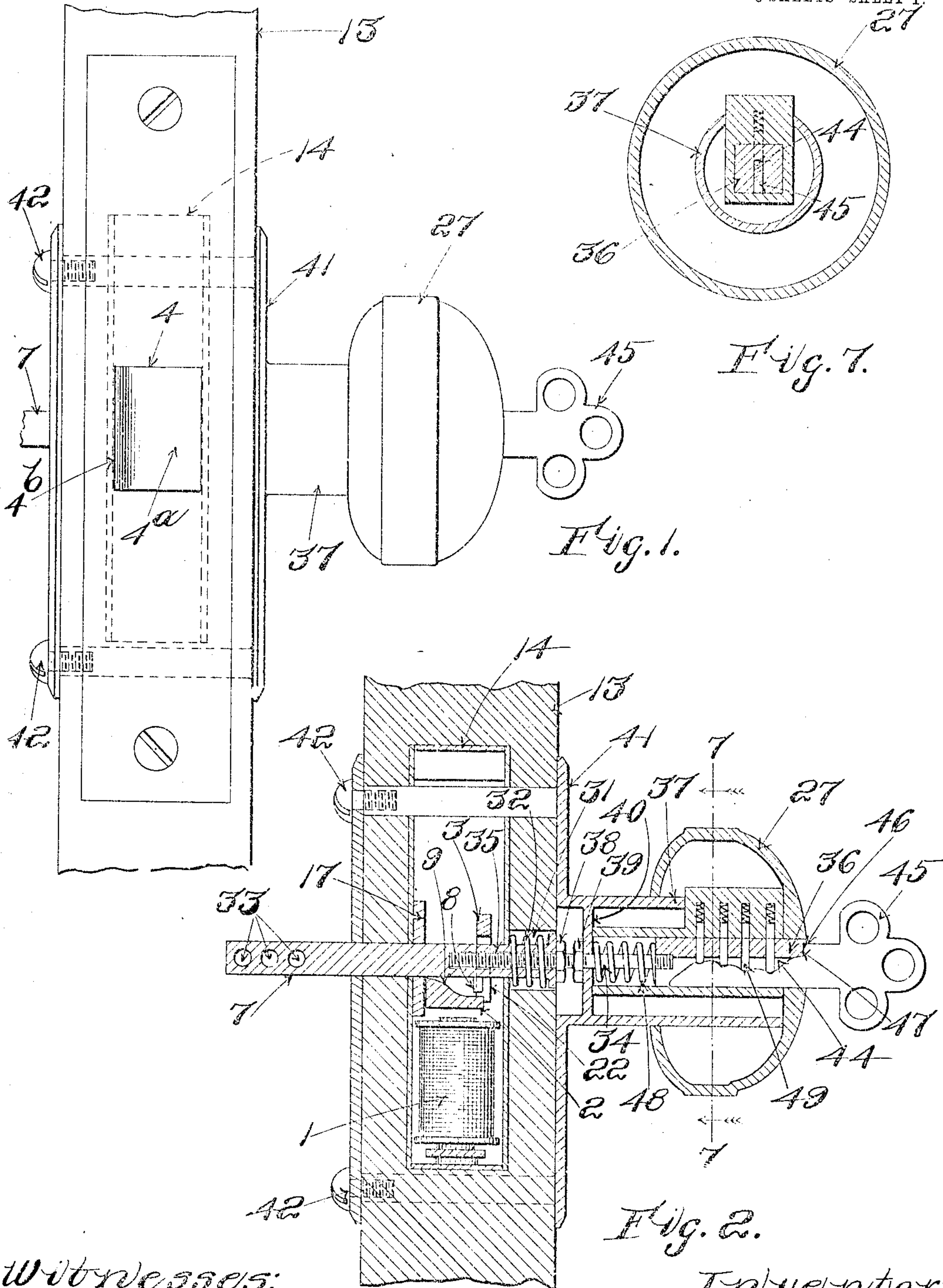


No. 872,022.

PATENTED NOV. 26, 1907.

C. SMITH.
DOOR FASTENER AND OPENER.
APPLICATION FILED APR. 24, 1907.

3 SHEETS—SHEET 1.



Witnesses:
John H. Parker
Alice Tarr

Inventor:
Charles Smith
by Macleod, Tolson, Leopold & Dike
Attorneys.

No. 872,022.

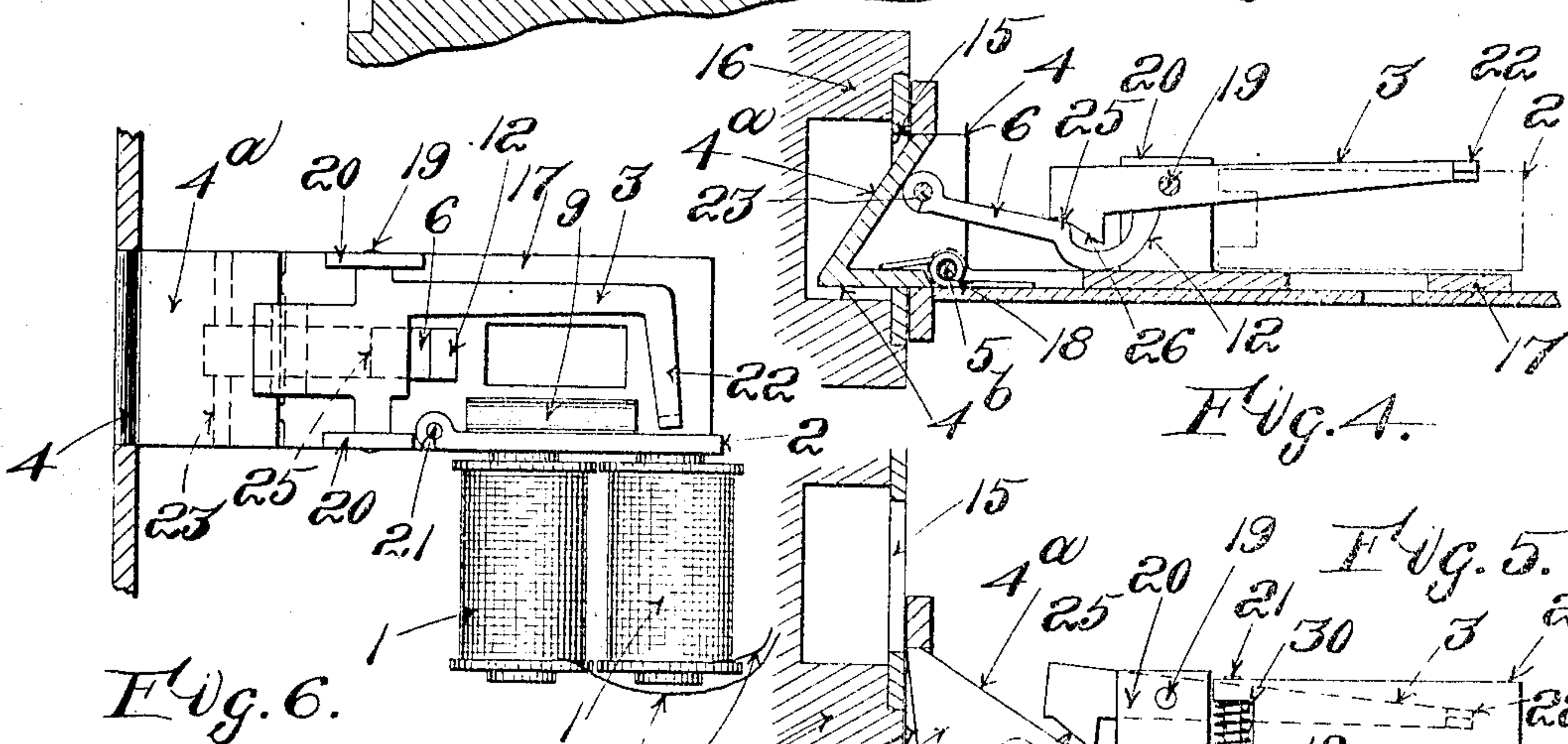
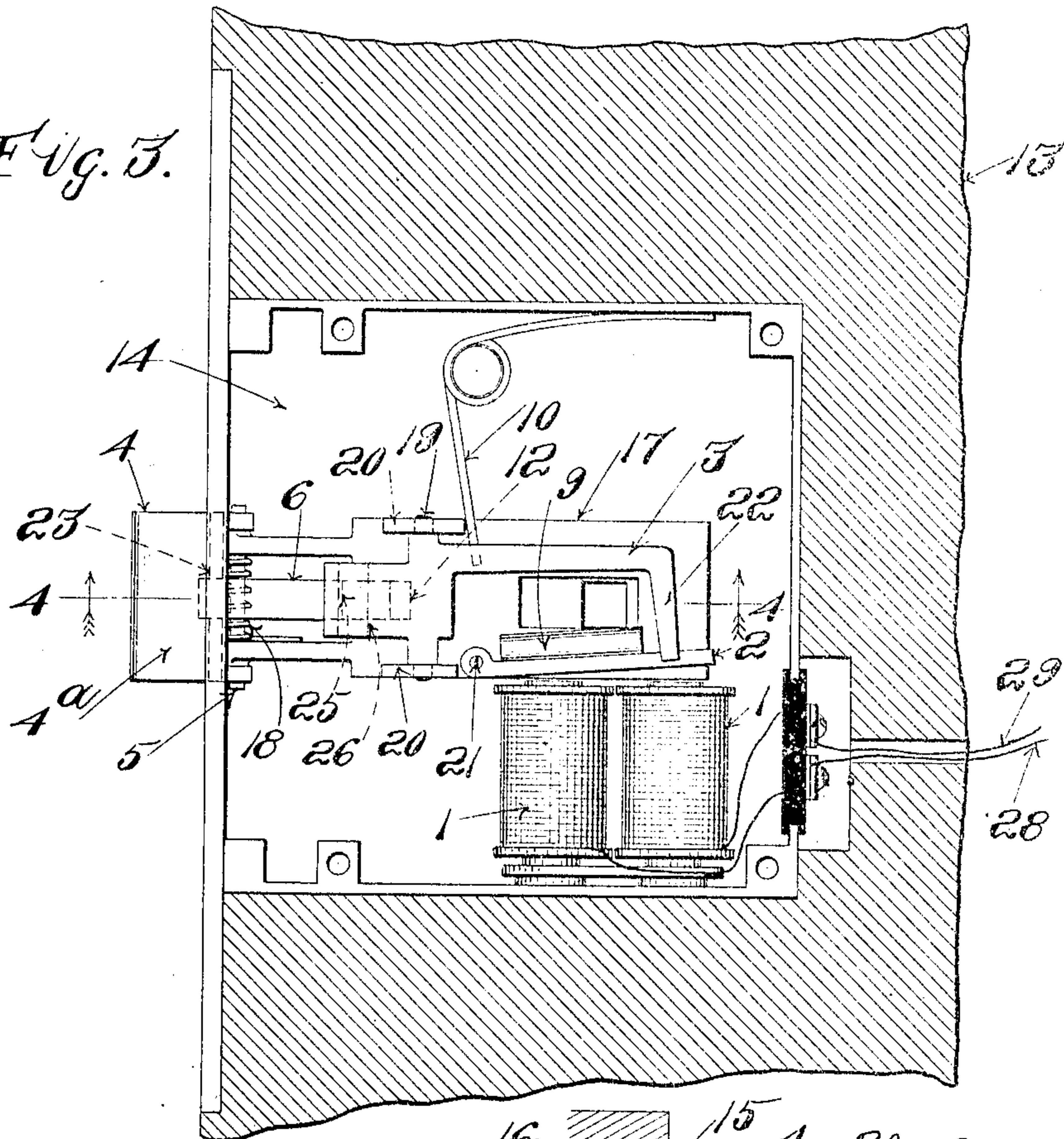
PATENTED NOV. 26, 1

C. SMITH.
DOOR FASTENER AND OPENER.

APPLICATION FILED APR. 24, 1907.

3 SHEETS—SHEET 2.

Fig. 3.



Witnesses:
John H. Parker
Alice Tarr

Inventor:
Charles Smith
by Maxwell, Laver, Copeland & Co.
Attorneys

No. 872,022.

PATENTED NOV. 26, 1907.

C. SMITH.
DOOR FASTENER AND OPENER.
APPLICATION FILED APR. 24, 1907.

3 SHEETS—SHEET 3.

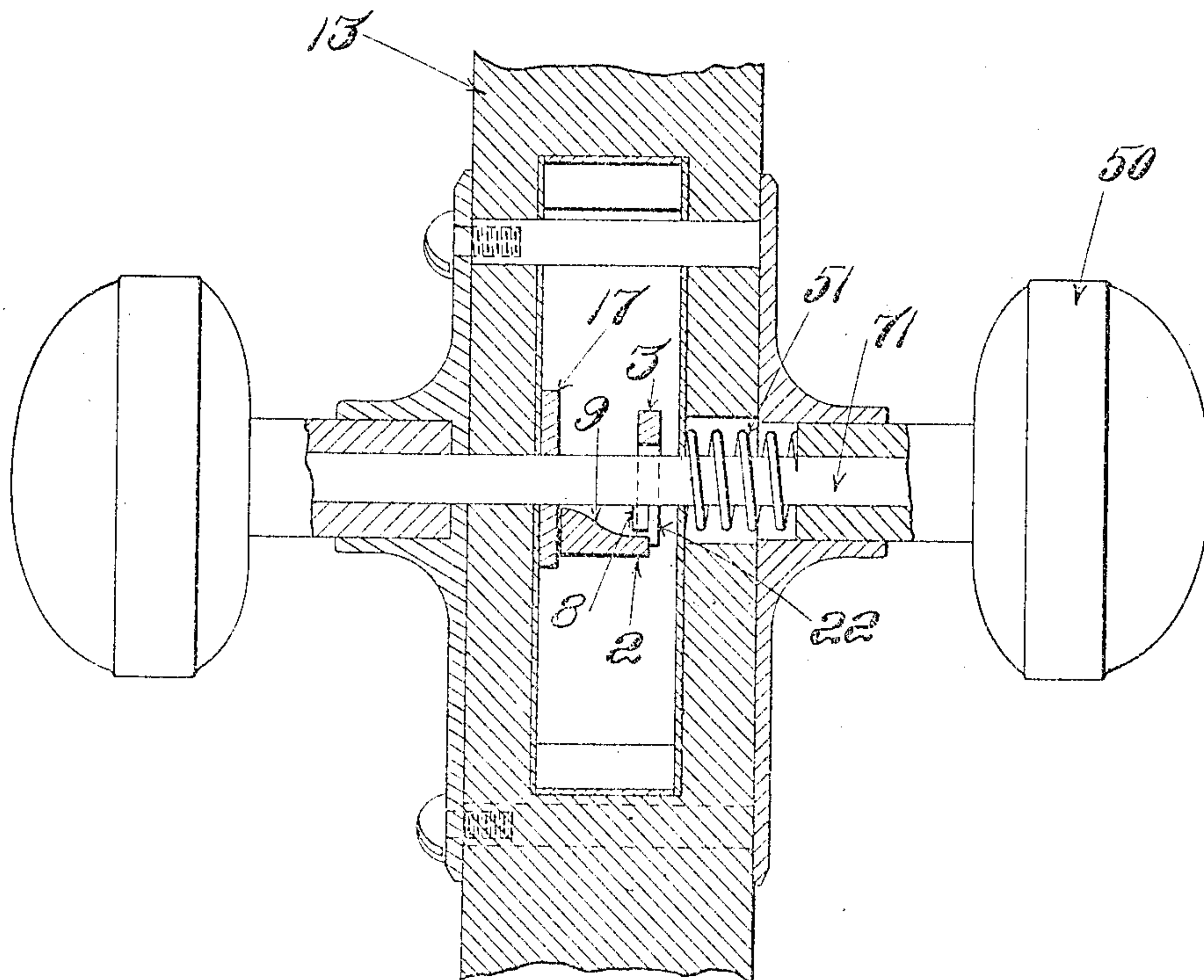


Fig. 8.

Witnesses:
John H. Parker
Alvin Tarr

Inventor:
Charles Smith
by Macleod, Salver, Copeland & Dike
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES SMITH, OF BOSTON, MASSACHUSETTS.

DOOR FASTENER AND OPENER.

No. 872,022.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed April 24, 1907. Serial No. 369,911.

To all whom it may concern:

Be it known that I, CHARLES SMITH, a citizen of the United States, residing at Boston, county of Suffolk, and State of Massachusetts, have invented a certain new and useful Improvement in Door Fasteners and Openers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention relates to a new door fastener and opener.

The special object of the invention is to provide a fastener which shall also serve as an automatic safety lock which can be 15 opened from without by means of a key or by a person in another room by means of an electrical connection, but the invention is also adapted for use as a door fastener which may be opened from either side of the door 20 by any one without a key and without making electrical connection by simply pushing the knob on one side or pulling the knob on the other side without turning the shaft. If the lock is employed, the door can still 25 be opened by a person on the inside without a key or making electrical connection.

If the lock is electrically released, the catch or fastener can then be released and the door opened from the outside by pushing 30 the door without turning the knob, and if the lock is released by a key, the key also moves the shaft axially so that the door may be opened by a straight push. In whatever form the fastener is employed in the preferred form of construction, no radial movement of the key, knob or shaft is required, the unlocking and the opening of the door is all done by a straight push from one side or 35 straight pull from the other side.

40 While I prefer the form of construction in which a straight line pressure is all that is required to unlock as well as to release the catch and open the door, yet the invention may be embodied in a form in which the 45 lock is released by a turning movement of the shaft and the catch released from the keeper by a straight line pressure.

In the drawings,—Figure 1 is an end elevation of a door, partly broken away, fitted with 50 my new lock, knob on one end of the shaft and key inserted, the inner end of the shaft being broken off. Fig. 2 is a vertical section of same taken through the knob, the inner knob being omitted but the shaft being 55 shown full length fitted for a door knob. Fig. 3 is a view in elevation looking into the

lock, one of the side plates of the lock case being removed. Fig. 4 is a section taken on line 4—4 of Fig. 3. Fig. 5 is a view in elevation of the same showing the locking catch 60 thrown back as when the door is being opened. Fig. 6 is a plan view of Fig. 5. Fig. 7 is a view on line 7—7 of Fig. 2. Fig. 8 is a sectional view showing the invention employed as a fastener alone without the lock. 65

Referring to the drawings,—13 represents a door (partly broken away) fitted with my new fastener which is mounted in a case 14 mortised into the door.

A catch 4 of the usual triangular form in 70 cross-section having an inclined cam face 4^a is adapted to engage with a socket 15 in the door casing 16 and is hinged to a vertical plate 17 by a vertical pivot 5 at the junction of the two right line sides of the catch so that 75 the catch is adapted to be turned on its pivot a quarter turn from the locking position shown in Fig. 4 (in which the catch protrudes from the case) into the position shown in Fig. 5, so that the catch is wholly 80 within the case. The pivot 5 is provided with a spring 18 which normally holds the catch in the position shown in Fig. 4 relative to the plate 17. The plate 17 has a sliding 85 movement whereby the catch 4 and all the other parts attached thereto which will be hereinafter described may be moved rearward from the position shown in Figs. 3 and 4, so that the catch 4 has a double movement, that is, a quarter turning movement 90 on its pivot and a sliding movement with its supporting plate 17.

A horizontally extending lever 3 is pivoted intermediate of its ends at its upper and lower edges as by a pivot 19 in the ears 20 95 which project horizontally from the plate 17, so that the lever 3 may be turned in a horizontal plane whenever it is left free to turn, but it is normally prevented from turning by means of a locking lever 2 pivoted at 100 21 which engages a downwardly turned finger 22 of the rear arm of the lever 3. The locking lever 2 is normally held in engaging position by a spring 30.

A lever 6 is pivoted at one end at 23 to 105 the catch 4 and extends rearwardly being formed in its rear portion with a bent arm 12 which engages the side of the lever 3, and is also formed with a shoulder 25 which engages a cam surface 26 of a projection on the 110 side of the lever 3. When the door is being opened, the catch 4 is turned on its pivot by

engagement with the striker and the pivot end of the lever 6 is thereby carried toward the slide plate 17 and the lever 6 as a whole is moved rearwardly as will be seen by Fig. 5.

5 While the finger 22 of lever 3 is engaged by the lever 2, as shown in Fig. 3, and as shown also in dotted lines in Fig. 4, the lever 3 cannot turn and therefore the engagement of the lever 3 with lever 6 holds lever 6 from
10 being moved relative to the catch 4, so that catch 4 cannot be turned on its pivot. Therefore, the door will remain locked and cannot be pushed open until the lever 2 is released from the lever 3. When, the attempt
15 is made to open the door from the outside, the square face 4^b of the catch will press against the side of the socket. The pressure of the square face 4^b against the side of the socket when the door is thus pushed,
20 however, tends to turn the catch on its pivot and would do so if the catch were not restrained from turning. One means of such restraint has been described. In order to permit the catch to be turned, this restraint must be released; that is, in the
25 means shown and already described, the locking lever 2 must be released from the lever 3. I have provided two means of doing this, one is mechanical to be operated manually by a key inserted in the knob 27
30 and the other is by an electrical connection, the electrical connection being intended for convenience of the person on the inside or in another room to save the trouble of going
35 to the door to admit the caller, and the key being intended for use by the owner or other person ordinarily entitled to a key.

For the purpose of electrically releasing the lever 2, I provide two electro magnetic
40 coils 1 within the casing 14 the ends of whose cores are beneath the swinging part of the lever 2. The wires 28, 29, connected with opposite poles of the magnet may lead to any point from which it is desired to have the
45 lock controlled, and by means of a circuit-closer (not shown) at that point, as by pressing a button or by other well known means, the coils are magnetized. The lever 2 is
50 virtually a swinging armature when the electrical connections are used, and when the coils are magnetized, the swinging end of the lever 2 will be drawn down by the magnet, releasing it from the lever 3, so that when
55 thus released, the person outside the door desiring to gain admittance, can by pushing the door inwardly cause the catch 4 to turn on its pivot and the door will yield to the pressure and open.

As soon as the door is open, the spring 18
60 will turn the catch 4 back into its normal position in Fig. 4, and the bent arm 12 trailing back on the side of the lever 3 will turn the lever 3 also back to its normal position to be reengaged by the locking lever 2. When
65 the door is being closed, the cam face 4^a will

engage the striker of the socket and the slide plate 17 will be thrust back against the pressure of spring 10, carrying with it the catch 4 and all attached parts, without turning the catch 4 on its pivot. When the door is en- 70
tirely closed and the catch is free from engagement with the sides of the socket, the spring 10 will thrust the plate 17 forward again, carrying the catch into the socket and locking the door. When the electrical con- 75
tact is broken, the magnet will be deenergized, and the lever 2 will be turned up to its normal locking position by the spring 30.

The key controlled mechanism is as follows: The lever 2 is provided with a cam surface 9 80
on its upper side. Extending horizontally through a slot 31 in the door and casing is a shaft 7, which at each end is adapted to be provided with a knob or handle. In the preferred form of construction, this shaft 7 is 85
movable longitudinally but not rotatably. It is provided with a pin 8 which when the shaft is moved inwardly from the position shown in Fig. 2, as by pushing from the out- 90
side of the door, will engage the cam surface 9 of the lever 2 and depress the lever out of engagement with the lever 3, as shown in Fig. 6, except that in this case the magnet coils perform no function. After the door is
95 opened and the inward pressure upon the shaft 7 is removed, a spring 32 will thrust the shaft out again, releasing the pin 8 from the cam surface 9 on lever 2 and permit the lever 2 to be restored to its locking position by spring 30 as previously described. The 100
action of the catch 4 will be as already described.

The means for moving the shaft 7 may be of various forms. Preferably the inner end of the shaft is provided with a handle or knob, 105
such as shown in Fig. 7. In Fig. 2 the shaft is shown as formed with screw holes 33 such as commonly employed to enable a knob to be attached. By such a knob the shaft can be pulled by a person on the inner side of the 110
door to cause the pin 8 to engage the cam surface 9 as already described, and when released, the spring 32 will carry the shaft back. A person on the inside can open the door without the use of a key by pulling the han- 115
dle. This will cause the pin 8 to engage the cam face 9 of the lever 2 and push lever 2 from finger 22 of lever 3 and the same pull cause the catch 4 to turn on pivot 5. To
120 operate the shaft from the outer side, there is provided a rod 34 the inner end of which slides in a longitudinal slot 35 in the shaft 7 and the outer end of which is screwed into a barrel 36 which slides in the tubular head 37 of the handle. A nut 38 on the rod 34 is ad- 125
justed to bear against the end of the shaft 7, so that when the rod 34 is pressed inwardly, it will move the shaft 7 inwardly to bring the pin 8 into engagement with cam surface 9, and a nut 39 on said rod 34 bears against the 130

end wall 40 of the head 37 and limits the outward movement of the rod 34 and barrel 36.

The head 37 may be provided with a flange 41 and secured to the door by bolts 42 and provided with a knob or handle 27. The barrel 36 is provided with a thin key slot 44 to receive a key 45, preferably of the Yale lock style, the key being formed with a shoulder 46 which engages with a shoulder 47 on the barrel 36 near its outer end, whereby by continuing to push the key straight inward after it has been inserted its full distance into the key slot, the barrel 36 and rod 34 will be moved inward, thereby also moving the shaft 7 inward to release the lever 2 as already described. The barrel 36 is recessed near its inner end to receive a coil spring 48, one end of which abuts against the barrel, and the other abuts against the fixed end wall 40 of the head 37 so that when the inward pressure of the key 45 is released, the spring will force the barrel outward again to its normal position. The spring seated pins 49 which engage the notches of the key 45 are of well known use only in ordinary construction the key turns while in my device the key does not turn.

With the construction already described, therefore, there are three ways of unlocking the door: first, it may be opened from the inside simply by a straight pull on the handle connected with the inner end of shaft 7; second, it may be unlocked at any distant point wherever there is a circuit-closer connected with the wires leading from the opposite poles of the electro magnet, and when thus unlocked, a person at the outer side of the door can open it by simply pushing inward on the door, either by pushing on the handle or by pushing directly on the door; third, a person having a key can insert it in the key slot and by a straight push release the lock and then by a still further direct pressure on the knob or door, the door will open.

It is obvious that the key controlled mechanism may be employed without the electrical mechanism, or vice versa, if desired. If it is desired to use the device merely as a door latch or fastener so that any one can open the door without a key or electrical connection, the outer end of the shaft 71 may be fitted with a handle 50 by which the shaft can be pushed in directly to release the locking lever, as shown in Fig. 7. A spring 51 is provided to retract the shaft when the inward pressure on the handle is relaxed.

I have described the shaft 7 as having only a longitudinal movement, and not a rotary movement, as that is all that is necessary for purpose of engaging the cam surface 9 to release the locking lever, and I prefer the longitudinal movement because a straight push is all that is required to both unlock and open the door without necessity of turning a knob.

It is obvious, however, that if the shaft 7

were made rotatable instead of axially movable, a cam might be mounted on the shaft which upon turning the shaft would engage the lever 2 and turn it on its pivot so as to release it from the lever 3 and then by a straight push on the door the catch 4 would be turned on its pivot and allow the door to open.

The main features of the invention are first the hinged catch 4 on the door, and means for normally holding it in engagement with the socket in the door casing which will yield to direct pressure on the door, and secondly, when desired to use it as a lock, to have a locking lever which normally holds the catch so that it cannot yield to pressure on the door until the lock is released, and after the lock is released, the catch will still hold the door fastened until released by a straight push or pull, the particular form of means for releasing the lock being of less importance.

What I claim is:

1. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which is released by a straight line pressure at right angles with the plane of the door, and a spring which normally holds the catch in engagement with said socket and throws the catch back into engaging position when the door is closed, a lock which prevents the catch from turning until the lock is released, a case therefor, a longitudinally movable shaft which extends through the case, means connected with said shaft whereby the longitudinal movement of the shaft will cause said means to release the lock, intermediate mechanism connected with said shaft provided with a key slot and a key which fits in said slot and is adapted to actuate said intermediate mechanism and said shaft by a straight line push whereby said unlocking means are operated to release the lock.

2. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which is released by a straight line pressure at right angles with the plane of the door, and a spring which normally holds the catch in engagement with said socket and throws the catch back into engaging position when the door is closed, a lock which prevents the catch from turning until the lock is released, a case therefor, a movable shaft which extends through the case, means connected with said shaft whereby the movement of the shaft will cause said means to release the lock, intermediate mechanism connected with said shaft provided with a key slot and a key which fits in said slot and is adapted by a straight push to actuate said intermediate mechanism and said shaft whereby said unlocking means are operated to release the lock.

3. A door fastener having a hinged catch

mounted on a slide plate, a case in which said slide plate is held in such position that the catch is normally adapted to engage with the socket in the door casing, said catch being adapted to be turned on its pivot into its case when the closed door is pushed from one side or pulled from the other and thereby permit the door to be opened, a spring which turns the catch again into its normal position after the door is opened, a cam face on said catch which is adapted to engage the socket on the door casing when the door is being closed and thereby move the slide plate and catch carried thereon back into the lock case, a spring which after the door is closed forces the slide plate forward to its normal position so that the catch will engage with the socket in the door casing, a lever pivotally mounted on said slide plate, a lever pivoted to said catch and engaged by said first lever, a pivoted locking lever which normally engages said second lever and thereby prevents the said catch from turning on its pivot, and means for releasing said locking lever from engagement with said second lever whereby the first lever is permitted to move and the catch is free to turn on its pivot.

4. A door fastener having a hinged catch mounted on a slide plate, a case in which said slide plate is held in such position that the catch is normally adapted to engage with the socket in the door casing, said catch being adapted to be turned on its pivot into its case when the closed door is pushed from one side or pulled from the other and thereby permit the door to be opened, a spring which turns the catch again into its normal position after the door is opened, a cam face on said catch which is adapted to engage the socket on the door casing when the door is being closed and thereby move the slide plate and catch carried thereon back into the lock case, a spring which after the door is closed forces the slide plate forward to its normal position so that the catch will engage with the socket in the door casing, a lever pivotally mounted on said slide plate, a lever pivoted to said catch and engaged by said first lever, a pivoted locking lever which normally engages said second lever and thereby prevents the said catch from turning on its pivot, a movable shaft which extends through said lock case, a cam face on said locking lever and a projection on said shaft which when the shaft is moved engages said cam face and actuates the locking lever and thereby releases the latch so that it is free to turn on its pivot.

5. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which is released by a straight line pressure at right angles with the plane of the door, an electro-magnet, an armature controlled by said magnet, intermediate mechanism connected with said catch and normally engaged by said armature whereby the catch is prevented from turning on its pivot.

6. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which is released by a straight line pressure at right angles with the plane of the door, an electro-magnet, an armature controlled by said magnet, intermediate mechanism connected with said catch and normally engaged by said armature whereby the catch is prevented from turning on its pivot, a case for the fastener, a movable shaft which extends through the case, and means connected with said shaft whereby the movement of the shaft will actuate said armature independently of the electro-magnet, to release said detent.

7. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which is released by a straight line pressure at right angles with the plane of the door, an electro-magnet, an armature controlled by said magnet, intermediate mechanism connected with said catch and normally engaged by said armature whereby the catch is prevented from turning on its pivot, a case for the fastener, a longitudinally movable shaft which extends through the said case, means connected with said shaft whereby the movement of the shaft will actuate said armature independently of the electro-magnet to release the detent, intermediate mechanism connected with said shaft provided with a key slot and a key adapted to fit in said slot and actuate the said intermediate mechanism and shaft.

8. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which may be released at any time on one side of the door by a straight line pull at right angles with the plane of the door and which is adapted to be released on the opposite side of the door by a straight line push at right angles with the plane of the door, an automatic lock which normally prevents the catch from being turned by a push on the outer side of the door, a longitudinally movable shaft which extends through the door and is connected with said lock, intermediate mechanism connected with said shaft provided with a key slot and a key which fits in said slot and is adapted to actuate said intermediate mechanism and release the lock by a straight line push whereby the said hinged catch may be turned and the door opened by a continued straight line push after the lock is released.

9. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which may be released at any time on one side of the door by a straight line pull at right angles with the plane of the door and which is adapted to be released on the opposite side of the door by a straight line push at right angles with the plane of the door, an automatic lock which normally prevents the catch from being turned by a push on the outer side of the door, a longitudinally movable shaft which extends through the door and is connected with said lock, intermediate mechanism connected with said shaft provided with a key slot and a key which fits in said slot and is adapted to actuate said intermediate mechanism and release the lock by a straight line push whereby the said hinged catch may be turned and the door opened by a continued straight line push after the lock is released.

10. A door fastener having a hinged catch which is adapted to engage with a socket in the door casing and which may be released at any time on one side of the door by a straight line pull at right angles with the plane of the door and which is adapted to be released on the opposite side of the door by a straight line push at right angles with the plane of the door, an automatic lock which normally prevents the catch from being turned by a push on the outer side of the door, a longitudinally movable shaft which extends through the door and is connected with said lock, intermediate mechanism connected with said shaft provided with a key slot and a key which fits in said slot and is adapted to actuate said intermediate mechanism and release the lock by a straight line push whereby the said hinged catch may be turned and the door opened by a continued straight line push after the lock is released.

the opposite side of the door by a straight
line push at right angles with the plane of the
door, an automatic lock which normally pre-
vents the catch from being turned by a push
5 on the outer side of the door, mechanism con-
nected with said lock having a key slot, a key
which fits in said slot and is adapted to re-
lease said lock by a straight line push from
the outer side of the door whereby the said

hinged catch is free to turn when continued 10
pressure is applied to the door.

In testimony whereof I affix my signature,
in presence of two witnesses.

CHARLES SMITH.

Witnesses:

WILLIAM A. COPELAND,
ALUIE TARR.