

July 6, 1948.

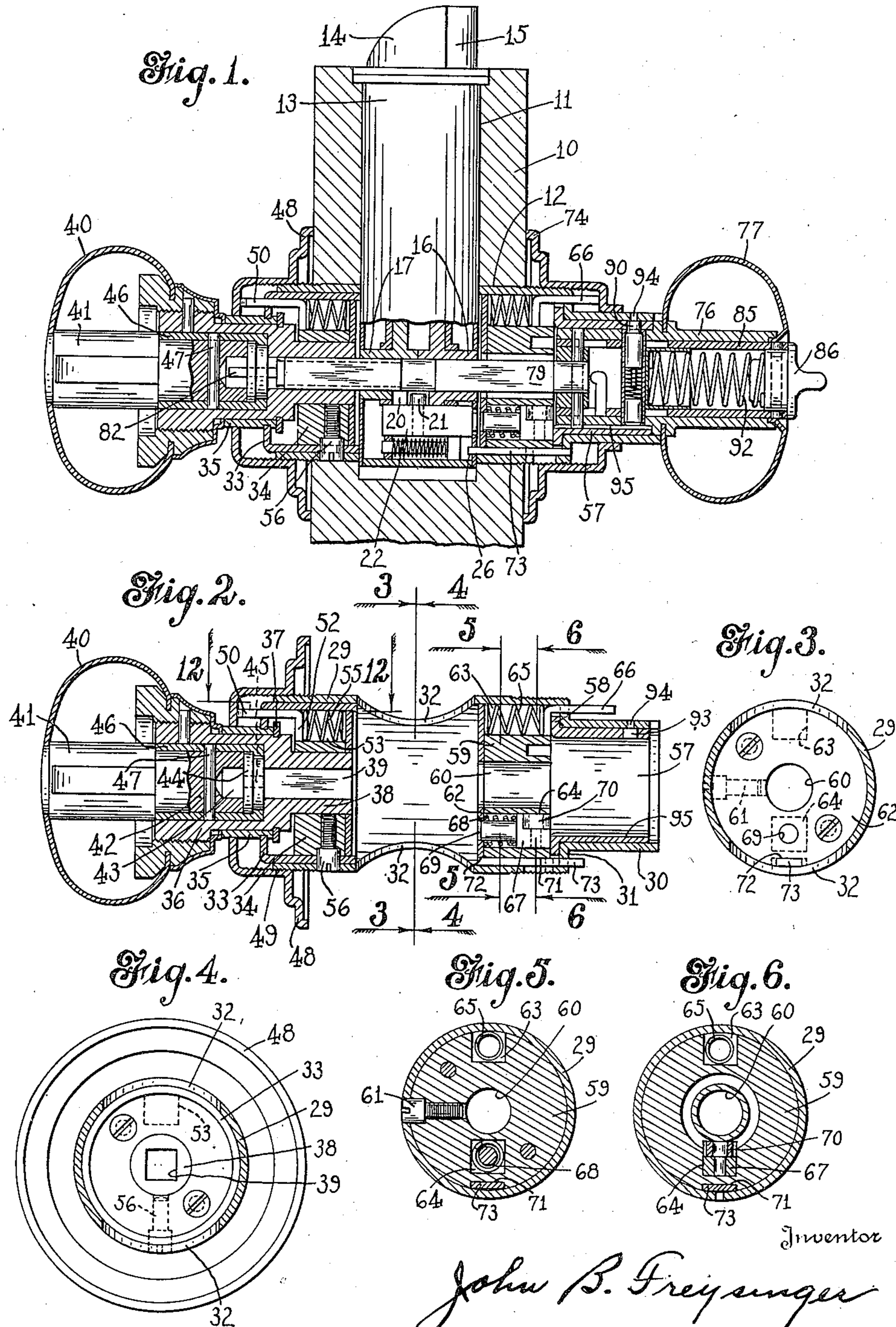
J. B. FREYSINGER

2,444,820

DOOR LOCK

Filed May 21, 1945

2 Sheets-Sheet 1



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Fig. 7.

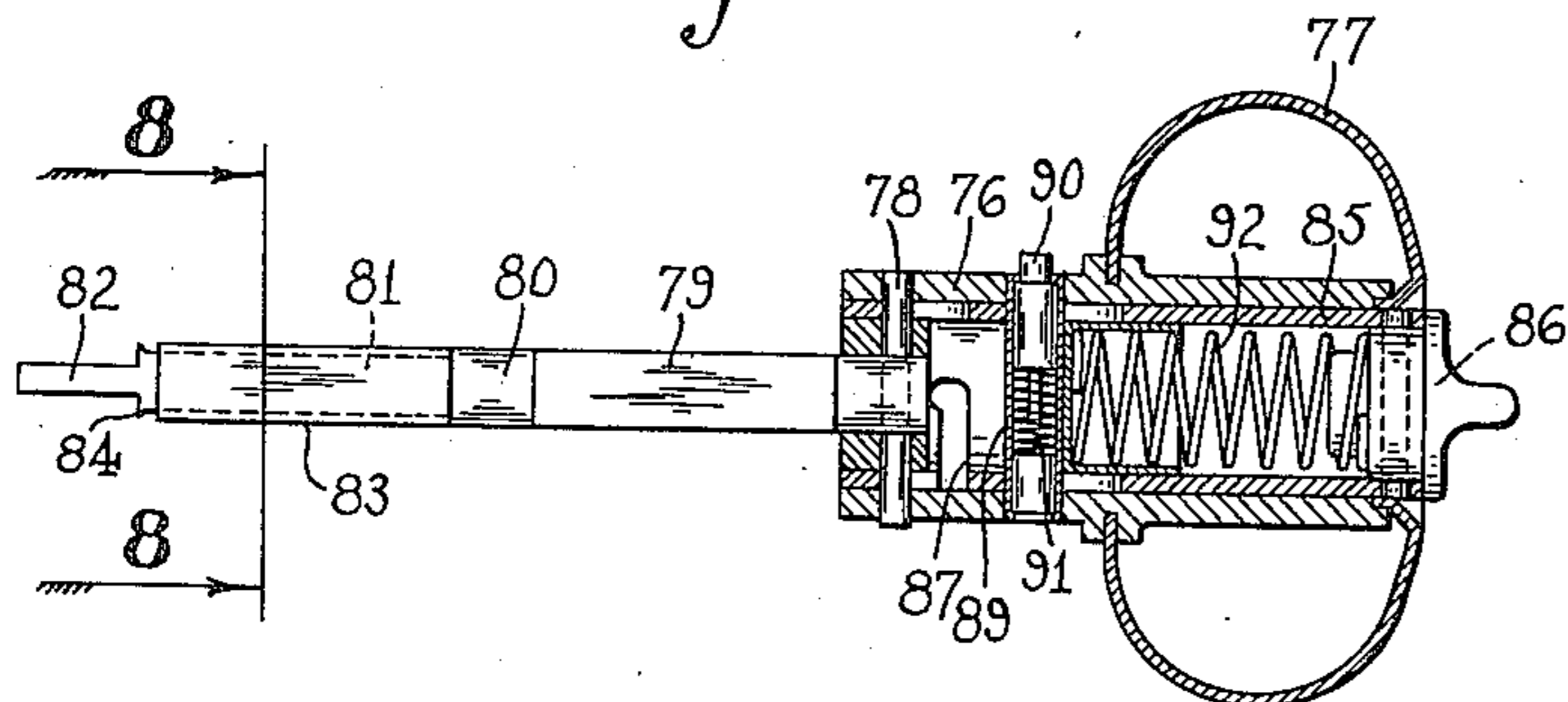


Fig. 8.

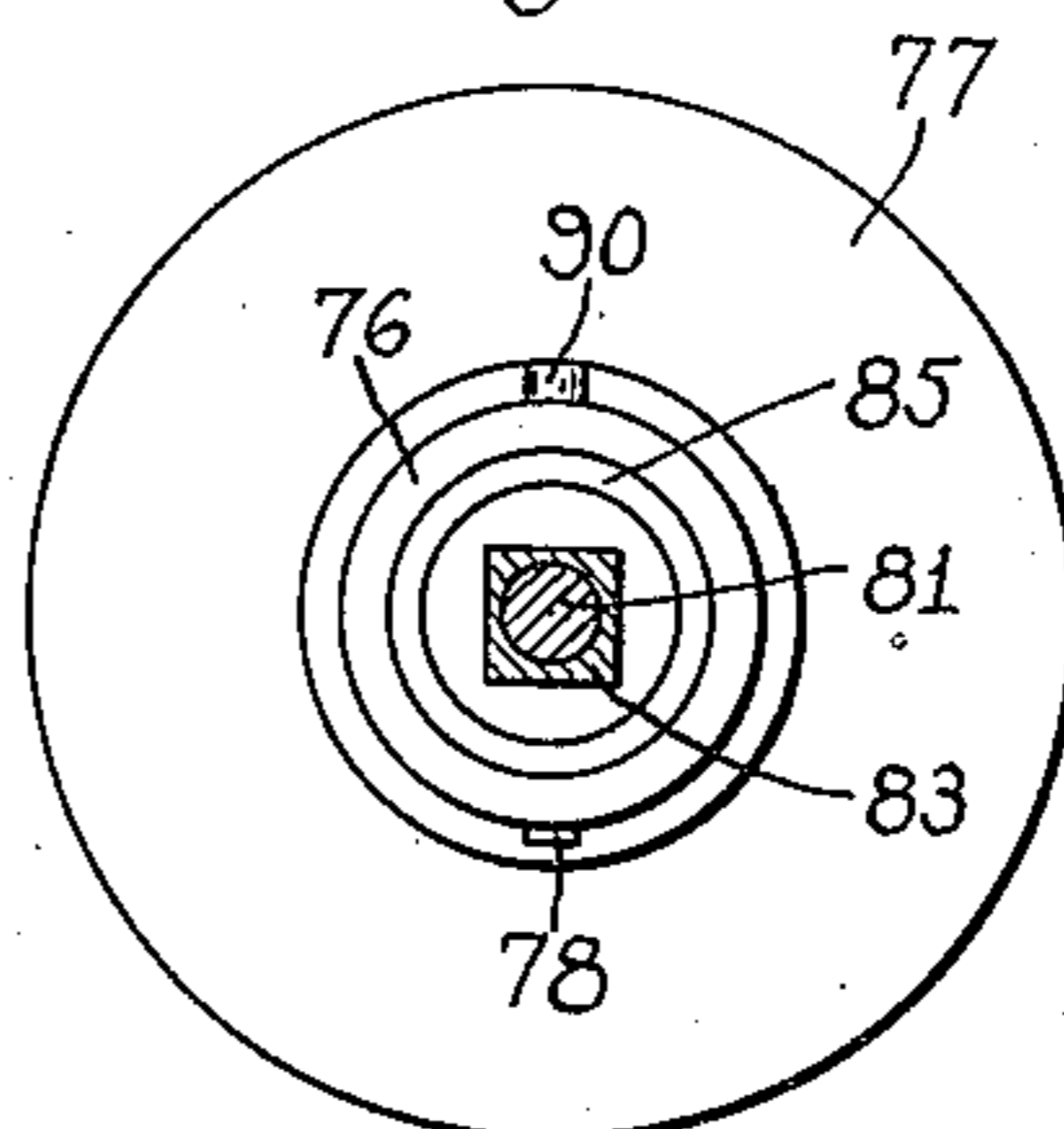


Fig. 10 Fig. 11.

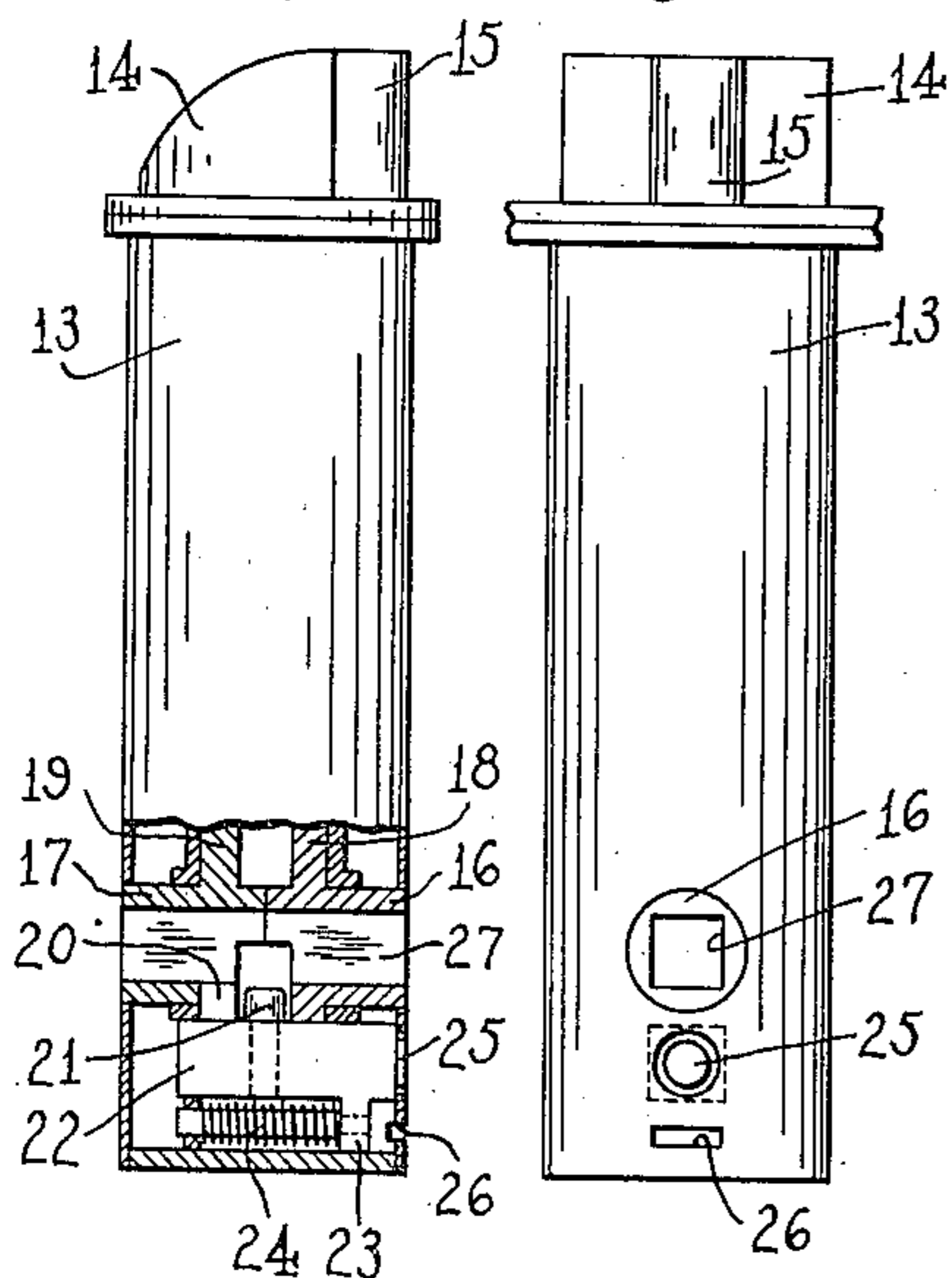


Fig. 9.

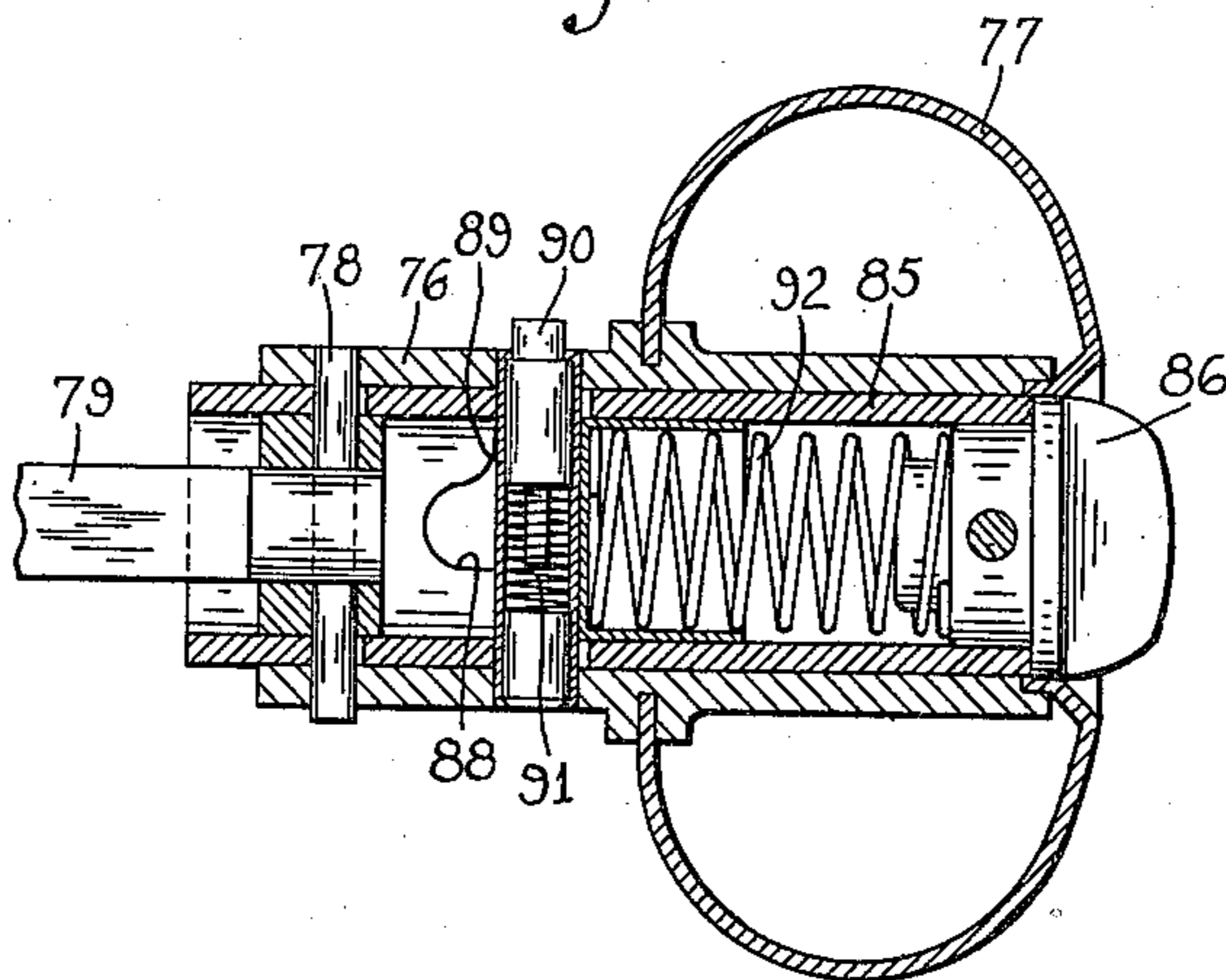


Fig. 12.

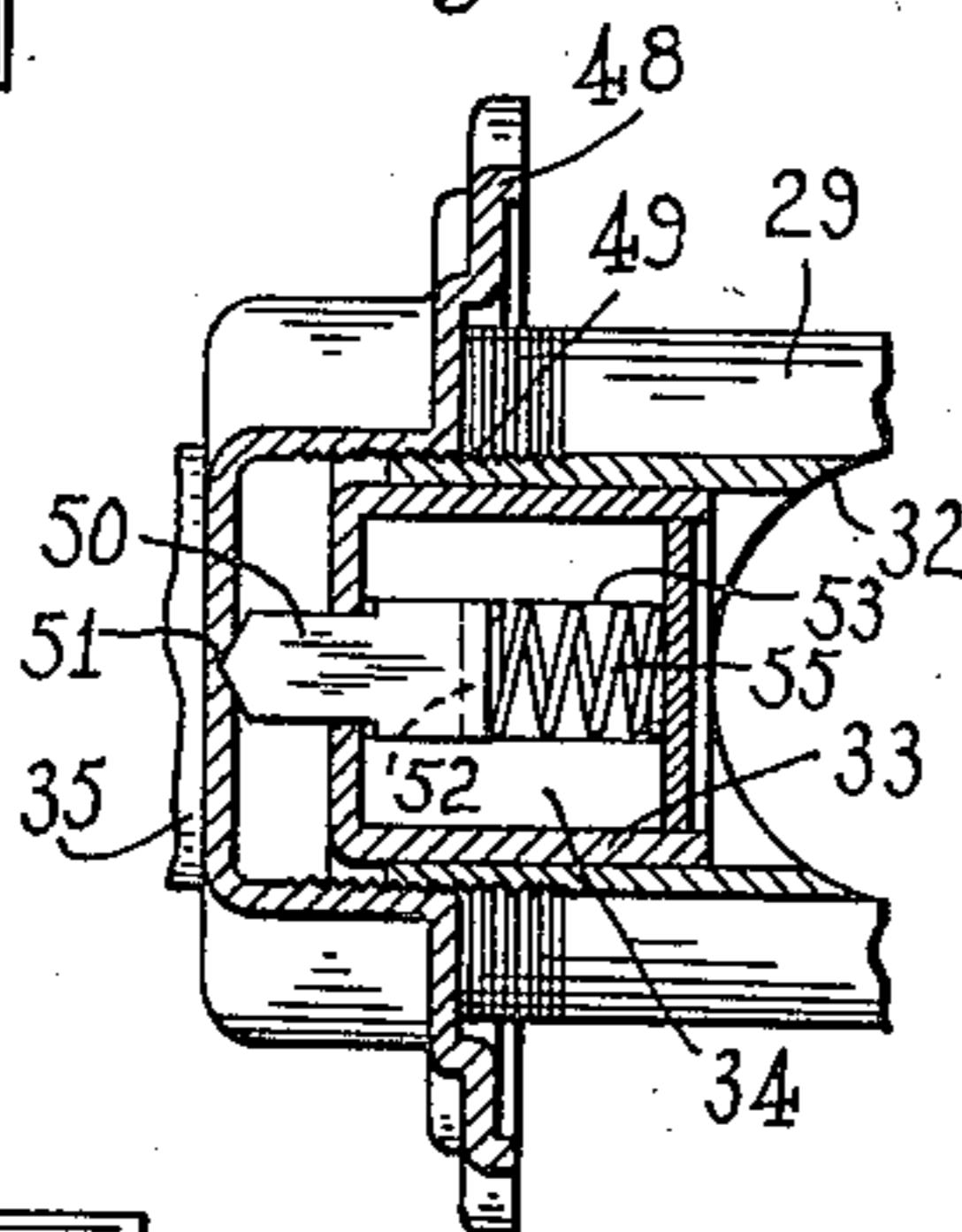


Fig. 13.

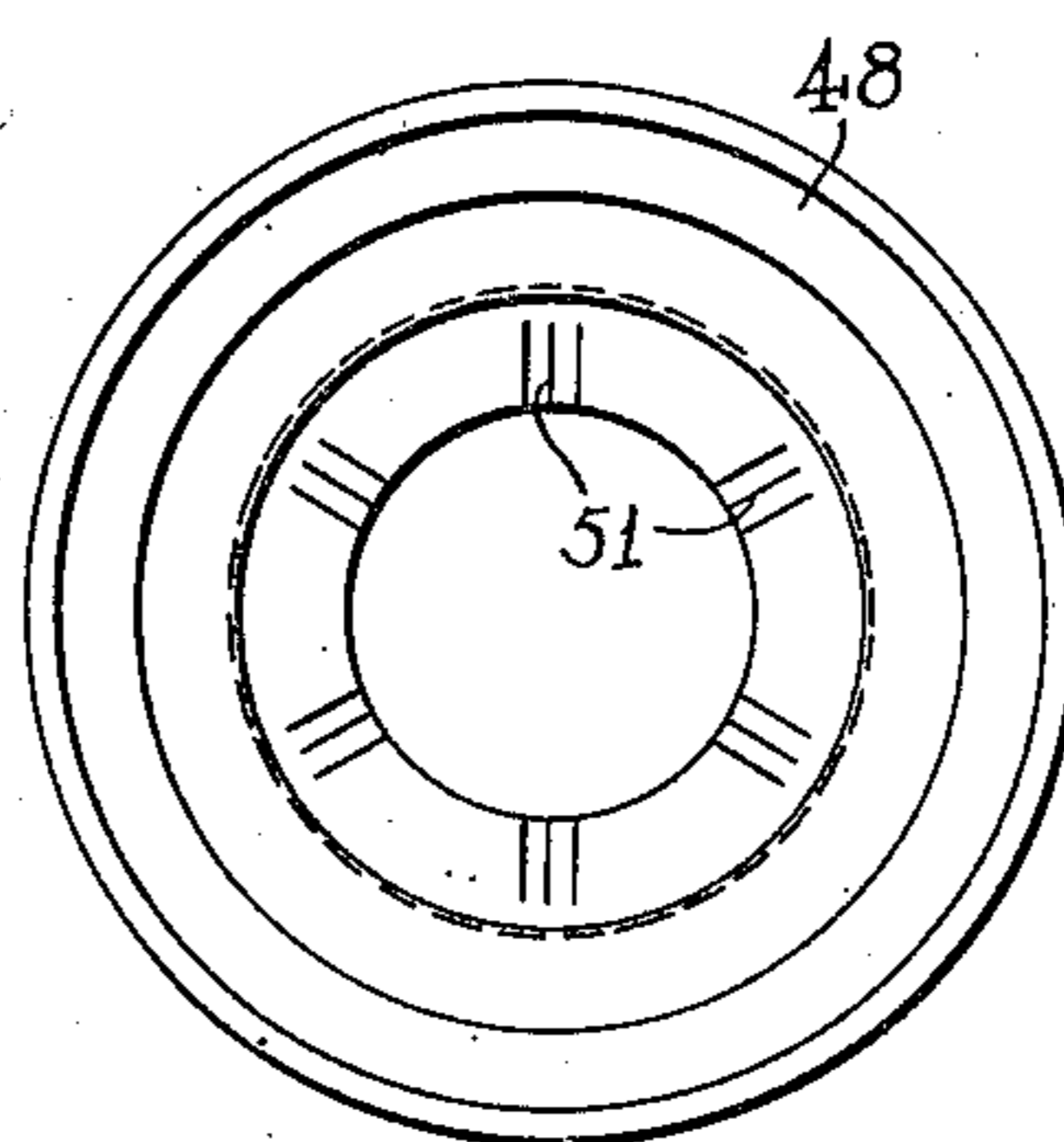
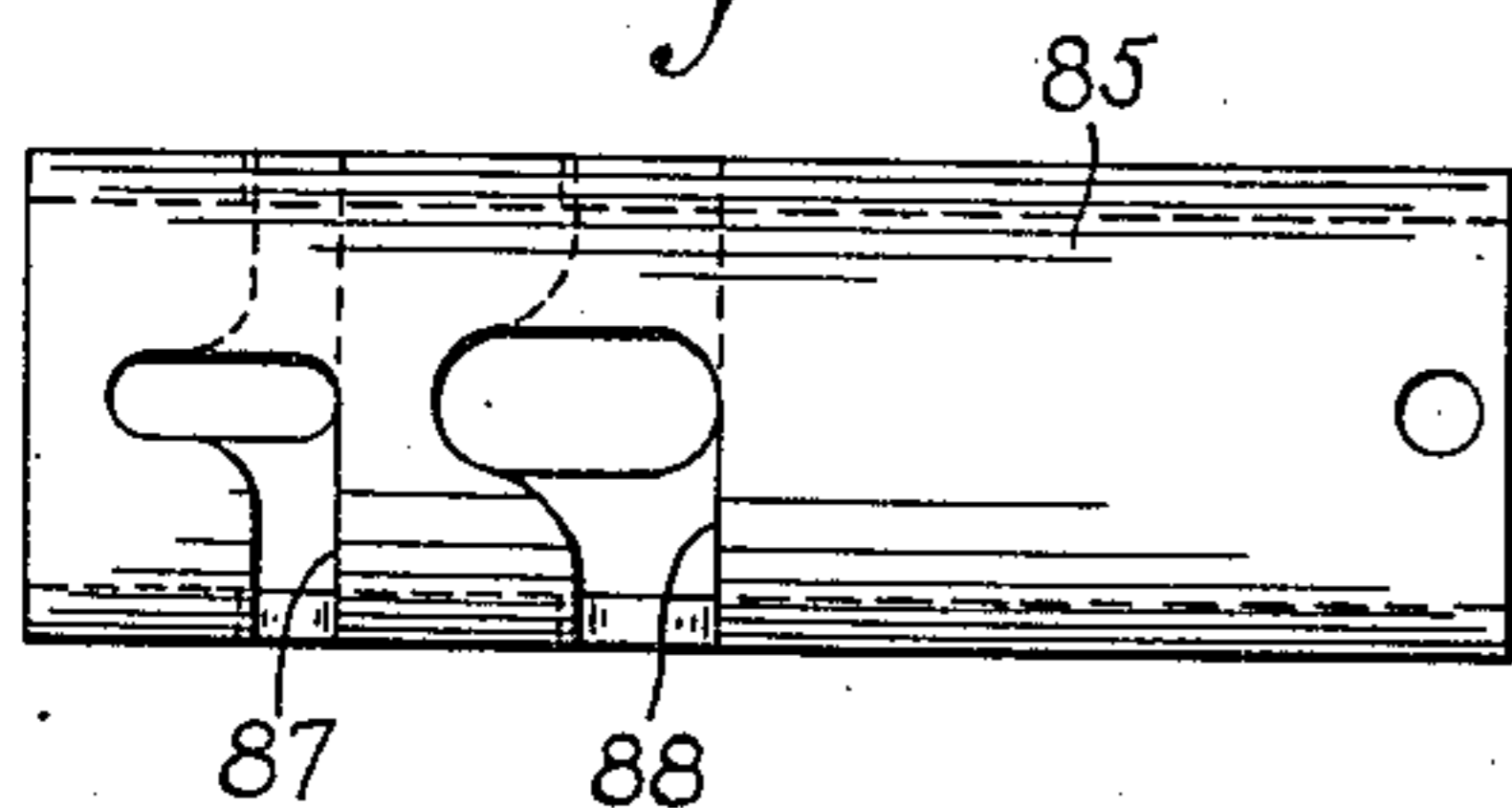


Fig. 14.



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## UNITED STATES PATENT OFFICE

2,444,820

## DOOR LOCK

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Application May 21, 1945, Serial No. 595,020

11 Claims. (Cl. 70-449)

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This invention relates to door locks, and more particularly to a lock having a cylindrical case which may be inserted through a round bore in the edge of the door.

In locks of this type, it is customary to employ a tubular bolt case which is inserted in a bore made through the edge of the door, and knob mechanism including actuating means for the bolt designed to be applied to the faces of the door and inserted at least in part through a bore transverse to that which receives the lock case. In the lock case is mounted a part of the actuating mechanism for the bolt which must be suitably engaged with cooperating mechanism actuated by the knobs and not included in the bolt case. It very often occurs that as these two sets of mechanisms are mounted separately upon the door and in openings made at right angles to each other, they are not secured in their proper relative positions and, therefore, the parts bind and do not work properly. This often is a result of the fact that the knob spindle is not accurately placed at right angles to the direction of reciprocation of the bolt, but may also be due to other errors in the mounting of the parts.

As the entire lock mechanism embodies at least two separate parts which are separately mounted upon the door, it is desirable that a firm and rigid connection between these parts be secured such that proper relative positioning and alignment of the cooperating mechanism will be obtained. In the lock shown in the present application, I provide a casing for the bolt mechanism of generally cylindrical shape which may be inserted through the edge of the door, and also provide a casing for the knob mechanism which may be inserted through an opening transverse to the opening which receives the bolt, and provide in the knob mechanism casing an opening to snugly receive the rear end of the bolt mechanism casing, thus insuring that the two casings will stand at the proper angle to each other so that the cooperating parts will enjoy a free movement without binding. Additional means are provided for securing the two casings together in a convenient manner which will prevent displacement thereof and which may be readily engaged during the installation of the parts. Also, the knob mechanism is provided in two units or sections which may be conveniently mounted from opposite sides of the door and which, at the same time, will contain all of the necessary mechanism desired in locks for any of the usual situations.

One object of the present invention is to provide

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a door lock of improved construction which may be readily applied to a door.

Still another object of the invention is to provide a tubular lock of improved construction such that the parts therefor may be mounted upon a door through bores or openings at right angles to each other and interengaged to provide a rigid connection between the parts whereby the lock mechanism will operate without binding.

A still further object of the invention is to provide a door lock of novel and improved construction, so that, when mounted upon a door, all parts will be held in proper alignment.

Still another object of the invention is to provide a door lock of the type described having improved means for dogging one of the knobs against rotation.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a sectional view of a door lock mounted upon a door and embodying my invention;

Fig. 2 is a sectional view of one of the knob sections of the lock;

Fig. 3 is a sectional view on line 3-3 of Fig. 2;

Fig. 4 is a sectional view on line 4-4 of Fig. 2;

Figs. 5 and 6 are sectional views on lines 5-5, 6-6 respectively of Fig. 2;

Fig. 7 is a view partly in section of the other part of the knob mechanism;

Fig. 8 is a sectional view on line 8-8 of Fig. 7;

Fig. 9 is an enlarged sectional view of a part of the mechanism shown in Fig. 7;

Fig. 10 is a side elevational view of the bolt case partly broken away to show the interior mechanism.

Fig. 11 is a top plan view of the bolt case at right angles to that shown in Fig. 10;

Fig. 12 is a sectional view on line 12-12 of Fig. 2;

Fig. 13 is an interior view of the rose mechanism; and

Fig. 14 is a side elevational view of the dog-operating sleeve.

To illustrate a preferred embodiment of my invention, I have shown a lock mounted upon a door 10, the door having a cylindrical bore 11 entering through the edge thereof, and a transverse bore 12 extending from one face to the other. In the bore 11 is mounted a lock case 13 of substantially cylindrical form, and reciprocally mounted in the case is the usual latch bolt 14 and guard bolt 15. Rotatably mounted in the case are a pair of rollback hubs 16 and 17

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which carry rollbacks 18 and 19 respectively, these rollbacks serve to retract the bolt in a manner well understood in the art.

The outer rollback hub or the one adjacent the outside of the door is provided with a notch or recess 20 in which is adapted to be moved a lug or pin 21 projecting from one side of a dogging member 22, this dogging member being slidably mounted transversely of the case and provided with an arm 23 against which bears a compression spring 24 to normally hold the dogging member 22 in its inoperative position as shown in Fig. 10. As shown in Fig. 11, one end 25 of the dogging member projects through an opening in the case to be engaged by a cooperating element hereinafter described, and thus being moved inwardly against the tension of the spring 24. Also, as shown in Fig. 11, the lock case is provided with a slot 26, the function of which will appear hereinafter. It will be understood that the rollback hubs 16 and 17 are provided with polygonal or rectangular openings 27 for the reception of knob spindles to be hereinafter described.

The casing 13 may be referred to as the casing of the bolt mechanism, and mounted in the transverse bore 12 is a second casing 29 which may be referred to as the casing for the knob mechanism. The casing 29 is, as shown, of generally cylindrical shape but is provided with a reduced portion 30 at one end, thus leaving a shoulder 31 between this reduced portion and the main body portion of the casing. The latter is provided with registering transverse openings 32 within which the bolt casing 13 is snugly received, so that, as shown in Fig. 1, the latter extends entirely through the knob mechanism casing when the parts are assembled, and thus the two casings will be rigidly held in their proper relative positions.

The entire knob mechanism is divided into two parts, one of which comprises the casing 29 and certain mechanism assembled therewith as shown in Fig. 2, while the other parts comprise the inner knob and certain mechanism associated therewith as shown in Fig. 7, these two parts or sections being inserted from opposite sides of the door when the lock is applied as will be described hereinafter.

Within the outer portion of the member 29 is a cup-shaped member 33 within which is mounted a block 34 of cylindrical shape. A short sleeve 35 is inserted in an opening in the base of the cup-shaped member 33 and the end spun thereover to secure these parts together, this sleeve acting as a bearing sleeve for the knob shank 36 rotatably mounted within the sleeve 35 and held in place by a split washer 37. The knob shank is provided with a reduced end portion 38 which passes through the cylindrical block 34, and this portion of the shank is provided with a square opening 39 for one of the knob spindles.

On the outer end of the knob shank 36 is secured the outside knob 40, and contained within this knob is a key-operated lock 41 of any improved form, this lock being provided with a rotatable key barrel or plug 42 extending into an opening in the outer end of the knob shank. At its inner end, the key barrel is provided with a recess 43 closed by a cap 44 provided with a slot 45, the purpose of which is described hereinafter, the cap being held in place by a sleeve 46 secured to the key barrel by the pin 47.

A rose member 48 is threadedly connected at

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49 to the outer portion of the case 29, the threaded connection providing means for adjusting the rose longitudinally of the casing 29 to compensate for doors of different thicknesses. When the rose has been set to the proper position, it is releasably held in place by means of a plunger 50 (Fig. 12), the pointed end of which may engage in one or a number of indentations or serrations 51 provided at the inner periphery of the rose. As shown more especially in Figs. 1 and 2, the plunger or detent 50 is of L-shaped form and is provided with a bent end 52 slidably disposed in an opening 53 in the member 34, the detent being urged into engagement with the rose by a spring 55.

The mechanism above described is all assembled with the cup member 33 which is thereafter inserted into the outer end of the cylindrical casing 29 and secured in place by means of the screw 56 passing through openings in the casing 29 and cup member 33 and threaded into the block 34. Thereafter, the rose 48 may be threaded upon the casing 29. Thus the outside knob mechanism may be readily assembled with the casing 29 before the latter is applied to the door.

Also, a part of the inner knob mechanism is assembled within the casing 29 before it is applied to the door as shown in Fig. 2. A sleeve 57 is rotatably mounted in the reduced end 30 of the casing 29, this sleeve having an annular flange 58 abutting the shoulder 31, and a block 59 is mounted in the casing 29 against the flange 58, this block being provided with a central opening 60 and being held in place by a screw 61 (Fig. 5) inserted through the casing 29. A retaining disk 62 is secured to the block 59, this disk closing the inner end of openings 63 and 64 provided in the block. In the opening 63 is a spring 65 acting against the bent end of an L-shaped detent or plunger 66 similar to the plunger 50 previously described. In the opening 64 is slidably mounted a plunger 67 which serves to actuate the dogging member 22, this plunger having a reduced end surrounded by a spring 68 and which end passes through an opening 69 in the disk 62. Rotatably carried by the body of the plunger 67 in an anti-friction roller 70.

The block 59 is provided with a recess 71 which registers with a recess or slot 72 in the disk 62, and slidably mounted in the recess 71 is a locking slide 73 adapted when the lock mechanism case 13 is inserted through the case 29 during the application of the mechanism to a door, to be moved to the left as shown in Fig. 1, so as to project into the opening 26 (Fig. 11) and secure the lock mechanism casing 13 to the knob mechanism casing 29. As shown in Fig. 2, this slide 73 projects through an opening in the shoulder 31 so that its projecting end is accessible for manual engagement after the assembly shown in Fig. 2 has been inserted into the opening provided therefor in the door and after the case 13 has been inserted into the bore 11 so that its rear end extends through the casing 29. It is believed that from the foregoing it will be clear as to the assembly of the parts shown in Fig. 2, and that structure shown in this figure is applied to the door as a unit before the application of the bolt mechanism in the case 13 and also before the other section of the knob mechanism shown in Fig. 7 and to be presently described. It may here be stated that after the assembly shown in Fig. 2 is applied to the door and the bolt mechanism casing 13 is locked to the casing 29 by the lock-

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ing slide 73, the inside rose 74 may be thread-  
ingly engaged with the outer end of the casing  
29 and, after it has been screwed snugly against  
the outer facing of the door, it will be held in  
place by the detent 66 as previously described in  
connection with the outer rose 48.

The other portion of the knob mechanism com-  
prising the inner knob and certain parts assem-  
bled therewith is shown in Fig. 7. This comprises  
a cylindrical knob shank 76 having mounted thereon  
the inner knob 77. Rigidly secured to the sleeve 76  
by a pin 78 is the lock spindle, which spindle com-  
prises a square portion 79, a circular intermediate  
portion 80, a reduced circular portion 81, and a  
flattened end portion 82. Rotatably mounted on the  
rounded portion 81 of this spindle is a square spindle  
section 83 designed to be actuated by the outer knob  
as will be herein described, this spindle section being  
held in place by staking or displacing outwardly the  
end portion of the spindle section 81, as shown at 84.

Within the sleeve 76 is slidably mounted a tubu-  
lar or sleeve-like plunger 85 to which is secured a  
fingerpiece 86, this sleeve being provided with a  
pair of L-shaped slots 87 which embrace the ends  
of the pin 78, and is also provided with a second  
pair of L-shaped slots 88 which embrace a sleeve 89  
mounted in the member 76. Within the sleeve 89 is  
a spring-pressed pin or detent 90 urged outwardly by  
the spring 91, the purpose of which will be described  
hereinafter. Mounted within the sleeve or plunger 85  
is a spring 92 which acts against the fingerpiece 86  
at one end and against the sleeve 89 at the other  
end to normally hold the member 85 in its outer  
position to urge it toward the right as shown in  
Figs. 7 and 9. It will be apparent, however, that  
the member 85 may be pressed inwardly by the  
member 86, this movement being permitted by the  
slots 87 and 88, which movement will cause the  
end of the sleeve 85 to project beyond the end of  
the sleeve 76 as shown in Fig. 9. If the fingerpiece  
86 is rotated at this time, this rotation will cause  
the transverse portion of the slot 87 to engage the  
pins 78 and hold the sleeve 85 in the position shown  
in Fig. 9 against the action of the spring 92. When  
the sleeve 85 is moved from the position shown in  
Fig. 7 to that shown in Fig. 9, it will through its  
engagement with the anti-friction roller 70 move the  
actuator 67 of the dogging member to the left as the  
parts are shown in Fig. 1, and thus effect the  
dogging of the outside knob through the pin 21.  
Upon rotation of the member 86 in the reverse  
direction, the longitudinal portions of the slots 87  
and 88 will then register with the pin 78 and the  
sleeve 89, and cause the spring 92 to move the  
sleeve 85 to its original or inoperative position,  
i. e., the position shown in Fig. 7.

It will be understood that after the bolt mechanism  
casing 13 and the knob mechanism casing 29 with the  
assembled parts shown in Fig. 2 have been inserted  
in the door and locked together by means of the  
locking slide 73, the inside knob assembly shown in  
Fig. 7 may then be inserted in place, the sleeve 76  
being inserted into the sleeve 57. The projecting  
end of the lock pin 90 will be depressed to lie flush  
with the outside of the sleeve 76 to permit this  
movement after which the pin will be projected by  
its spring to engage in an opening 93 provided in the  
sleeve 57 for this purpose. The portion 30 of the  
casing 29 may be provided with a small opening 94  
registering with the opening 93 to permit the

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insertion of a tool to depress the locking pin 90  
when it is desired to remove the lock from the  
door. From Figs. 7 and 9 it will be noted that  
the pin 78 projects from the sleeve 76 at one end,  
and the sleeve 57 is provided with a shallow groove  
95 to slidably receive this pin so that the inser-  
tion of the sleeve 76 into the sleeve 57 can be  
effected in one position only. This will insure  
the registration of the pin 90 with the opening  
93 so that it will spring into place when it arrives  
opposite this opening to secure the inner knobs to  
the casing 29.

It will likewise be seen from Figs. 1 and 7 that  
the square portion 79 of the main spindle en-  
gages the inner rollback hub 16, while the outer  
rollback hub is engaged by the square spindle sec-  
tion 83, which is rotatably mounted with respect  
to the section 79. Likewise the flat end 82 of  
the main spindle projects through the slot 45 in  
the cap 44, and it will be understood that this  
cap is provided with a lost-motion connection  
with the key barrel to permit a certain amount  
of rotation of the cap independently of the key  
barrel, so that the inner knob may be rotated,  
although the key barrel will be held stationary.

From the above construction it will be apparent  
that either knob may be rotated independently of  
the other, the inner knob 77 operating the bolt  
by means of the square section 79 of the spindle  
and the inner rollback hub 16. The outer knob  
operates the bolt by means of the square section  
83 of the spindle, one end of which fits the hub  
17, while the other end is non-rotatably mount-  
ed in the opening 39 of the outer knob shank.  
Due to the rotatable mounting of the section 83  
on the round portion 81 of the main spindle, the  
latter remains at rest when the outer knob is ro-  
tated.

It will also be apparent that when the sleeve  
85 has been pushed inwardly by the fingerpiece  
86, and the inner end of this sleeve has moved the  
dogging member 22 by means of the actuating  
slide 67 so as to dog the outer hub 17 against  
movement, the outer knob may not be actuated.  
The inner knob can, of course, be actuated in the  
usual manner and may also be actuated from the  
outside of the door by means of the lock 41.  
When the key plug 42 of this lock is moved by  
the key in the usual manner, the spindle 79 will  
be rotated due to the connection of the flat end  
82 of this member with the key barrel which,  
through the pin 78, will rotate the inner knob  
and, therefore, actuate the bolt.

It will also be apparent that when the parts  
are assembled as shown in Fig. 1 of the drawings,  
and the locking slide 73 is moved inwardly to lock  
the case 13 to the case 29, the sections of the  
lock will be rigidly secured together in proper  
alignment so that there will be no binding or  
undue friction between the operating parts of  
the structure. As the bolt mechanism casing 13  
extends entirely through the case 29 of the knob  
mechanism, it will effectually be held in place  
at its proper angle regardless of any misalign-  
ment of the openings formed in the door. That  
is, all that is required is that the openings be  
sufficiently large to receive the parts disposed  
therein, and the casings will be positioned rela-  
tively to each other by their telescoping engage-  
ment without regard to the walls of the openings  
in the door.

While I have shown and described a preferred  
embodiment of my invention, it will be understood  
that it is not to be limited to all of the details  
shown, but is capable of modification and varia-

tion within the spirit of the invention and within the scope of the claims.

What I claim is:

1. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, means for rigidly securing said casings together, both of said casings being of substantially cylindrical shape, a bolt and bolt-actuating mechanism in said first casing, said mechanism including rollbacks rotatably mounted in the first casing, inner and outer knob members having shank portions rotatably carried by the ends of said second casing, and a spindle structure connecting said knob members with the rollbacks.

2. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, means for rigidly securing said casings together, both of said casings being of substantially cylindrical shape, a bolt and bolt-actuating mechanism in said first casing, said mechanism including rollbacks rotatably mounted in the first casing, inner and outer knob members having shank portions rotatably mounted in the ends of said second casing, and spindle mechanism operated by said knobs and extending into the first casing for engagement with the said rollbacks.

3. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, the rear end of said first casing extending into and being rigidly secured to said second casing, a bolt, an actuating mechanism therefor mounted in the first casing including rotatable rollbacks, knob members having shanks rotatably mounted in the outer ends of said second casing, and spindle members actuated by said knob members and operatively connected to said rollbacks.

4. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, the rear end of said first casing extending through said second casing, means for securing said casings together to hold them in predetermined relative angular relation, a bolt, an actuating mechanism therefor mounted in the first casing including rotatable rollbacks, knob members having shanks rotatably mounted in the outer ends of said second casing, and spindle members actuated by said knob members and operatively connected to said rollbacks.

5. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, said second casing having registering openings in opposite walls thereof, said first casing extending through said openings, means for securing said casings together, a bolt, an actuating mechanism therefor mounted in the first casing including rotatable rollbacks, knob members having shanks rotatably mounted in the outer ends of said second casing, and spindle members actuated by said knob members and operatively connected to said rollbacks.

6. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, a bolt and bolt-actuating mechanism

in the first casing, a knob mechanism having a shank member rotatably mounted in the second casing and connected to said bolt-actuating mechanism, said knob mechanism being slidably insertable into the second casing after the latter is mounted in the door, said bolt-actuating mechanism including rollbacks rotatably mounted in the first casing, and said knob mechanism including a spindle structure connected to said rollbacks.

7. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, a bolt and bolt-actuating mechanism in the first casing, a knob mechanism having a shank member rotatably mounted in the second casing and connected to said bolt-actuating mechanism, said knob mechanism being slidably insertable into the second casing after the latter is mounted in the door, releasable means for holding said knob mechanism against removal, said actuating mechanism including rollbacks rotatably mounted in the first casing, and said knob mechanism including a spindle structure connected to said rollbacks.

8. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, a bolt and bolt-actuating mechanism in the first casing, a sleeve rotatably mounted in the second casing, and a knob mechanism having a part slidably insertable into said second casing and engaged with said sleeve.

9. A door lock comprising a casing insertable through the edge of the door, a second casing insertable into an opening through the face of the door and extending transversely of said first casing, a bolt and bolt-actuating mechanism in the first casing, a sleeve rotatably mounted in the second casing, a knob mechanism having a part slidably insertable into said second casing and engaged with said sleeve, and a locking member slidably carried by said knob mechanism and spring pressed outwardly into engagement with said sleeve.

10. A lock mechanism comprising a bolt, actuating mechanism for the bolt, knob mechanism for operating said actuating mechanism, a two-part casing for said mechanisms, one of said casing parts comprising a substantially cylindrical member extending through the door from one face thereof, and the other part of said casing comprising a substantially cylindrical member extending through an opening through the edge of the door and joined to said first casing part intermediate its ends to form a T-shaped structure, and a substantial portion of the rear end of said second casing part being received in said first casing part and rigidly secured thereto.

11. A lock mechanism comprising a bolt, actuating mechanism for the bolt, knob mechanism for operating said actuating mechanism, a two-part casing for said mechanisms, one of said casing parts comprising a substantially cylindrical member extending through the door from one face thereof, the other part of said casing comprising a substantially cylindrical member extending through an opening through the edge of the door and joined to said first casing part intermediate its ends to form a T-shaped structure, a substantial portion of the rear end of said second casing part being received in said first casing part and rigidly secured thereto, and a knob-

actuated spindle in said first casing part and extending into said second casing part to be engaged with the bolt-actuating mechanism.

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