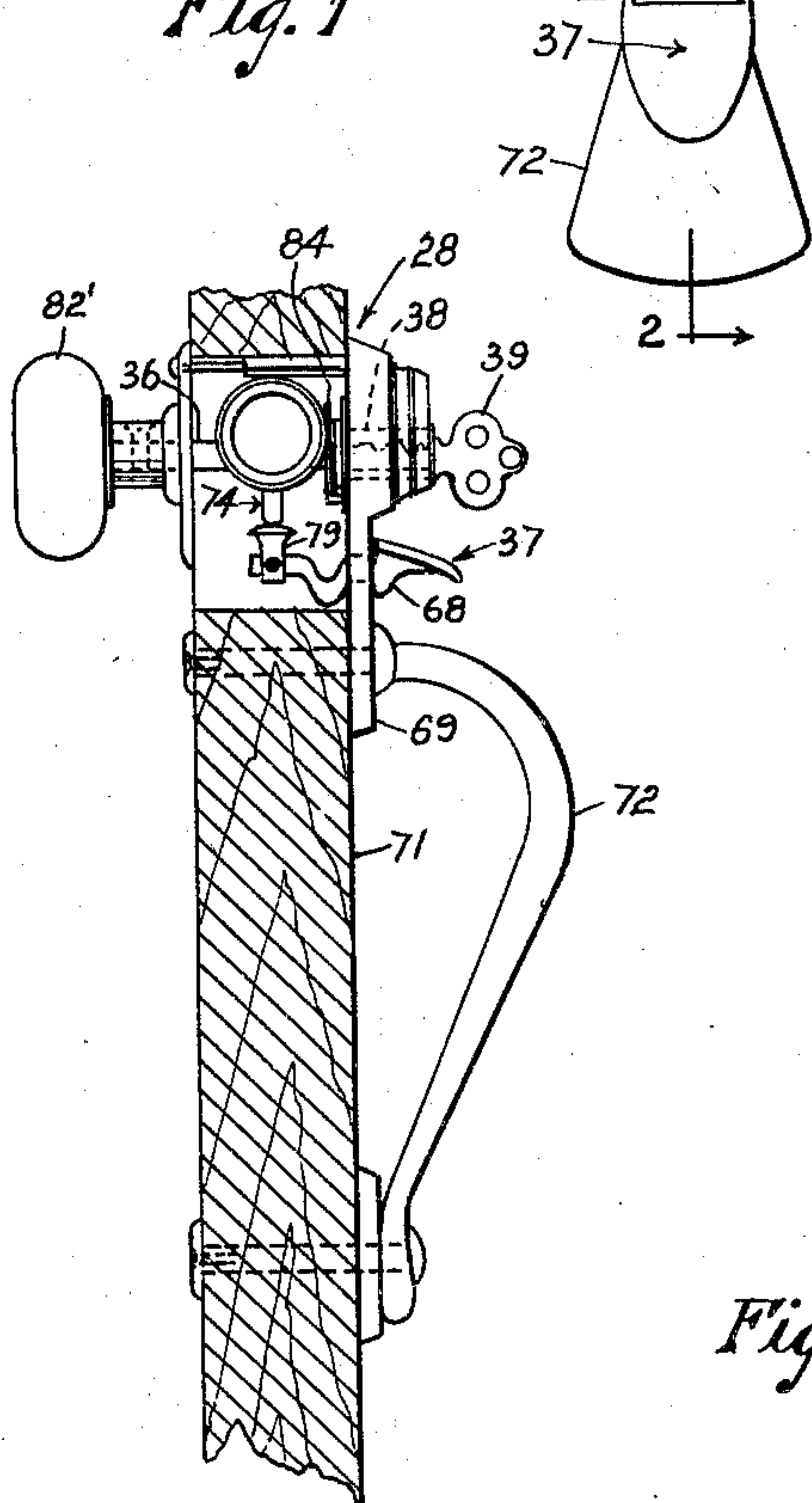


Fig. 2

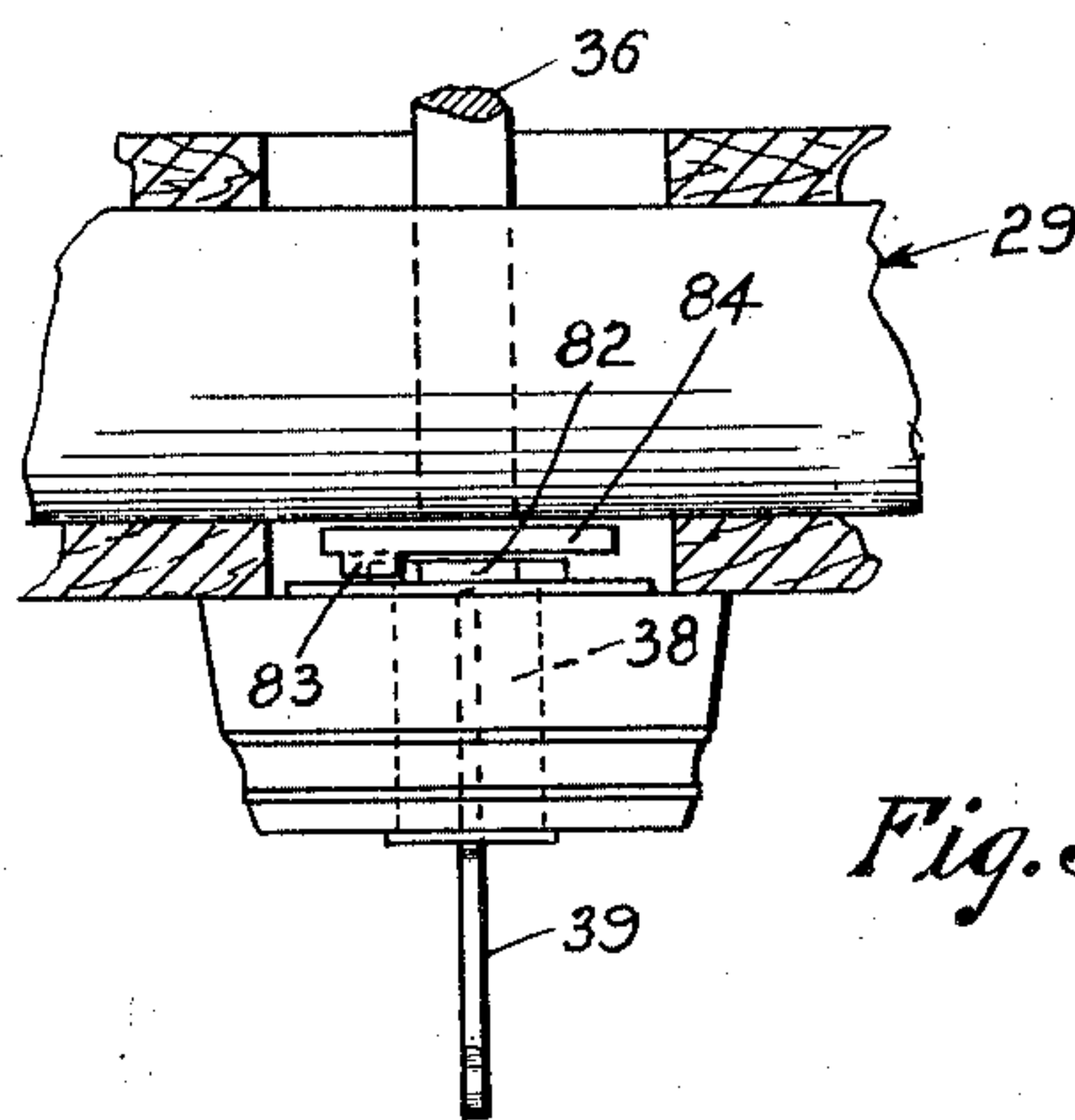
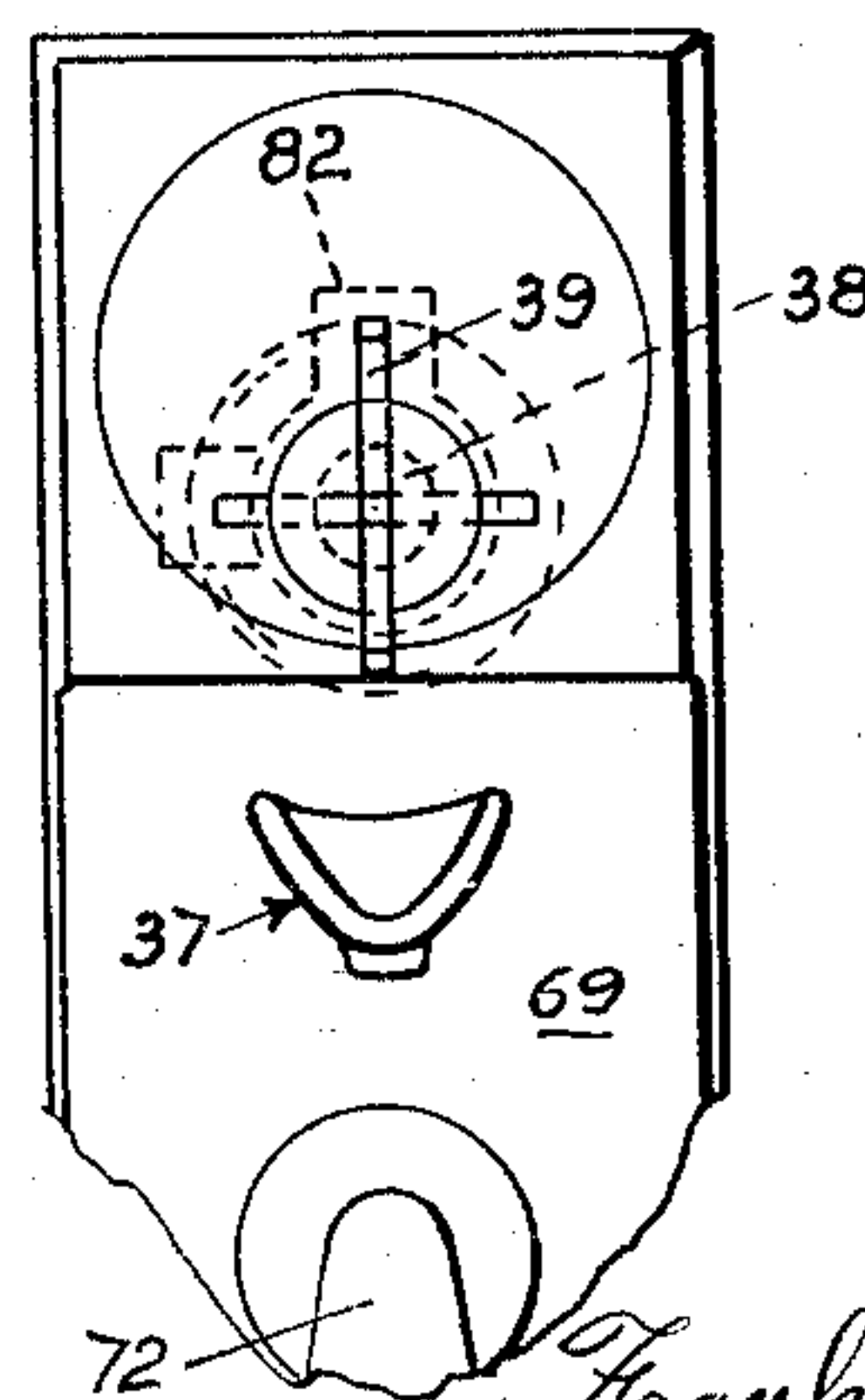


Fig. 3

Fig. 4



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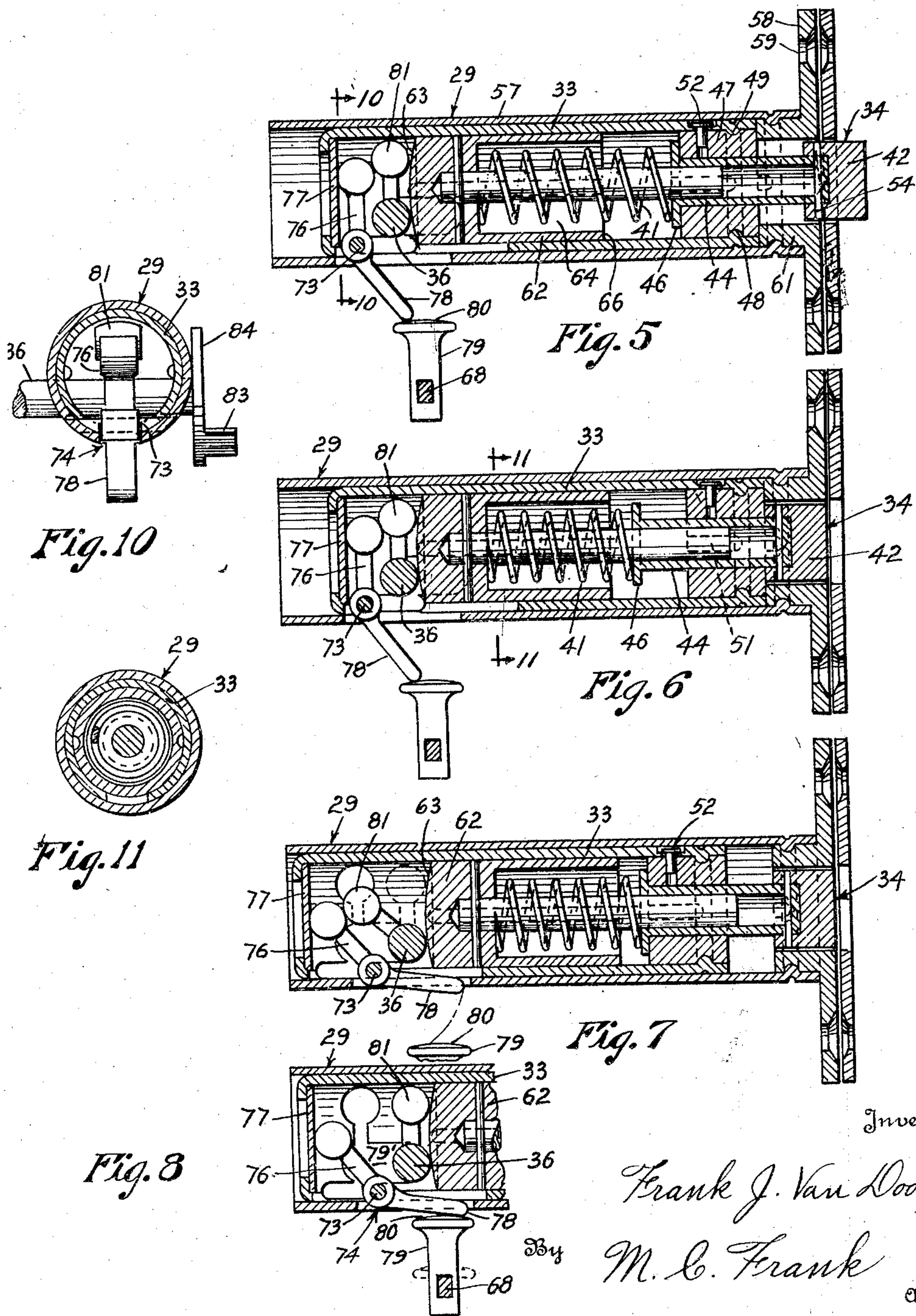
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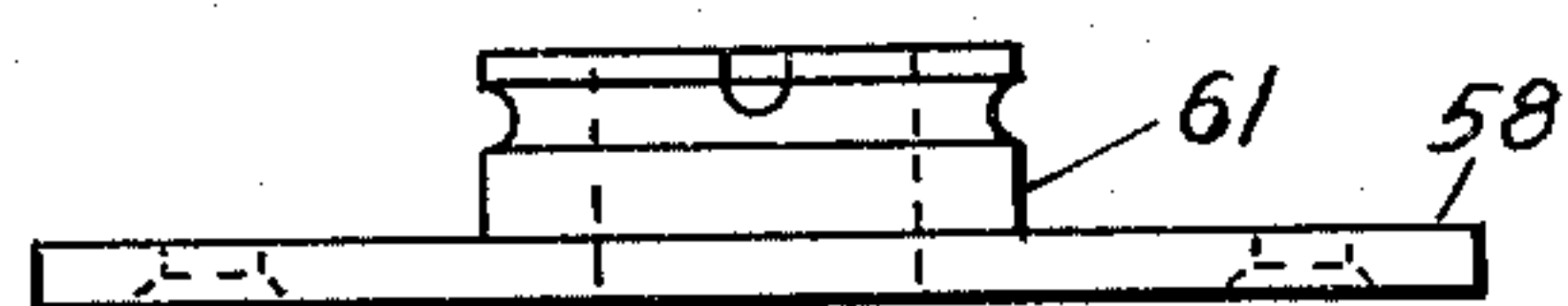
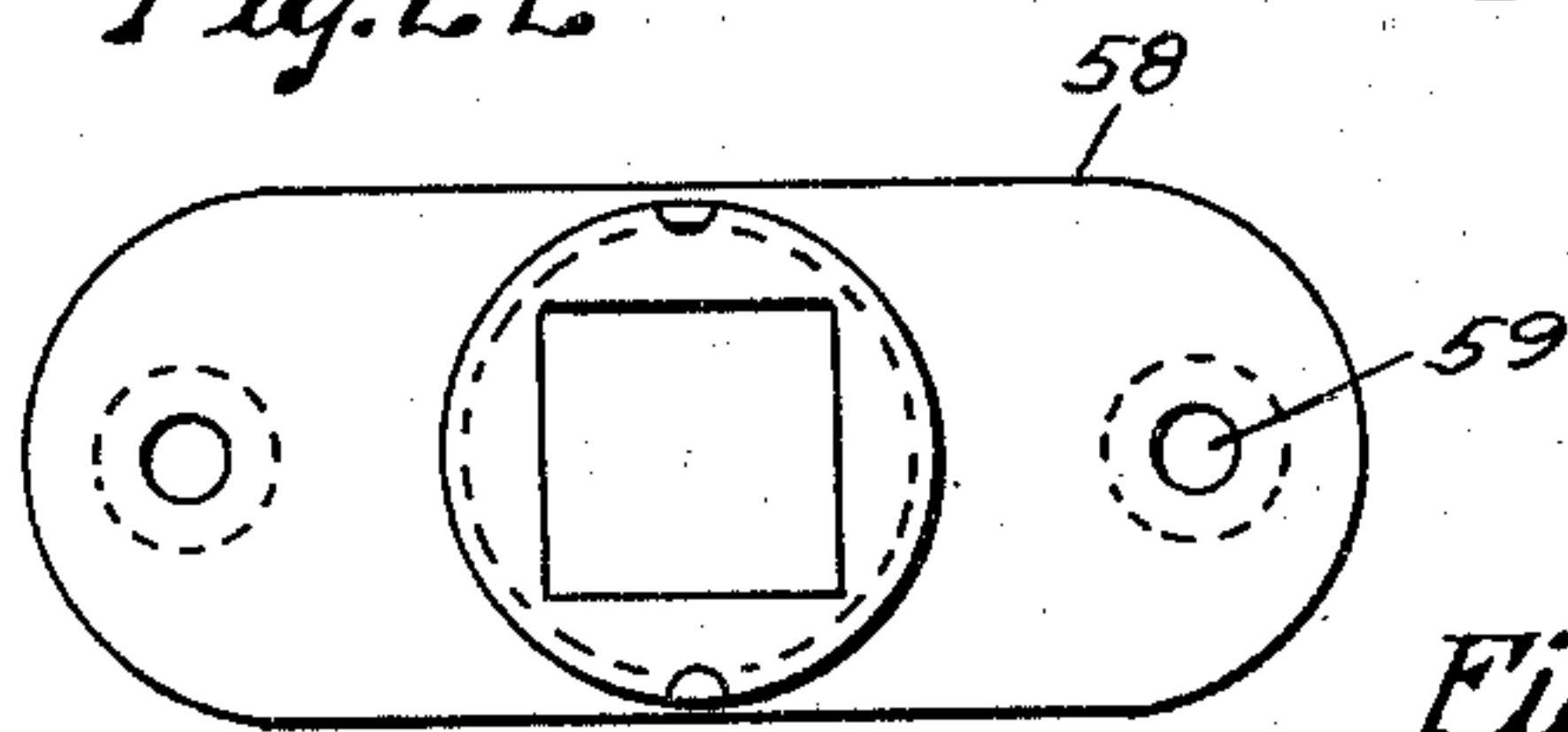
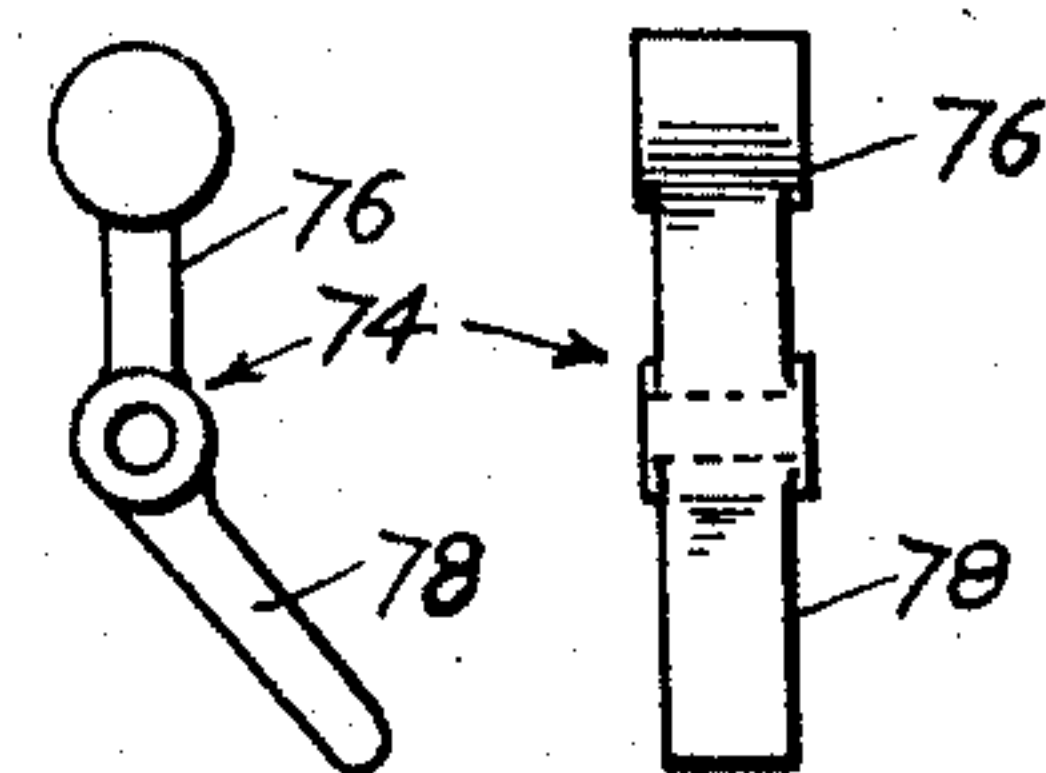
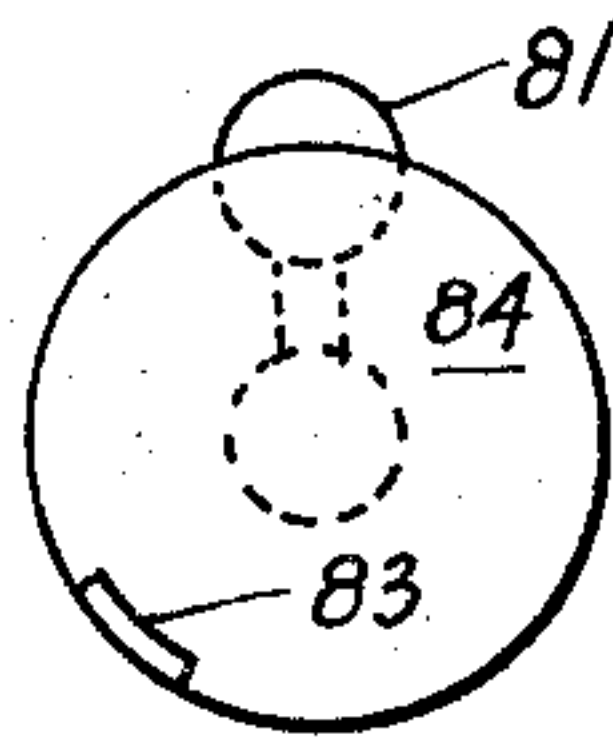
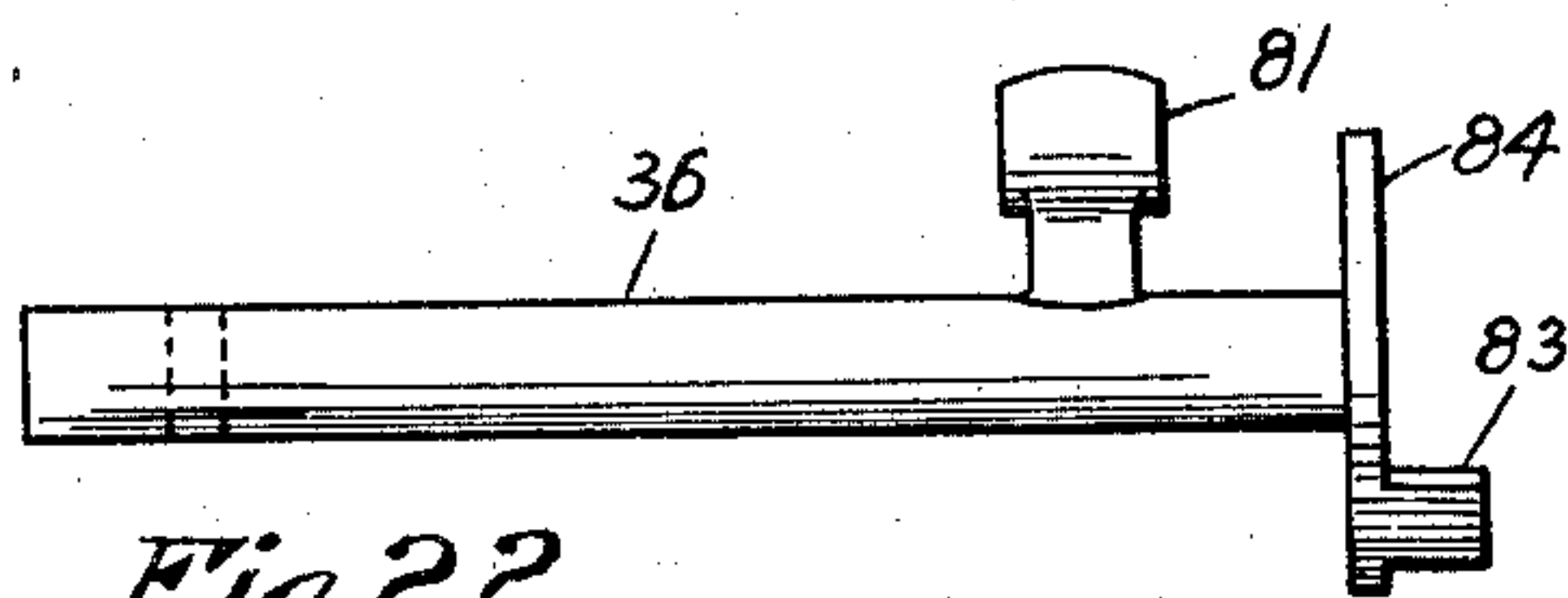
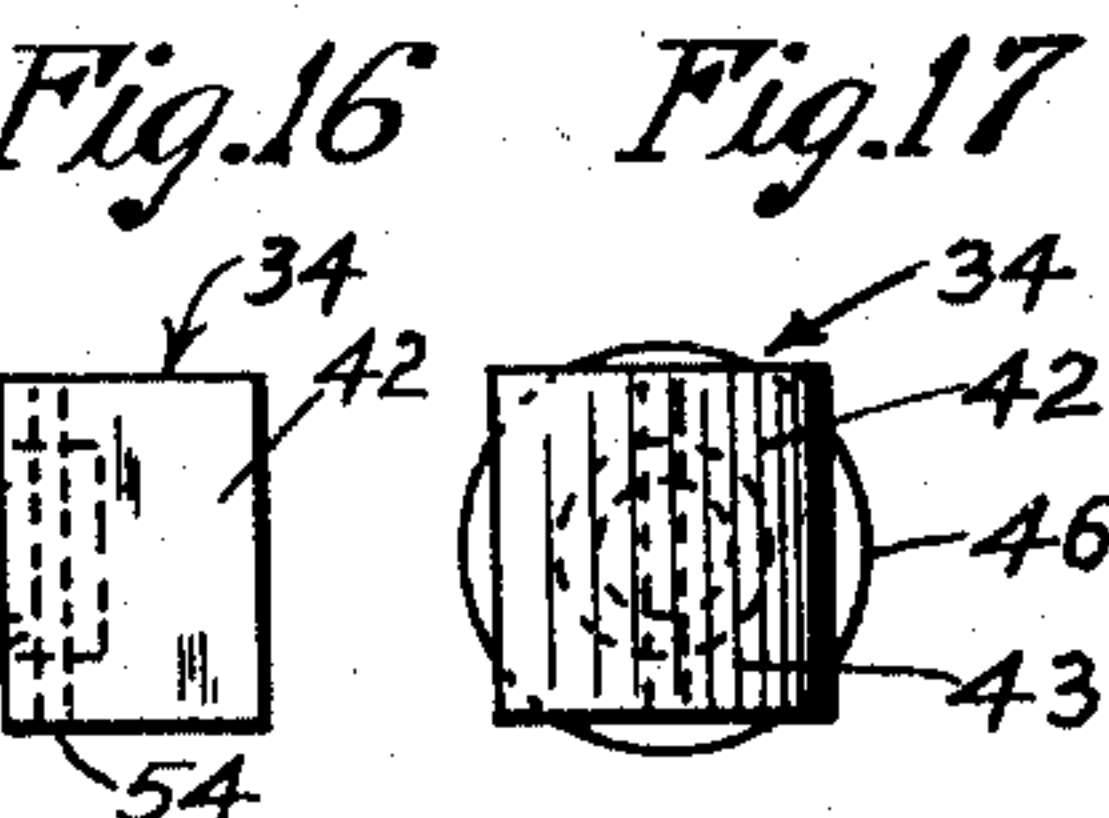
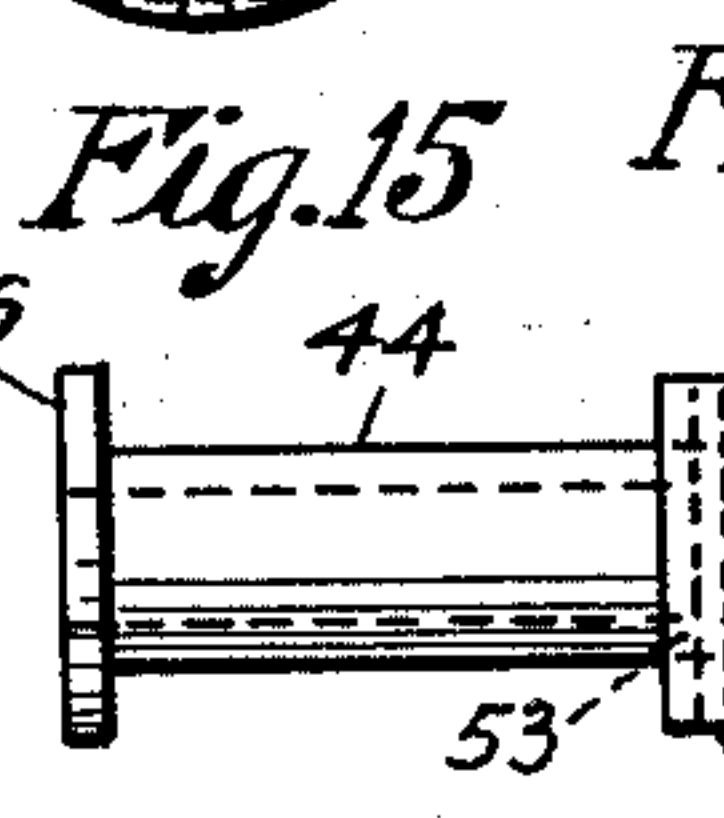
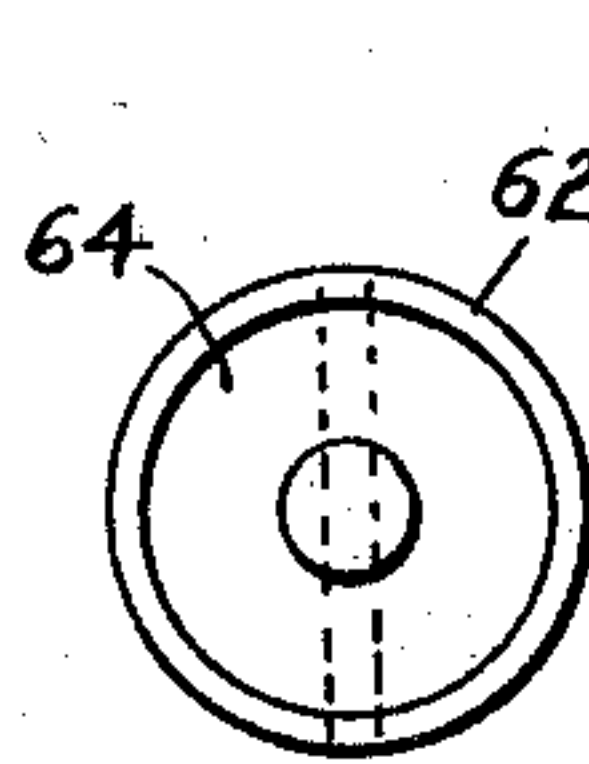
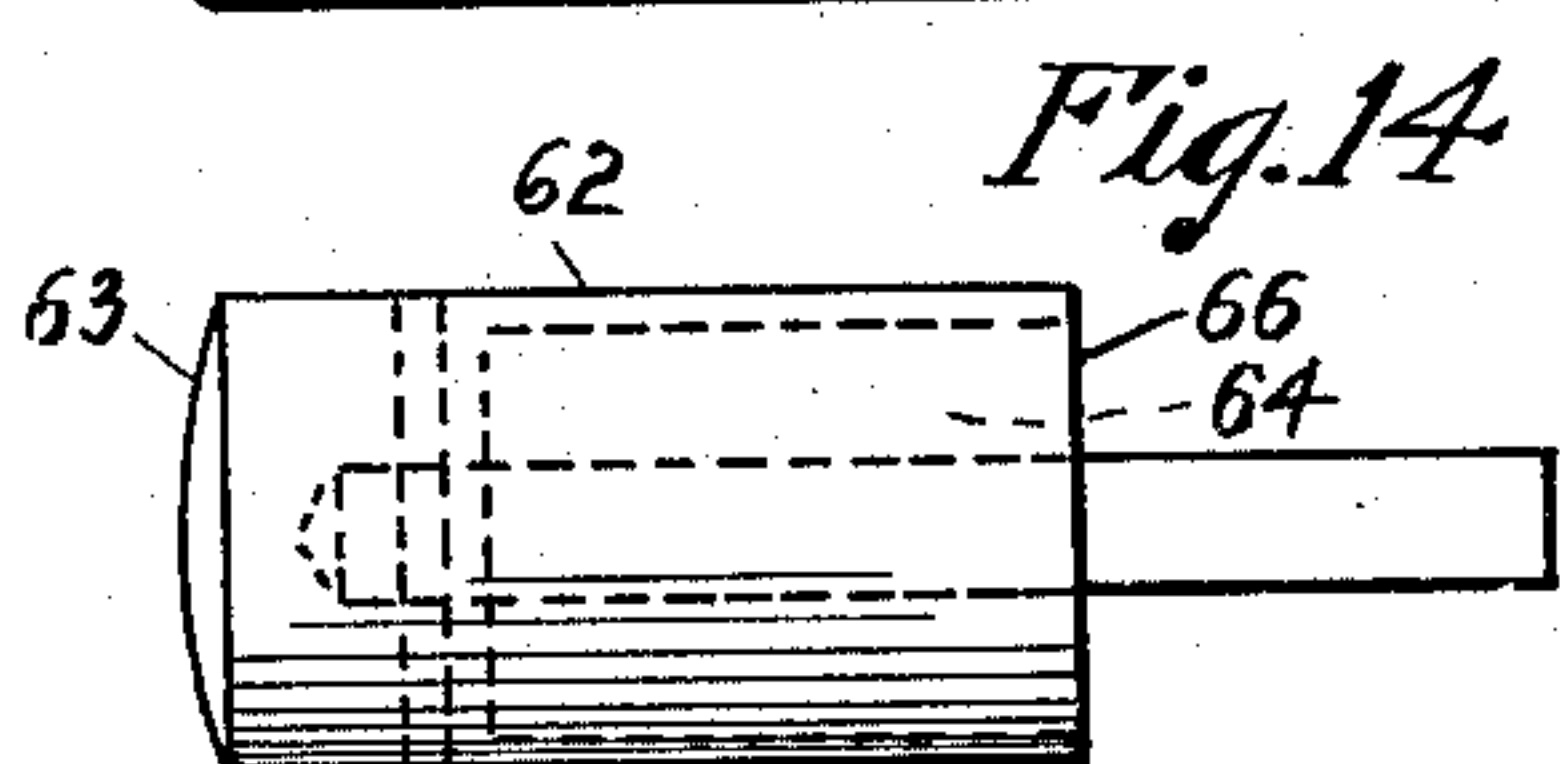
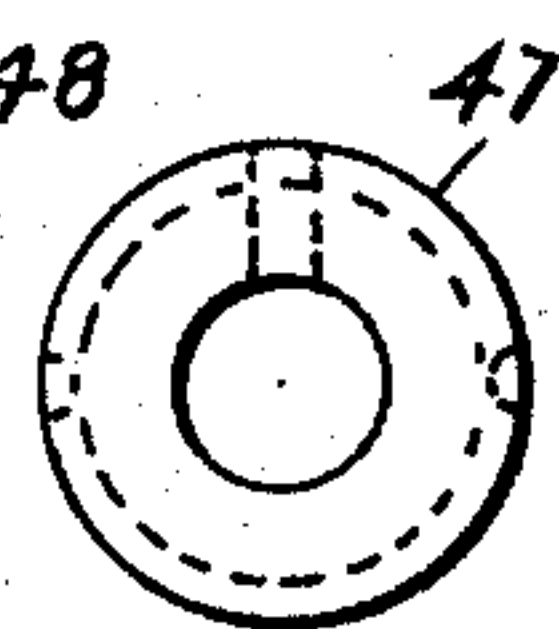
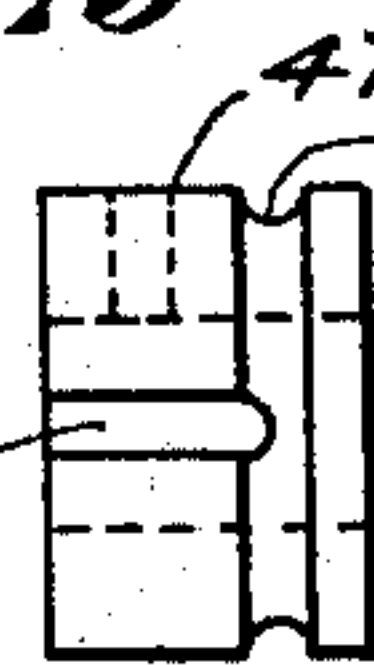
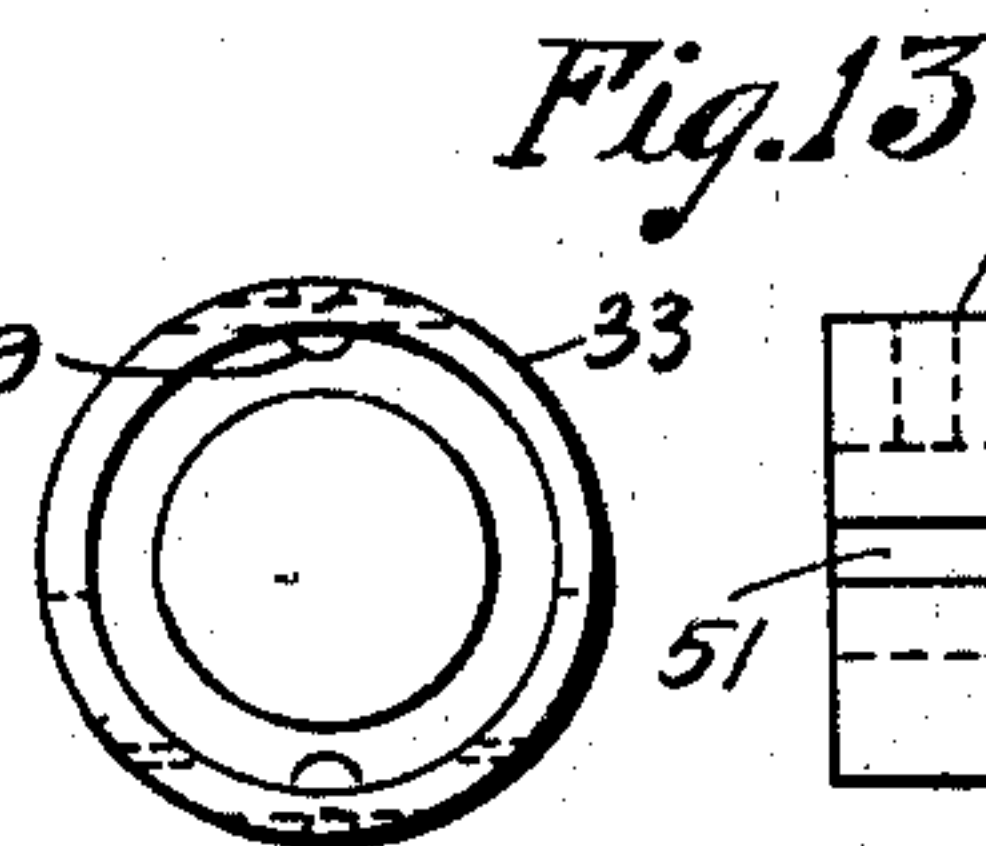
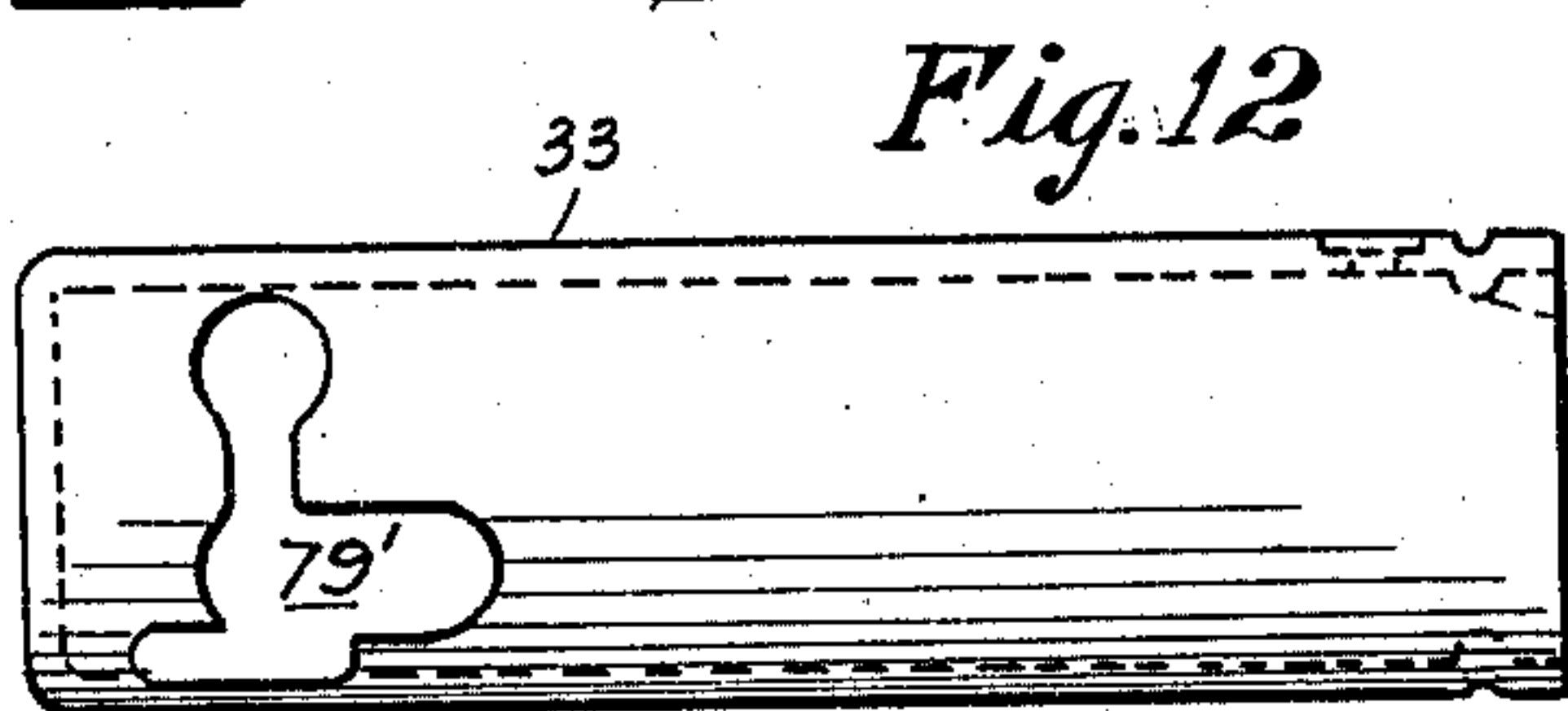
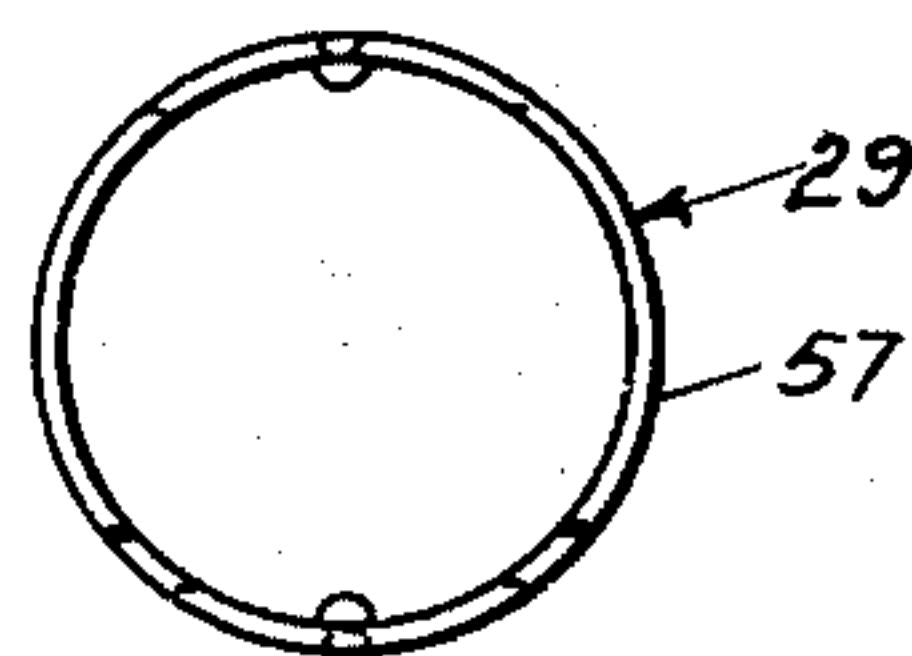
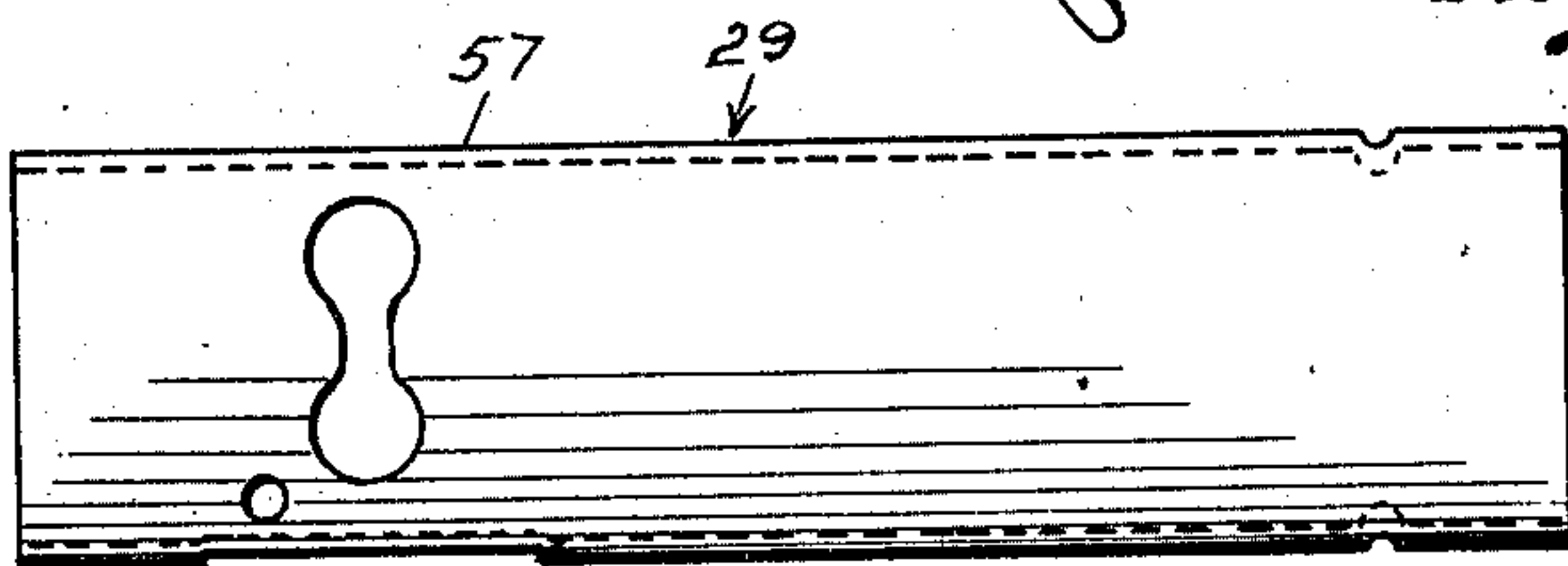
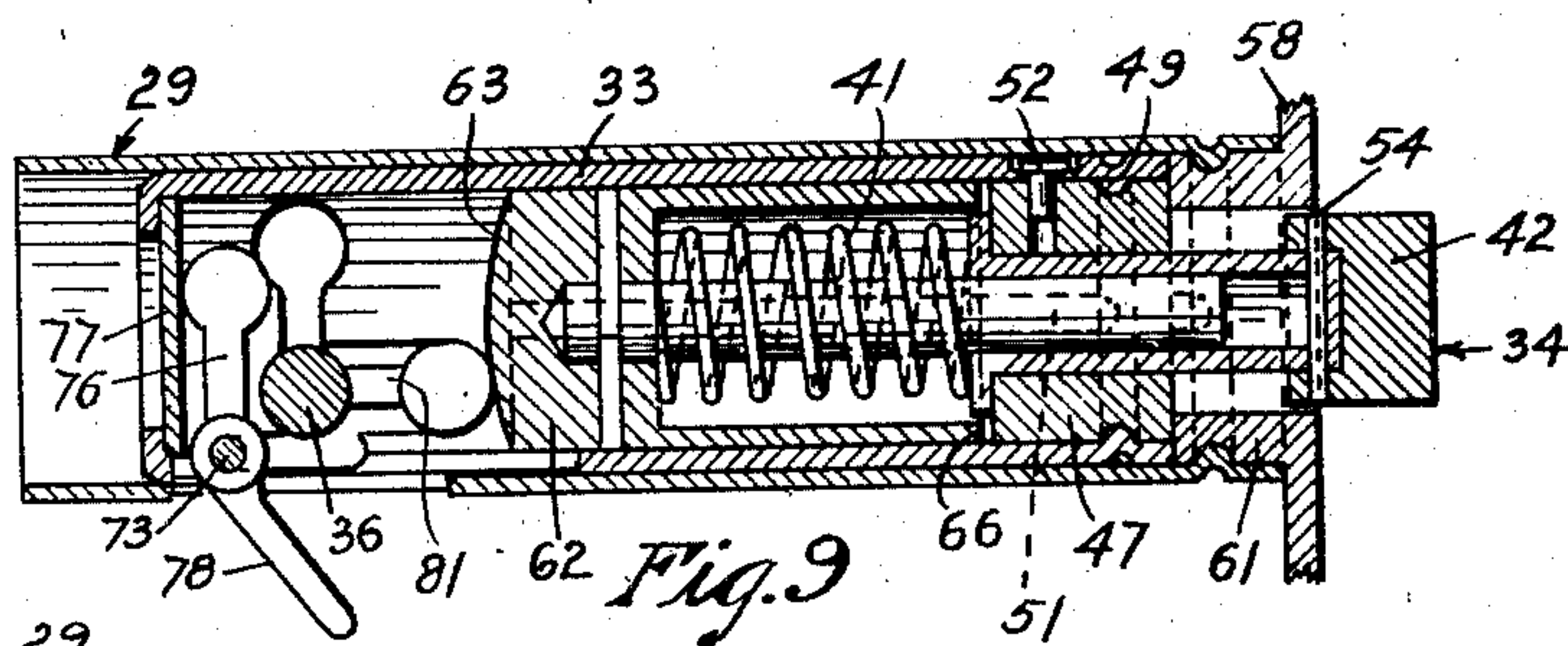
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UNITED STATES PATENT OFFICE

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DOOR LOCK

Application filed October 21, 1927. Serial No. 227,689.

My invention relates to a combined latch and lock particularly designed for use on outside doors.

An object of the invention is to provide a lock of the class described which may be locked from the inner side thereof by and upon an appropriate manipulation of the bolt-withdrawing member at said side where-
by a normally operative thumb latch at the outer side of the door may be rendered inoperative.

Another object of the invention is to provide a lock of the character described having key-controlled means operative from the outer side of the door for restoring the operativeness of the bolt-withdrawing member at said side.

A further object of the invention is to provide a lock of the character described in which the key-controlled means may be directly utilized for withdrawing the bolt.

A still further object of the invention is to provide an improved and simplified structure for a lock of the type described.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of a preferred form of the invention which is illustrated in the accompanying drawings, in which,

Figure 1 is a plan view of the lock in mounted relation to a door and its associated jamb.

Figure 2 is a view taken on the line 2—2 in Figure 1, and drawn at a reduced scale, the door being in section.

Figure 3 is a plan view of a key-controlled lock portion with a key operatively disposed therein.

Figure 4 is a fragmentary outside face view of the lock.

Figure 5 is a side sectional view through the lock with the parts thereof normally disposed.

Figure 6 is a side sectional view through the lock with the bolt in withdrawn position as by a force applied directly there-against.

Figure 7 is a side sectional view of the structure showing the relation of the parts

when the bolt is withdrawn by means operative from the inner side of the door.

Figure 8 is a fragmentary side sectional view of the lock showing the relation of the parts when the bolt is withdrawn by means of a thumb latch operable from the outer side of the door.

Figure 9 is a side sectional view of the lock structure showing the appropriate parts disposed for preventing the withdrawal of the bolt by the thumb latch.

Figure 10 is a sectional view taken on the line 10—10 in Figure 5.

Figure 11 is a sectional view taken on the line 11—11 in Figure 6.

Figures 12 and 13 are side and end views of portions of the lock casing.

Figures 14 and 15 are side and end views of a movable latch cylinder forming part of the lock structure.

Figures 16 and 17 are side and end views of a latch cylinder portion providing a mounting for the latch bolt.

Figures 18 and 19 are side and end views of a portion of the latch structure.

Figures 20 and 21 are side and end views of the latch bolt of the lock.

Figures 22 and 23 are side and end views of a knob spindle for operating the lock.

Figures 24 and 25 are views of a lever forming part of the operating structure.

Figures 26 and 27 are face and edge views of an edge plate forming part of the lock casing.

Briefly, the lock 28 of my invention comprises a casing 29 arranged to be mounted in the edge portion 31 of a door 32, and a movable latch member in the form of a hollow cylinder 33 reciprocable in the casing and normally positioned to dispose a latch bolt 34 carried thereby in extended position. A spindle 36 is disposed through the casing and latch cylinder, said spindle being operable from the inner side of the lock for effecting the withdrawal of the latch cylinder or locking it against withdrawal as may be desired, while a thumb latch 37 is provided for effecting the withdrawal of the latch cylinder from the outer side of the door, except when the spindle is disposed in its locking position.

Key-operated means are also provided for effecting a withdrawal of the latch plate, such means comprising a key-receiving barrel 38 arranged to be freed for rotation about its longitudinal axis only by and upon the insertion of a proper key 39 therein and operable upon the rotation thereof to displace the spindle from its locking position and to effect a withdrawal of the latch cylinder. The latch cylinder is arranged to be resiliently urged to maintain its normal forward position by means of a spring 41 operatively interposed between it and the spindle 36.

The latch bolt 34 comprises a head portion 42 of rectangular section having a beveled outer face 43, and a reduced stem portion 44 having a radial flange 46 provided at the free end thereof. Fixed in the outer end of the latch cylinder 33 is a cylindrical plug 47 having an axial bore provided therein for the sliding reception of the bolt stem 44. The plug 47 is preferably removably fixed to the latch cylinder, and as here shown the cylindrical plug face is provided with an annular groove 48 in which one or more bosses 49 upset inwardly from the bore of the latch cylinder are arranged to engage. To provide for the engagement of the bosses 49 in the groove 48, axially directed channels 51 are provided in the plug surface to extend from the inner end thereof to the groove 48 and arranged to simultaneously receive the bosses 49 whereby the plug may be inserted in the end of the latch cylinder and thereafter be rotated to dispose the bosses in front of the rear groove edge. Preferably, and as shown, the plug 47 is arranged to be held in the latter relation to the latch cylinder by means of a pin 52 extending through the latch cylinder into the plug and having the head thereof countersunk in the latch cylinder. In this manner, the plug 47 is held in releasably fixed relation to the latch cylinder.

To provide for the disposal of the bolt portion 44 in the bore of the plug 47, the portion 44 is preferably detachably fixed to the bolt head 42. As herewith particularly disclosed, the bolt head is provided at its inner side with a socket 53 for the reception of the cooperating end of the stem 44, and the stem and head are fixed together by means of a pin 54 engaged transversely through the stem and head. The space between the bolt flange 46 and the head 42 is arranged to exceed the axial length of the plug 47 by an amount substantially equaling the desired reach or extension of the bolt from the lock and into the bolt socket 54' provided in the door jamb 56, whereby, with the latch cylinder in its normal position, a retractive movement of the bolt head for disposition within the lock is permitted, such relation being particularly shown in Figure 6.

The casing 29 it will now be noted, comprises a tubular shell 57 having the bore

thereof provide the guideway for the movable latch-plate 33 and an edge plate 58 fixed transversely across an end of the shell 57 and provided at points thereof lying outwardly of the shell 57 with screwholes 59 whereby it may be fixed to and against the door edge. The plate 58 and shell 57 are preferably detachably associated, and as here shown, the former is provided with a rearwardly extending portion 61 arranged for a sliding engagement in the bore of the shell 57 at the extreme end thereof. When, as is here shown, the shell 57 is cylindrical, the portion 61 would be of like form and a device such as that employed in fixing the plug 47 in the latch cylinder 33 may be employed in the manner shown. It is noted, however, that in this case no pin is needed for preventing the relative rotation of the shell and plate, as these members are both held against any rotative movement when the lock is mounted on a door. The plate 58 at the portion 61 thereof is perforated therethrough to slidably receive the bolt head 42 and is of such thickness that the bolt head may be entirely disposed in the perforation thereof, it now being noted that the inner face of the portion 61 provides a stop to limit the outward movement of the latch cylinder 33.

The spring 41 does not directly engage either the latch cylinder 33 or the spindle 36 but is engaged, rather, between the flanged inner end of the latch bolt 34 and a member 62 which engages the spindle. The member 62 is generally cup-shaped, is longitudinally slidable in the bore of the latch cylinder 33, and is provided with a spherically curved outer end surface 63 for engagement with the spindle 36. The cavity 64 of the member 62, it is noted, is arranged to receive a major portion of the spring 41 and the bore thereof is preferably such as will freely receive the flange 46 of the latch bolt whereby under certain conditions to be hereinafter brought out, the annular forward edge 66 of the member 62 may directly engage the inner face of the plug 47. With the structure provided, it will now be obvious that the spring 41 will normally function to forcibly and yieldingly hold the latch bolt in its extended position with the flange 46 thereof engaging the inner side of the plug 47 as a stop as is shown in Figure 5, and that an inward displacement of the bolt is permitted as when the bevelled face 43 of the bolt head engages a jamb plate 67 at the socket 54', as the door is closed, such displacement of the bolt being indicated in Figure 6.

The thumb latch 37; it will now be noted, comprises a lever 68 disposed through and fulcrumed on an escutcheon plate 69 fixed on the outer face 71 of the door opposite the lock mechanism. Fixed on the door surface below the thumb latch is a handle 72 arranged to provide a grip for the fingers for

facilitating a depressing movement of the overlying portion of the latch lever, said lever portion being formed to provide a thumb bearing at its upper side. Pivotaly mounted on a pin 73 extending horizontally and transversely of the casing portion 57 adjacent the lower side and inner end thereof, is a bell-crank lever 74 having an arm 76 thereof disposed within the area of the latch cylinder 33 between the member 62 and the inner end wall 77 of the latch cylinder, it being noted that the arm 76 is normally disposed generally vertically and is arranged to maintain an engagement with the wall 77 at all times. The other arm 78 thereof of the lever 74 depends forwardly of the pivotal axis into the path of movement of the inner end of the latch lever 68, the latter having adjustably mounted on the inner side thereof a member 79 providing a convex surface 80 against which the end of the lever arm 78 is arranged to slidably engage as the latch lever is rocked. In this manner, an operative rocking of the latch lever 68 is arranged to rock the bell-crank lever 74, Fig. 8, to forcibly engage the arm 76 of the latter against the latch cylinder end wall 77 and so effect a retraction of the latch cylinder and bolt against the resistance of the spring 41. To permit the retraction of the latch cylinder in the manner described, the perforation 79' of the latch cylinder through which the pin extends is so shaped that a reciprocation of the latch cylinder equal to the necessary movement of the latch bolt between its fully extended and fully retracted positions is permitted. The relation of the parts when the bolt is retracted by means of the thumb latch is particularly shown in Figure 8.

The spindle 36, it will now be noted, is journaled in the casing shell portion 57 with its axis horizontal and extending transversely of and below the axis of the latch cylinder. Extending radially from the spindle is an arm 81, which arm is arranged to be normally disposed upwardly from the spindle axis and in engagement with and between the member 62 and the lever arm 76. In this manner a rotation of the spindle to force the arm 81 backwardly and against the arm 76 acts through the latter to effect a retractive movement of the latch cylinder independently of the disposition of the thumb latch lever, it being noted that the perforation 79' is so shaped as to permit the passage of the spindle 36 through the latch cylinder and the necessary movement of the latch cylinder with respect to said spindle. The relation of the parts when the latch bolt is withdrawn by means of the spindle is shown in Figure 7.

It will now be clear that a withdrawal of the latch bolt may normally be effected either through appropriately rotating the spindle by means of a knob 82' carried at an end thereof which protrudes from the inner side of the

door, or by means of the thumb latch 37 at the outer side of the door. When, however, it is desired to lock the door against a retraction of the latch cylinder by means of the thumb latch, it is merely necessary to turn the spindle in an opposite direction from that in which it is turned for withdrawing the latch, in which event the spindle arm 81 is arranged through its engagement with the end surface 63 of the member 62 to force the latter forwardly against the resistance of the spring 41 to dispose the edge 66 of the member 62 adjacent the inner face of the plug 47. Preferably, and as here shown, the arm 81 is arranged to be passed through a dead-center position with respect to the member 62 whereby it will stay in a set position against the member when the torque on the spindle is thereafter relieved, it now being noted that the convexity of the surface 63 is provided to assist in maintaining the arm 81 in such set position. With the arm 81 set as described, the engagement of the edge 66 with the plug 47 functions to prevent the withdrawing movement of the latch cylinder which is normally permitted, so that the thumb latch is rendered inoperative for opening the door. It will thus be clear that in order to prevent an opening of the door from the outside by means of the thumb latch, it is merely necessary to rotate the spindle in a direction opposite from a door-opening rotation and through an angle approximating ninety degrees to set the member 62 as a stop against a retraction of the latch cylinder and bolt by means of the thumb latch, such setting of the member 62 being particularly illustrated in Figure 9.

Since the present lock is particularly designed for use on outside doors, key-controlled means are provided for effecting a release of the latch cylinder and a retraction thereof. As here shown such means comprises the previously mentioned key-controlled rotatable barrel 38, such barrel being mounted on the escutcheon plate 69 with the axis thereof in substantial alignment with that of the spindle 36. A radial arm 82 is provided on the inner end of the barrel 38, while extending outwardly from the opposed spindle end in the path of movement of the arm 82 is a projection 83 of the spindle which is eccentrically offset from the axis of the latter. As herewith particularly shown, the projection 83 is provided adjacent the outer edge of an integral and disc-like end portion 84 of the spindle. It will now be noted that with the key 39 disposed in the barrel 38 for releasing the same, an appropriate rotation of the barrel is arranged to so engage the arm 82 of the barrel with the projection 83 of the spindle that the spindle will be rotated to displace it from its latch locking to its normal position, after which a continued rotation of the barrel by means of the key will act

through the spindle to effect a withdrawal of the latch cylinder and bolt as by the operation of the spindle by means of the knob. Since the first movement of the key-controlled barrel restores the spindle to its normal position, the thumb latch may thereafter be used instead of the key for withdrawing the bolt. In this manner, a key-controlled means is provided which is operative both to release the latch cylinder and to effect a withdrawal thereof.

I claim:

1. In a lock, a movable latch cylinder, a bolt normally projected carried by said latch cylinder for movement relative thereto, means engaging the bolt operative to resiliently urge said latch cylinder to maintain a position to dispose said bolt in extended relation from the lock, a thumb latch operable from one side of the lock to effect a retraction of said latch cylinder and bolt, and a knob spindle operable from the other side of said lock to effect a retraction of said latch cylinder and bolt.

2. In a lock, a normally projected movable latch member, a bolt carried thereby, a lever operable against said member for effecting a retraction thereof, a thumb latch operative against said lever for effecting said retraction, and a knob spindle operative when rotated in one direction for effecting said retraction of the member and when rotated in an opposite direction to render said thumb latch inoperative to retract the latch member.

3. In a lock, a normally projected movable latch member, a bolt carried thereby, a lever operable against said member for effecting a retraction thereof, a thumb latch operative against said lever for effecting said retraction, and a knob spindle operative when rotatably displaced in one direction to rock said lever for effecting the retraction of the member and when rotatably displaced in an opposite direction to lock said member against retraction by said lever.

4. In a lock, a normally projected movable latch member, a bolt carried thereby, a lever operable against said member effecting a retraction thereof, a thumb latch operative against said lever for effecting said retraction thereof, a knob spindle operative when rotatably displaced from its normal position in one direction to rock said lever for effecting the retraction of the member and when rotatably displaced in an opposite direction to become set to lock said member against retraction, and key-controlled means operative to restore said spindle to its normal position.

5. In a lock, a normally projected latch member, a bolt carried thereby, a knob spindle operative from one side of said lock for effecting a retraction of said member and key-controlled means operative from the

other side of said lock for operating said spindle to retract said member.

6. In a lock, a normally projected latch member, a bolt carried thereby, a knob spindle extending from a side of the lock and operative upon a rotation thereof in one direction for effecting a retraction of said member and upon a rotation thereof in another direction to become set as a stop to lock said member against retraction, and key-controlled means operative from the other side of said lock for displacing said spindle from its set position to a position for retraction of said member.

7. In a lock, a normally projected movable latch member, a bolt carried thereby, a lever operable against said member for effecting a retraction thereof, a thumb latch operative against said lever for effecting said retraction thereof, a spindle having an arm operative when rotatably displaced from its normal position in one direction to rock said lever for retracting said member and when rotatably displaced in an opposite direction to be disposed to lock said member against retraction, means automatically operative to yieldingly retain said arm in said locking position, and key-controlled means operative against said spindle to rotate the same for releasing said arm and effecting the retraction of said member.

8. In a lock, a movable latch member, a normally projected bolt carried by said latch member for movement relative thereto, means engaging the bolt to resiliently urge said member to maintain a position to dispose said bolt in extended relation from the lock, lever means operable from one side of the lock to effect a retraction of said latch member and bolt, and a knob spindle operable from the other side of said lock to effect a retraction of said latch member and bolt.

In testimony whereof, I affix my signature.
FRANK J. VAN DOOREN.