

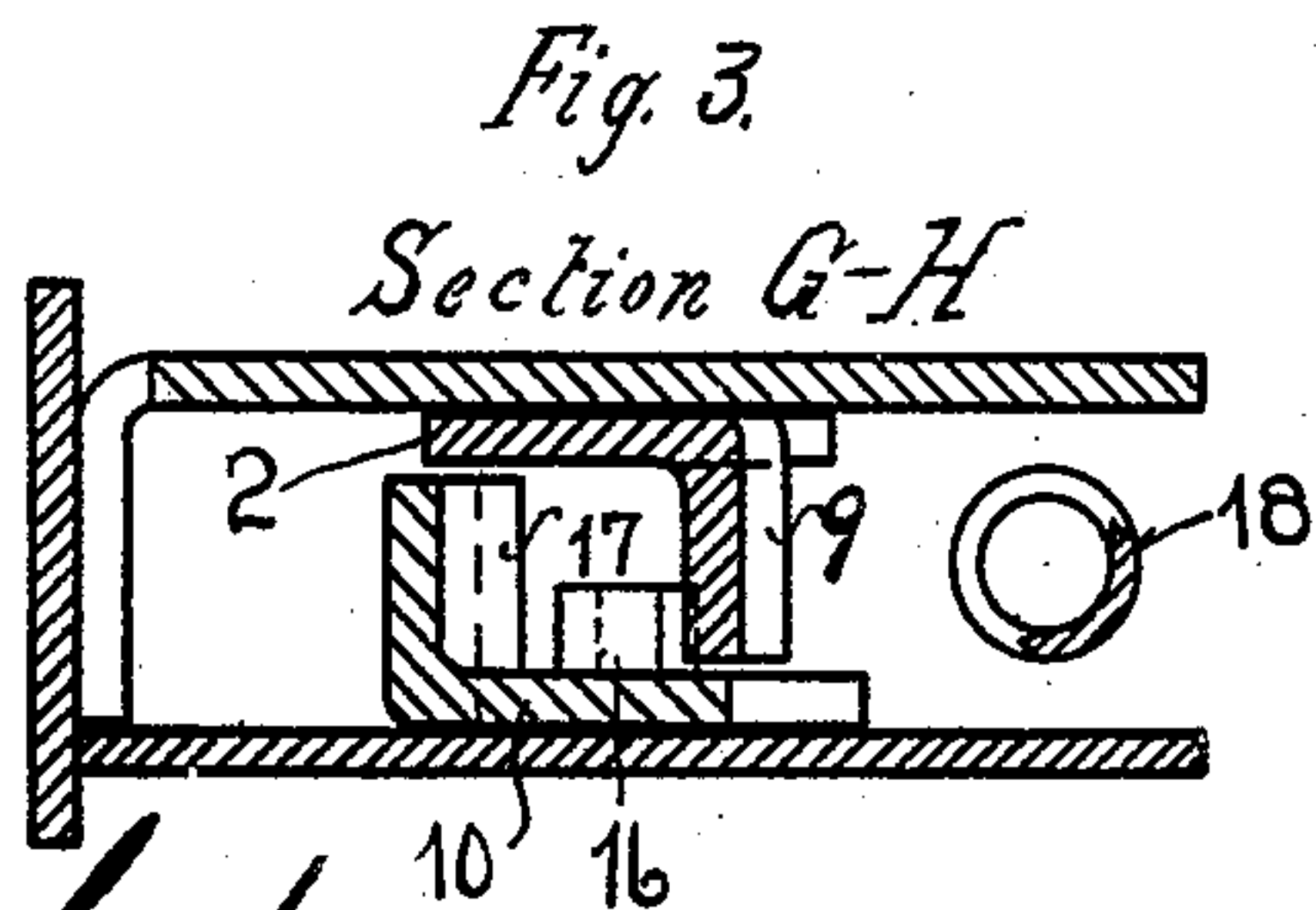
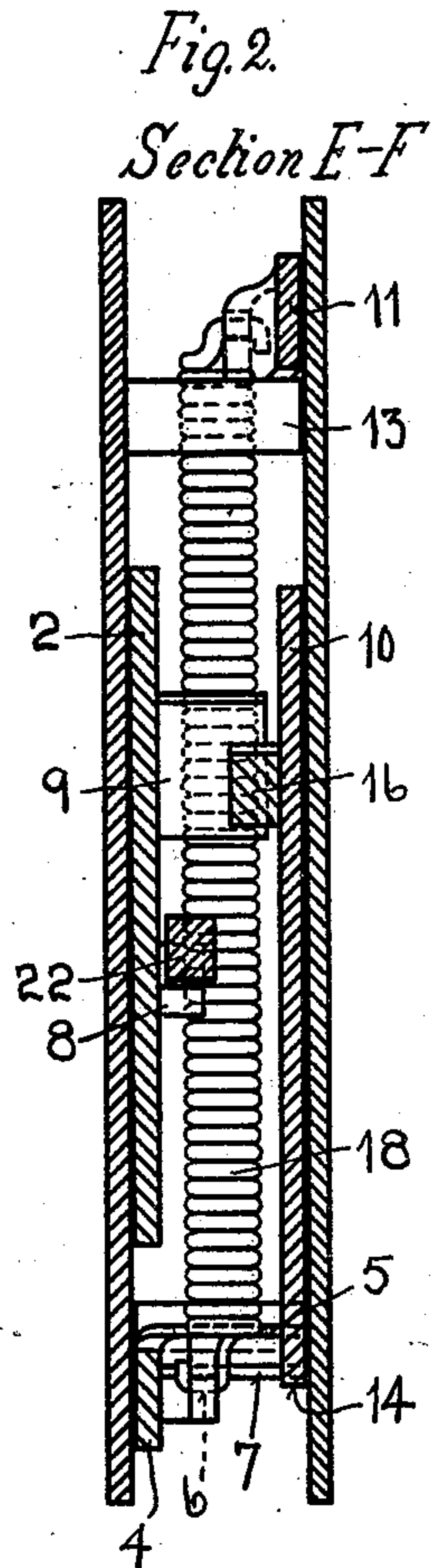
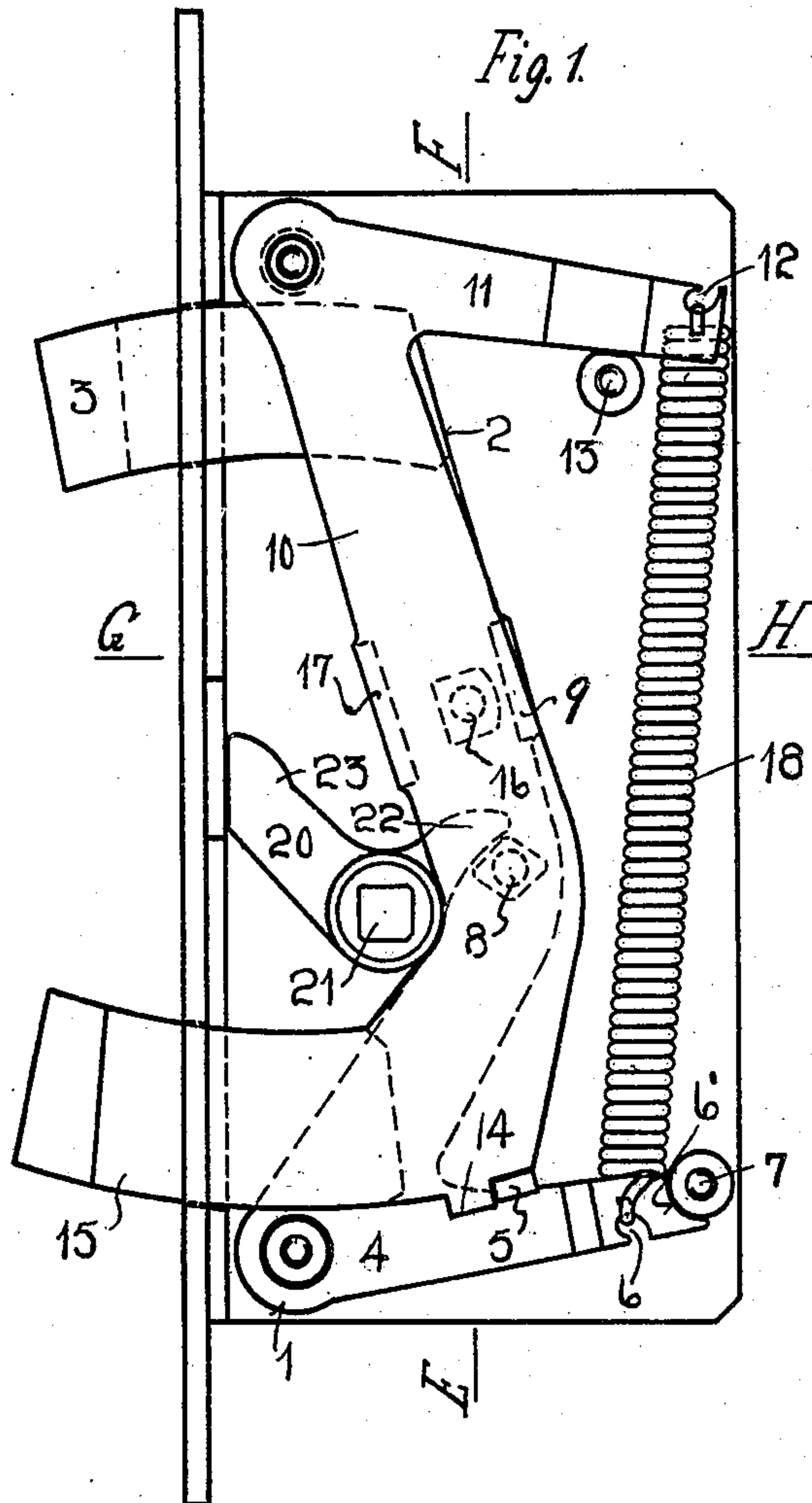
No. 886,538.

PATENTED MAY 5, 1908.

A. NATHAN.
SELF CLOSING LOCK.

APPLICATION FILED MAR. 10, 1905.

5 SHEETS—SHEET 1.



Witnesses:
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Engineer
Alfred H. Blomann, Eng.

Inventor
Arthur Nathan

No. 886,538.

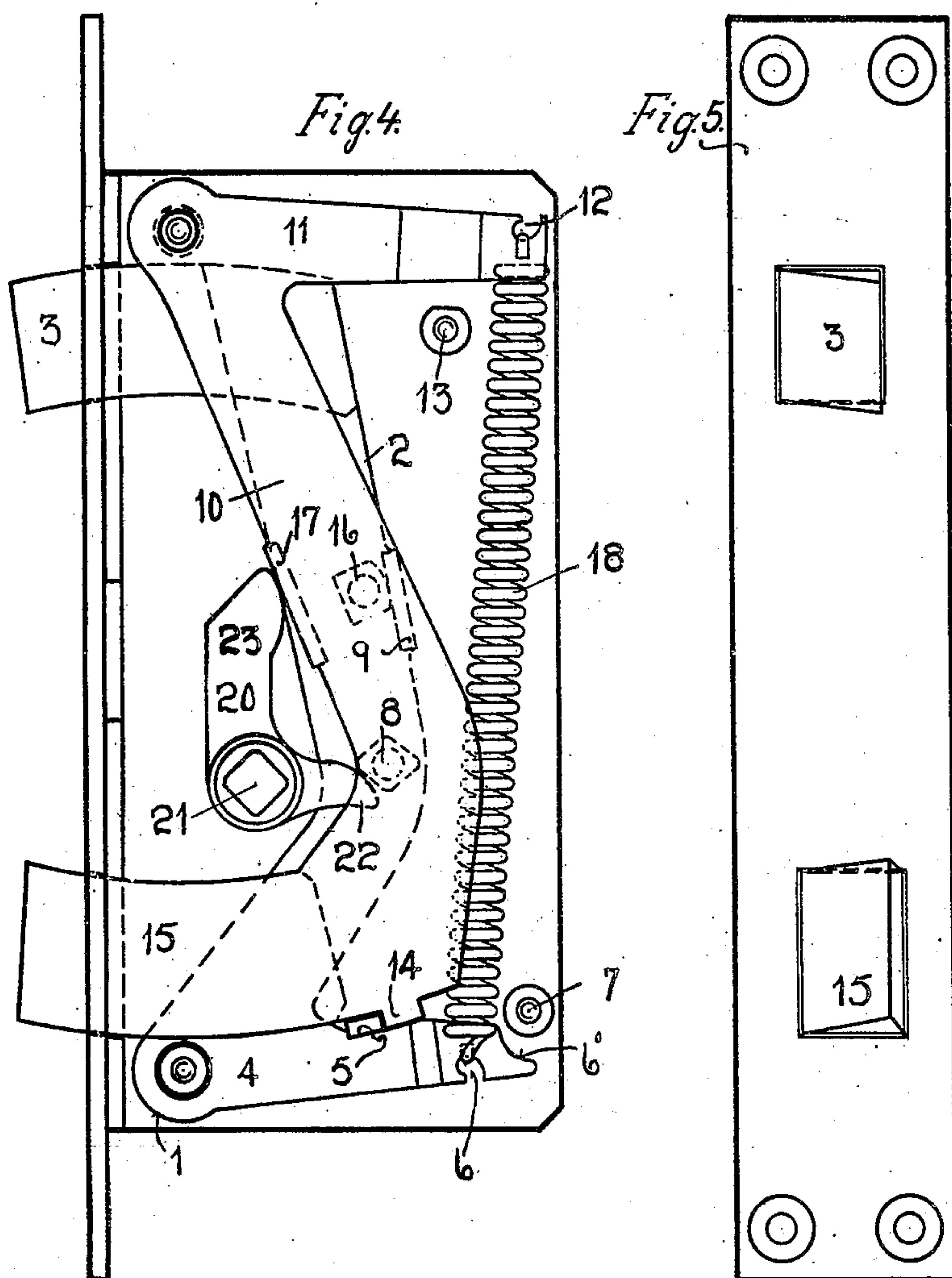
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6 SHEETS—SHEET 2.



Witness:
Arthur H. H. H.
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Inventor.
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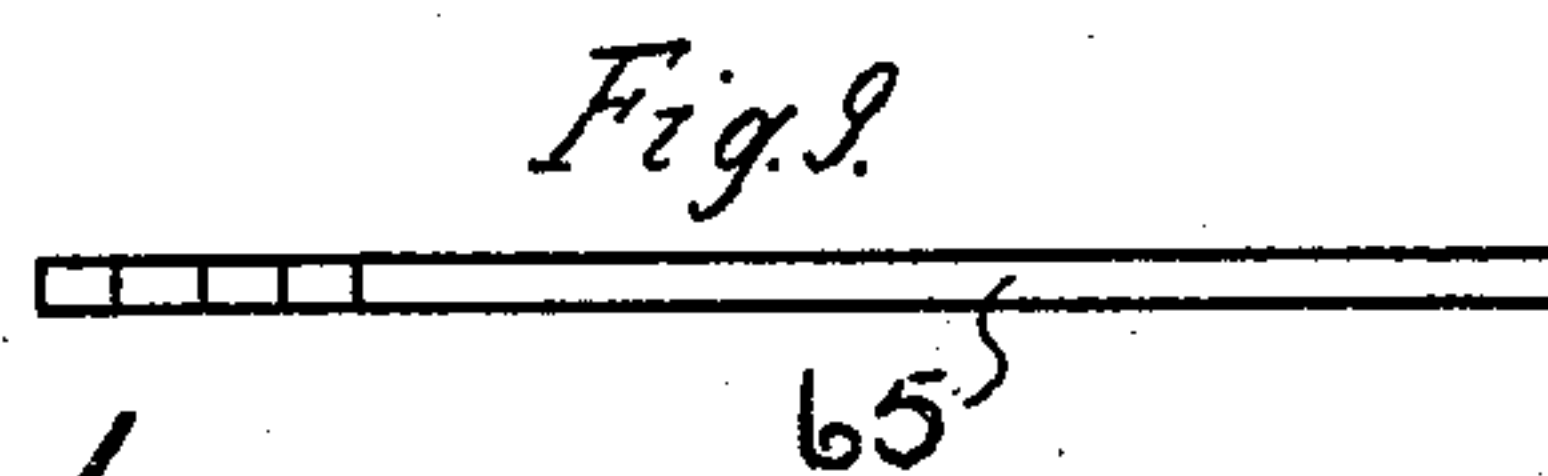
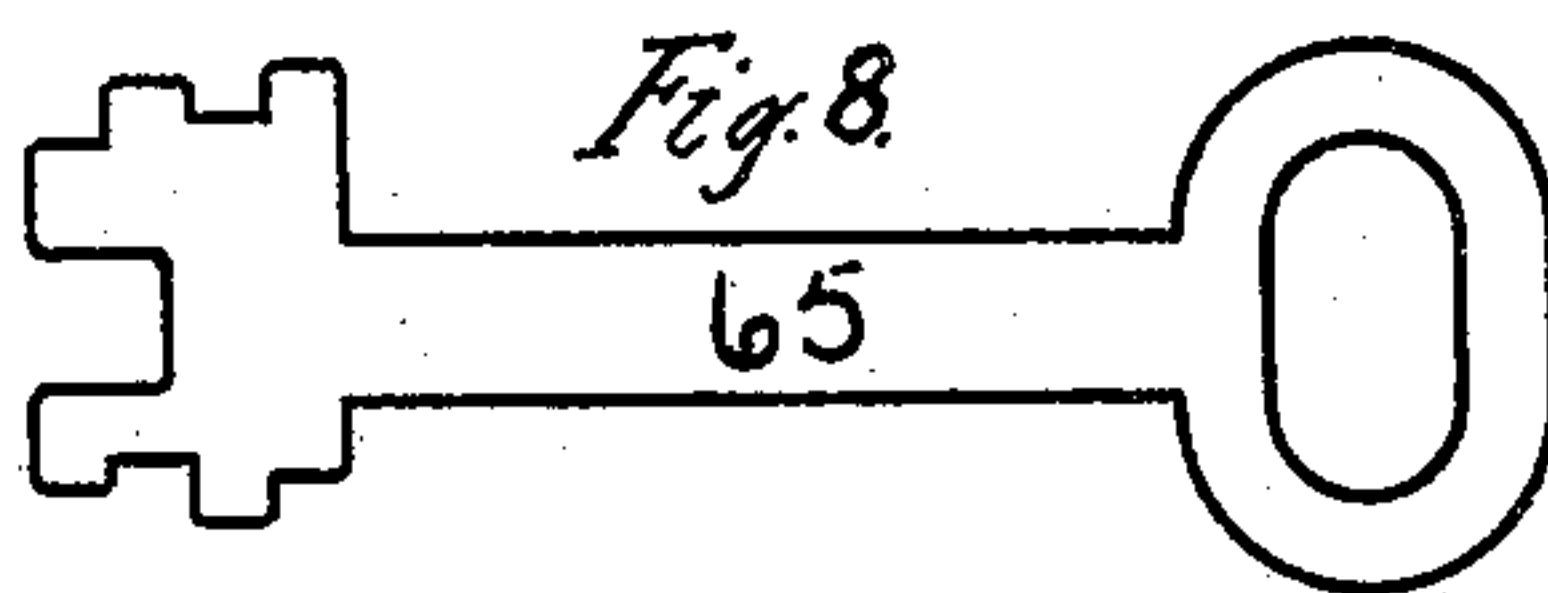
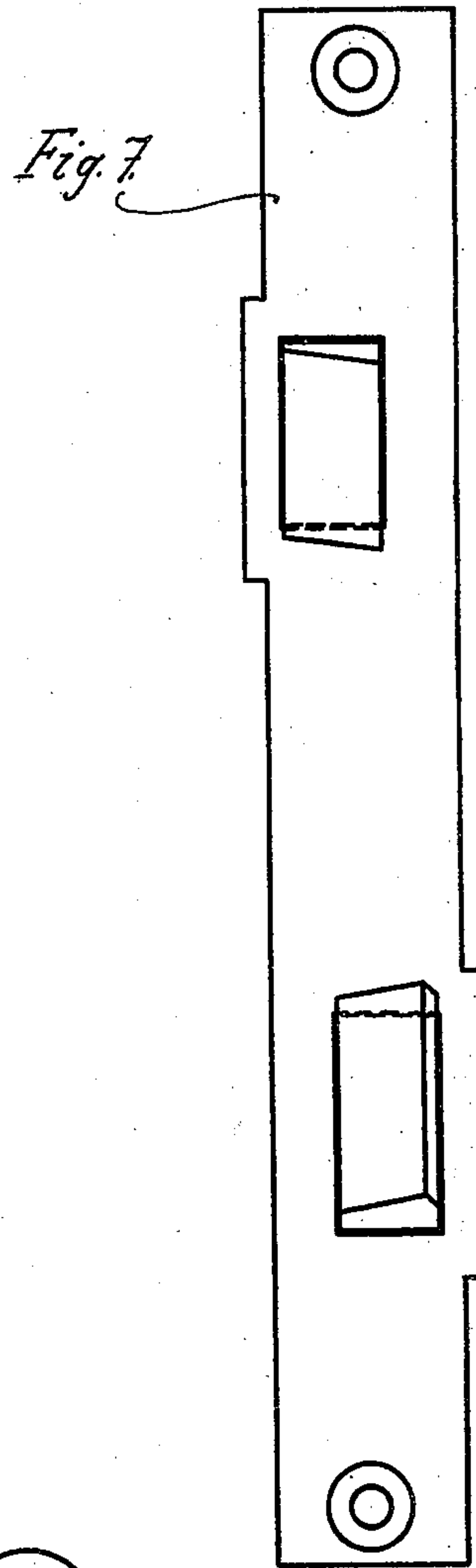
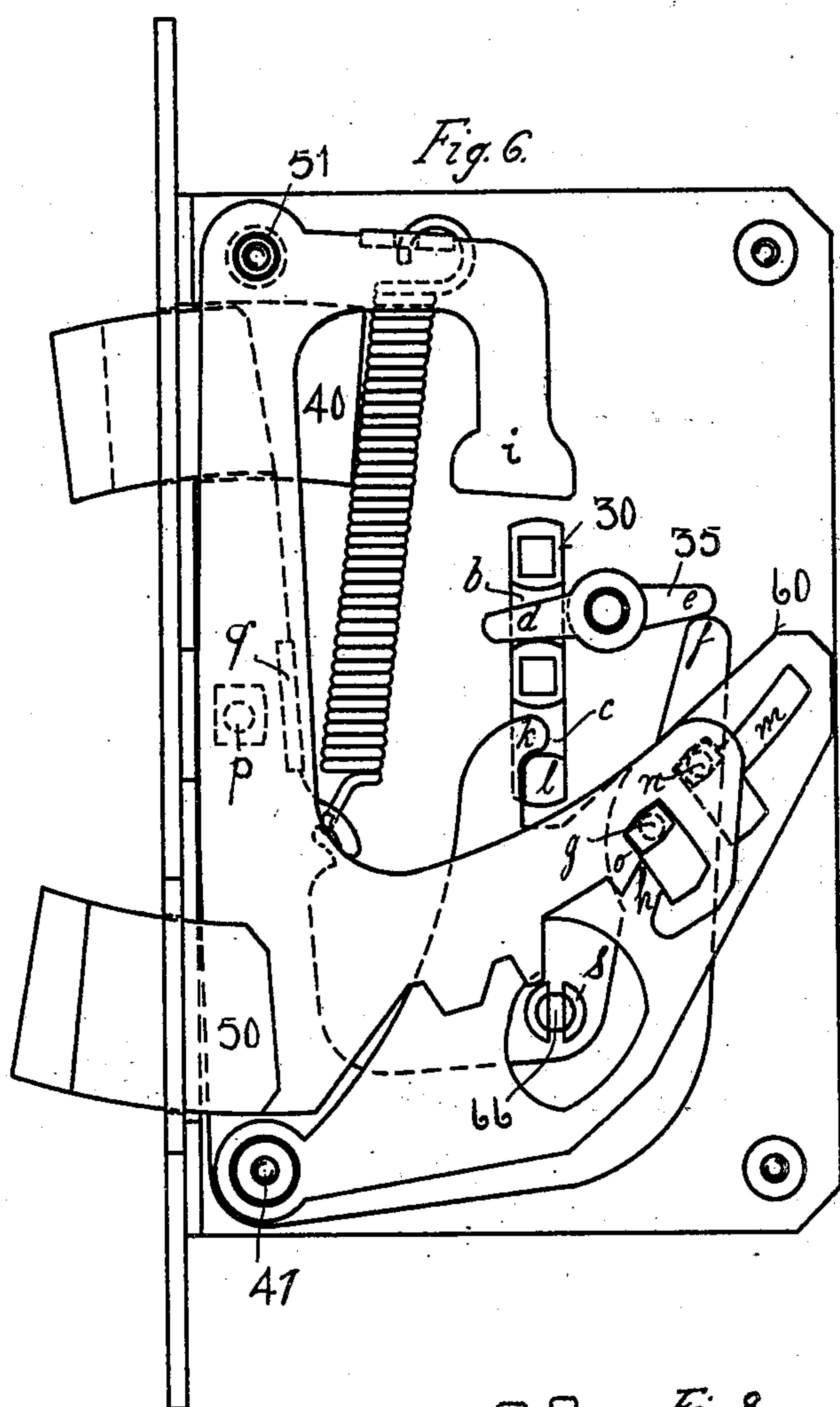
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5 SHEETS—SHEET 3.



Witness:
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5 SHEETS—SHEET 4.

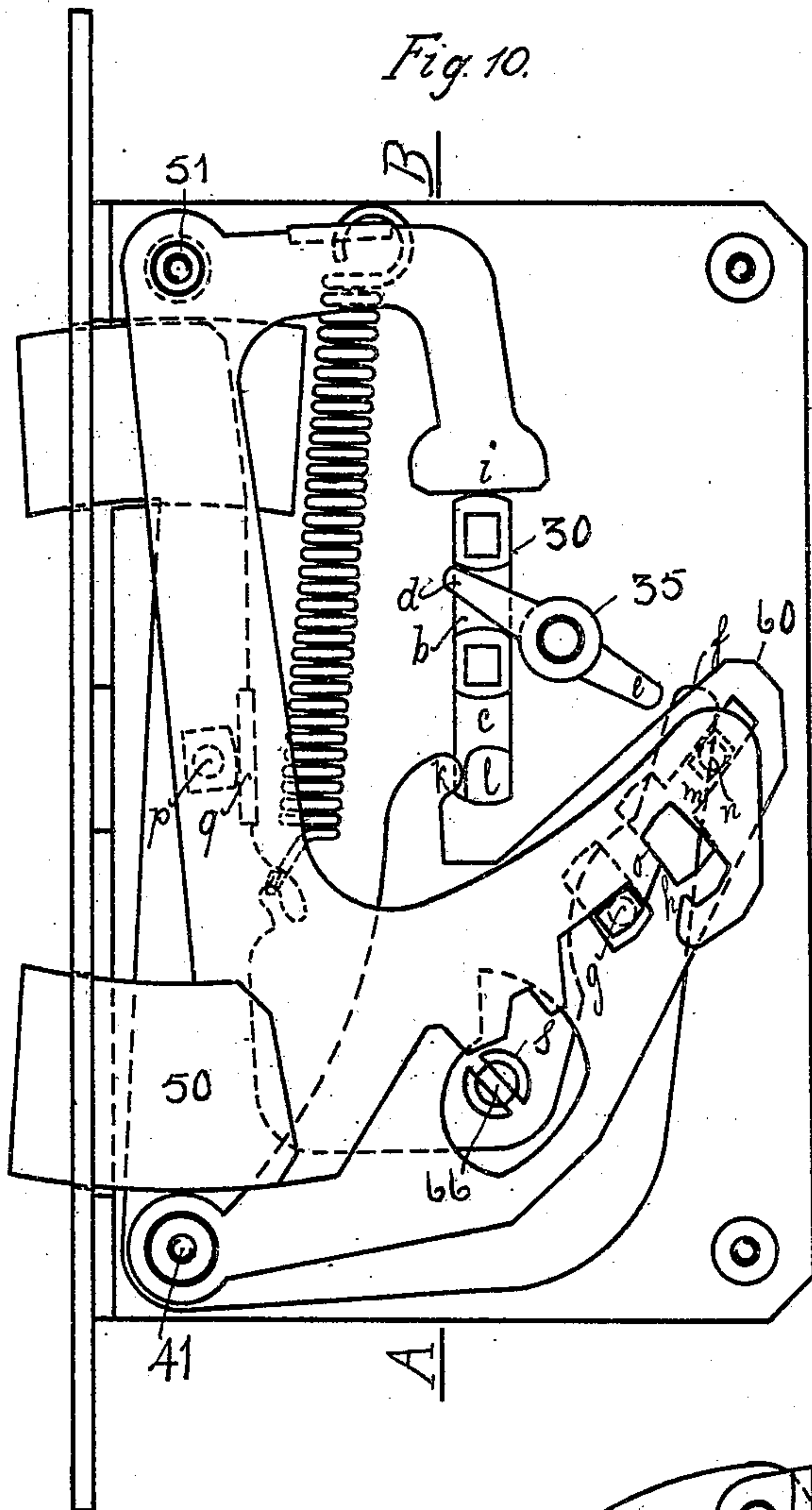
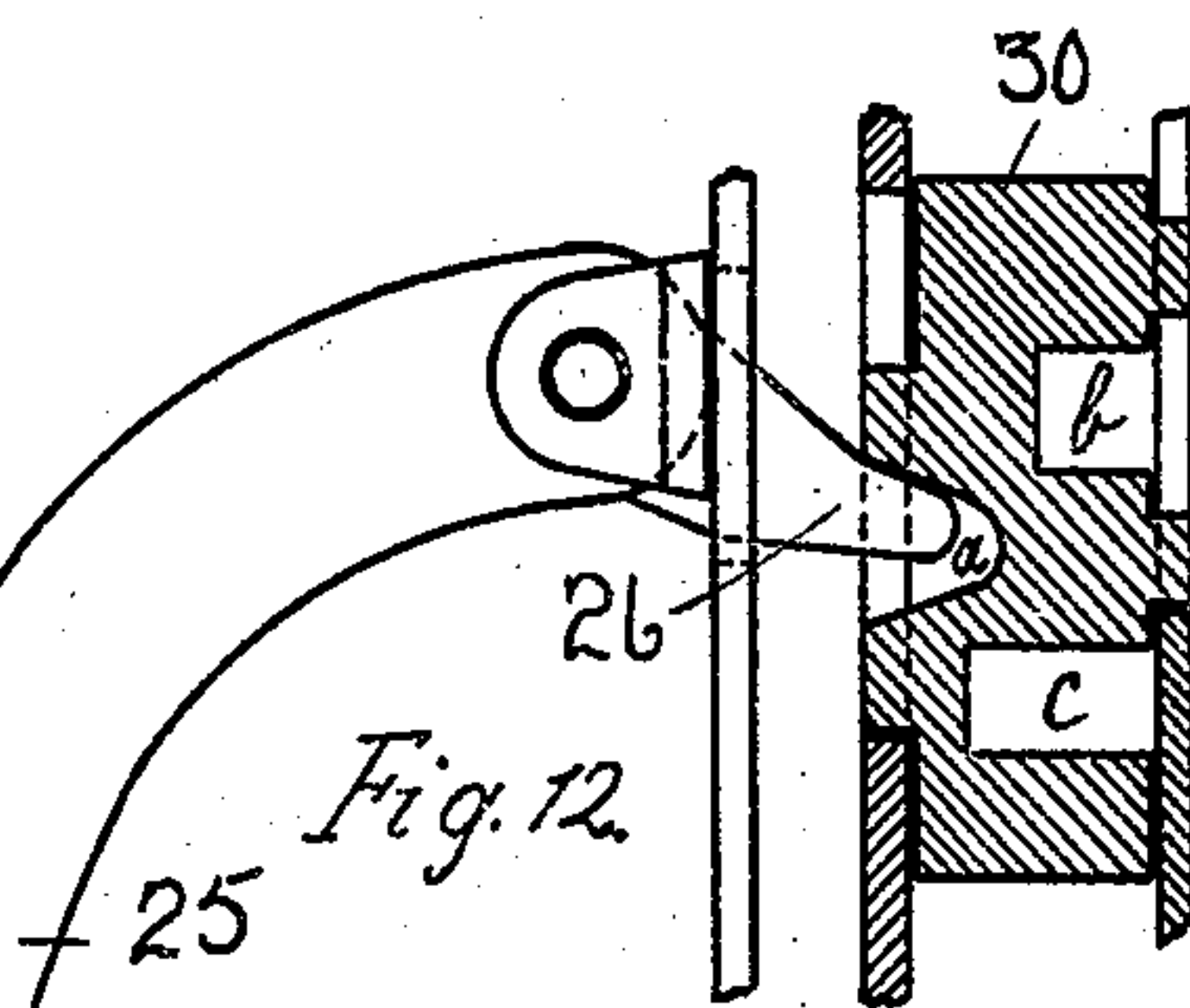
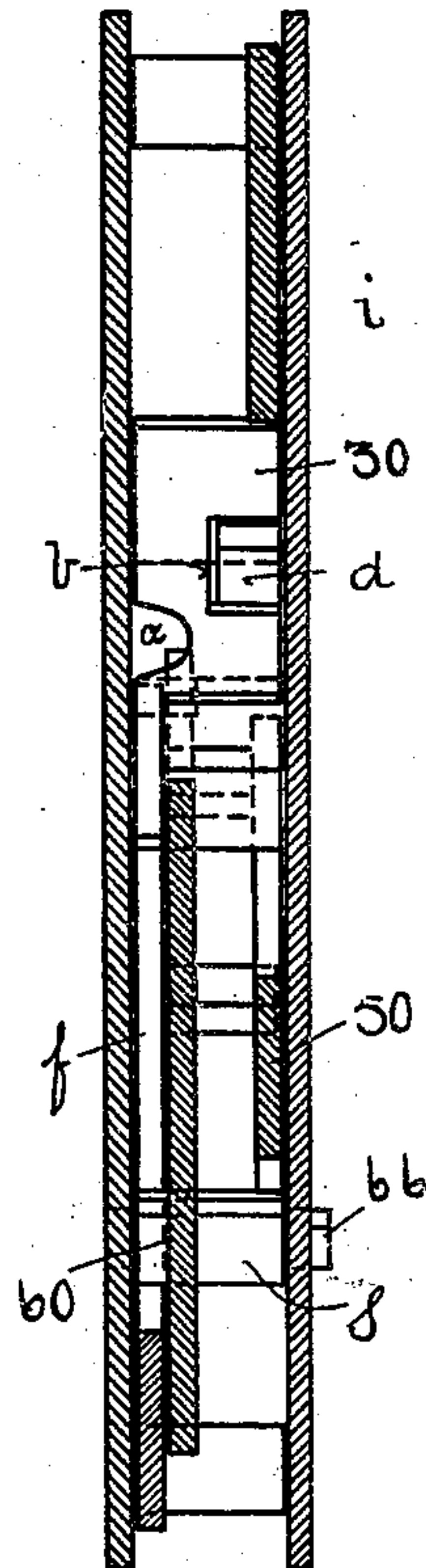


Fig. 11.
Section A-B.



Witnesses:
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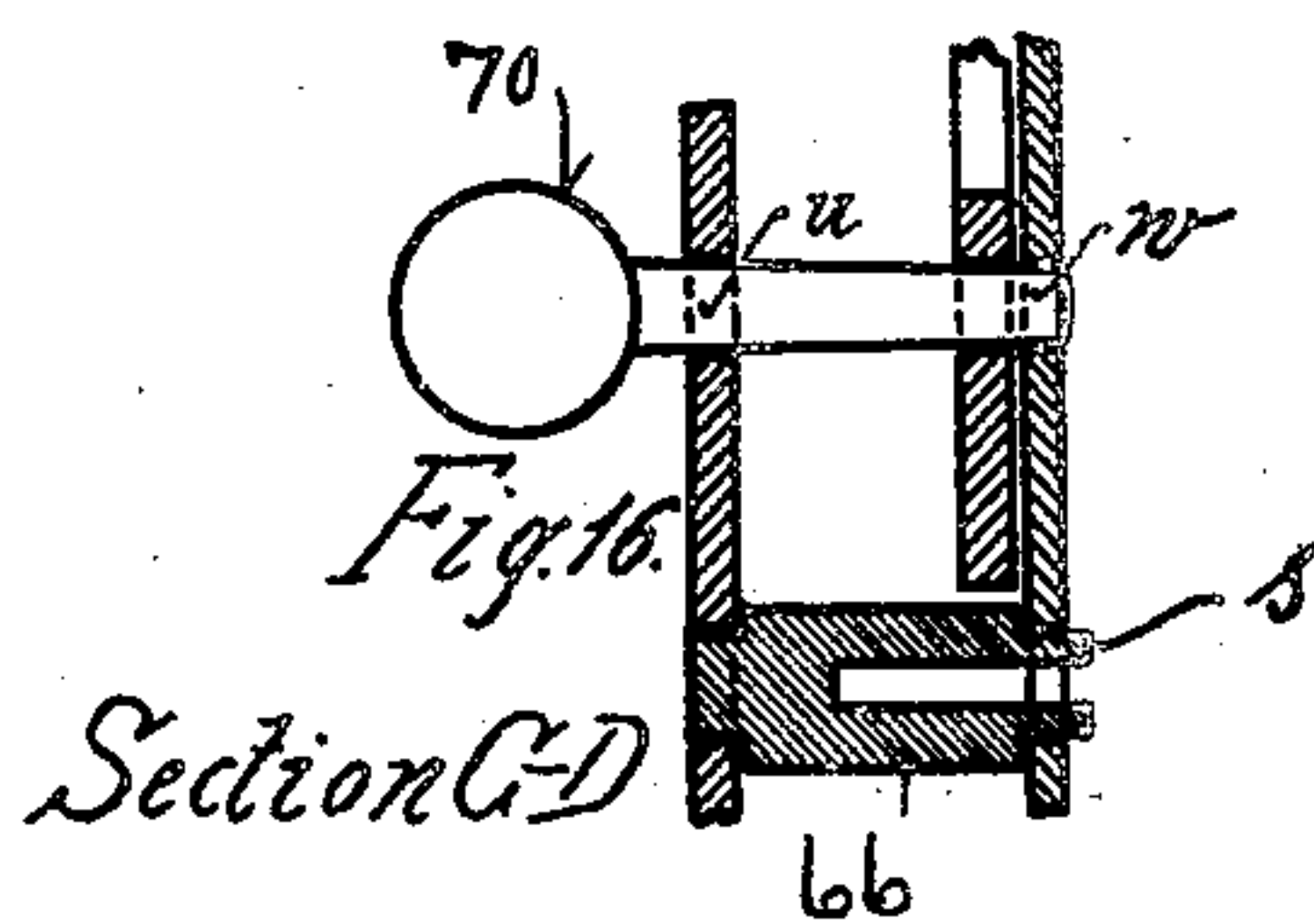
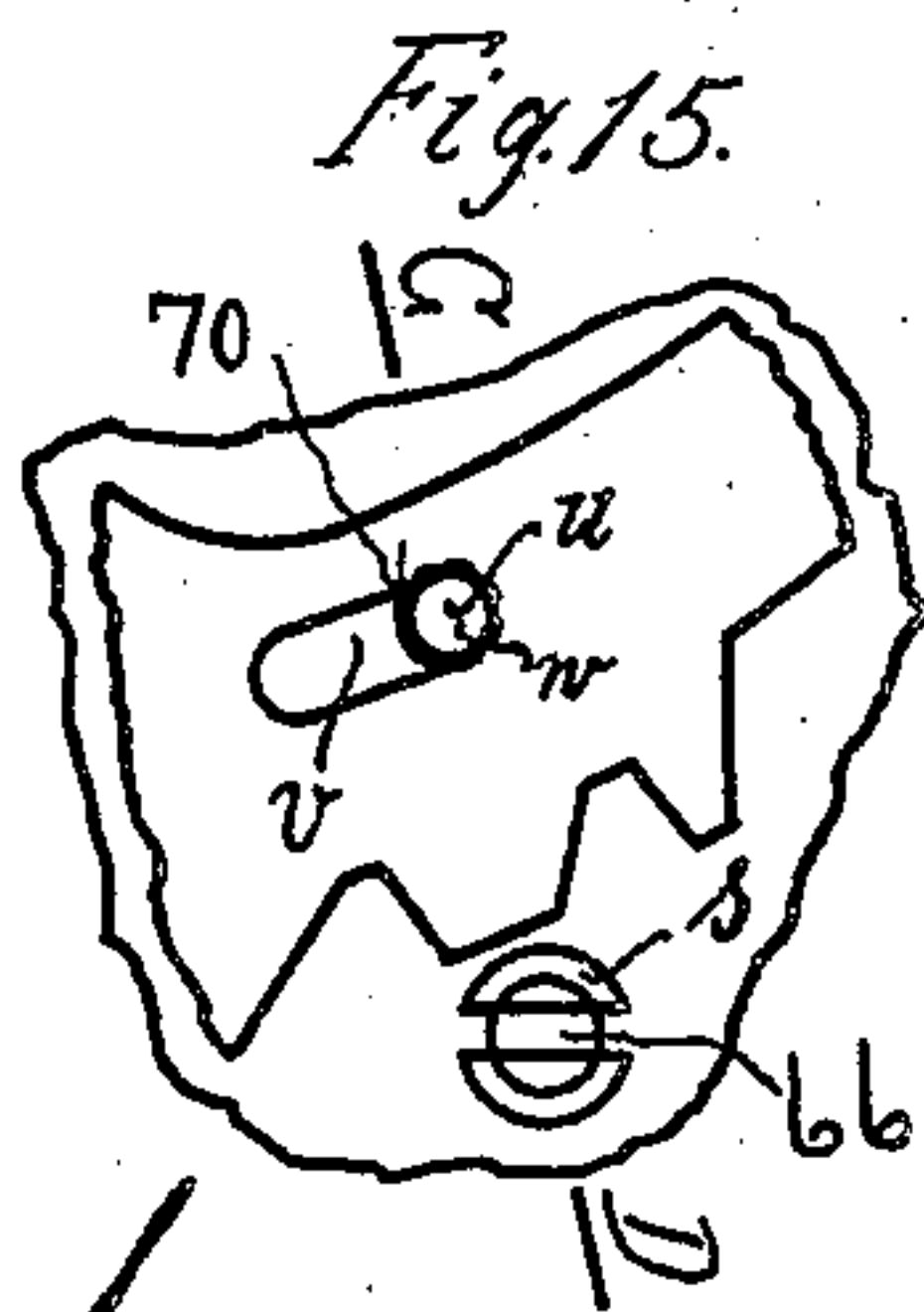
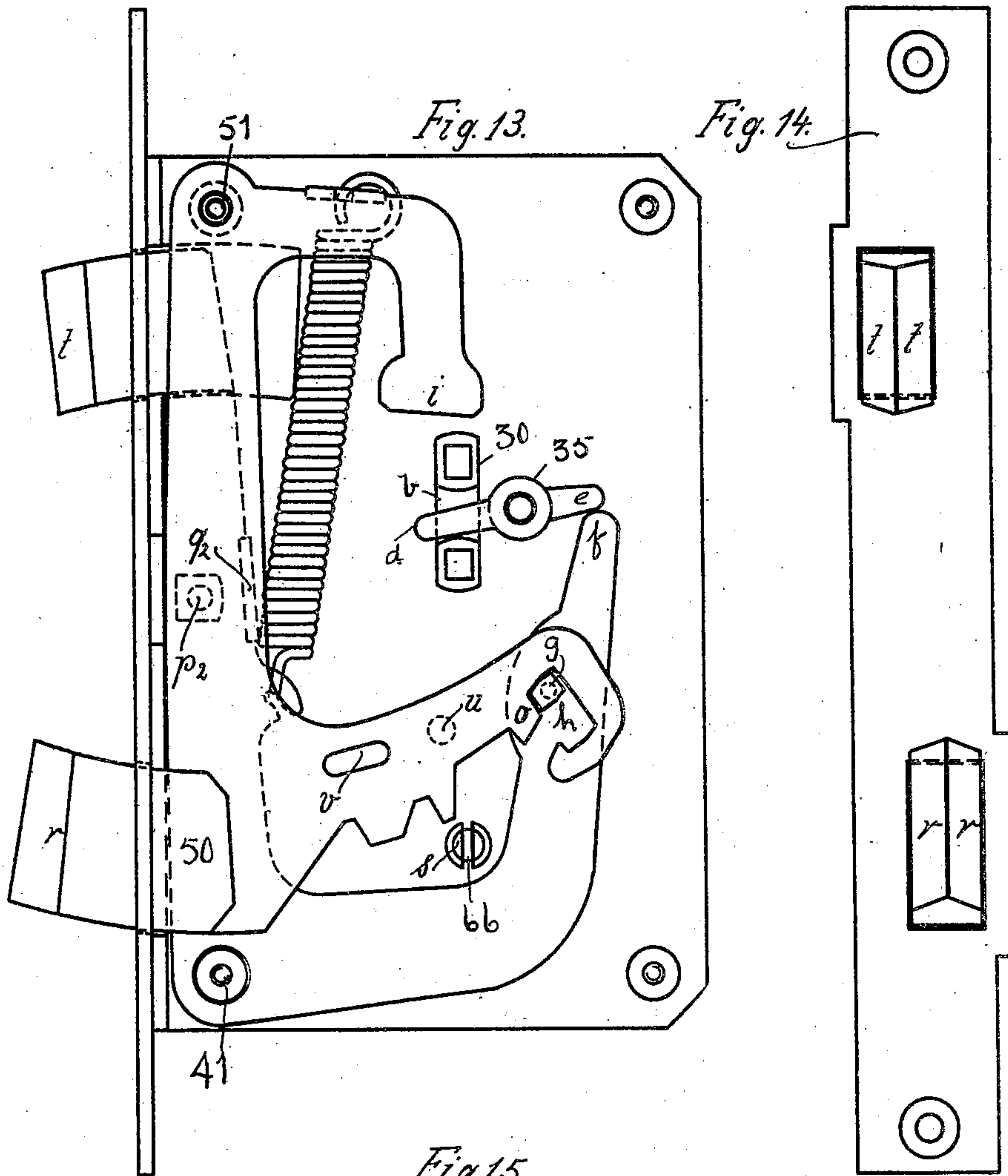
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A. NATHAN.
SELF CLOSING LOCK.
APPLICATION FILED MAR. 10, 1905.

5 SHEETS—SHEET 5.



Witness:
Arthur Nathan
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Alfred Hilborn, Eng.

Inventor
Arthur Nathan

UNITED STATES PATENT OFFICE.

ARTHUR NATHAN, OF CHARLOTTENBURG, GERMANY.

SELF-CLOSING LOCK.

No. 886,538.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed March 10, 1905. Serial No. 249,496.

To all whom it may concern:

Be it known that I, ARTHUR NATHAN, a citizen of the Kingdom of Prussia, residing at 87 Goethestrasse, Charlottenburg, Berlin, Prussia, Germany, have invented certain new and useful Improvements in Self-Closing Locks, of which the following is a specification.

The invention relates to a self-closing lock, which is adapted to be used according to the type in which it is made for railway car doors, house and hall doors, and the like.

One object of the invention consists in making the bolt and latch as bell-cranks turning on center points and connected with each other by a movable spring in such a manner that a nut, or slide in connection with a double-armed lever or double-bitted key operated from outside will first raise the latch and the tumblers and then move back the bolt simultaneously with the latch.

A further object consists in the feature that the said spring catches the bell-crank levers of latch and bolt in such a manner, that a heavier pull is exercised on the bolt than on the latch, so that the bolt, on the closing of the lock will more rapidly come into locking position than the latch.

With these and other objects in view the invention consists in the novel construction and combination of parts as will be hereinafter fully described and claimed.

In the accompanying drawings,—Figure 1 represents a side elevation of a lock designed for railway car doors, the lock being in closed position and the cover-plate of the casing being removed; Fig. 2 is a vertical section, taken on lines E—F of Fig. 1; Fig. 3 represents a horizontal section, taken on lines G—H of Fig. 1; Fig. 4 represents a view similar to that shown in Fig. 1 with the bolt and latch moved back one turn; Fig. 5 shows a front elevation of the lock; Fig. 6 represents a side elevation of a lock designed for use on hall doors, the lock being closed; Fig. 7 represents a side elevation thereof; Figs. 8 and 9 represent a plan and a side view, respectively, of a double-bitted key used in connection therewith; Fig. 10 represents a side elevation of the lock shown in Fig. 6, with the bolt and latch turned back one turn, and the inner parts in corresponding position; Fig. 11 is a vertical section, taken on lines A—B of Fig. 10; Fig. 12 is a side elevation of the outside handle, used in connection with this form of

lock and a vertical section of a portion of the lock; Fig. 13 shows a side elevation of a lock for house doors and passage doors; Fig. 14 is an end view of this lock; Figs. 15 and 16 show details of a device for putting out of action the locking mechanism shown in Figs. 13 and 14.

Referring more particularly to the form of lock shown in Figs. 1 to 5 of the drawings, numeral 1 refers to the latch, which in this form of lock, is made in the form of a bell-crank lever and serves as a tumbler for the bolt also formed as a bell-crank lever. The bell crank of the latch 1 is curved in the form of an S and is pivoted to the lock casing near its bottom in the bend between the long arm 2 and the lower short arm 4 of the bell-crank. This lower, rearwardly - extending arm 4 of the bell-crank latch 1 has a block or lug 5, projecting laterally from its upper edge, and a notch 6 formed in its lower edge near the end thereof for receiving one end of a spring 18, the terminal of this arm 4 having a curved recess 6' for engaging a roller 7 mounted on the lock casing to hold the latch in proper locking position against the tension of its spring and prevent it from moving too far out. A lug or pin 8 projects laterally from the face of the long arm 2 of the latch member at a point a little below its center in position to be engaged by an operating lever 20, hereinafter described. This arm 2 is also provided at its rear edge, at a point near its center, with a lug 9 for operation in conjunction with a pin or lug on the bolt member now to be described.

The bell-crank 10 which constitutes the bolt member is also curved in a manner corresponding to that of the latch 1 and is fulcrumed to the upper end of the lock casing with its upper, rearwardly-extending arm 11 made slightly longer than the corresponding arm 4 of the latch member. This arm 11 has a notch 12 in the upper face of its free end, to which the other end of the spring 18 is connected, and the lower face of said arm bears on a roller 13 mounted in the casing for limiting the downward movement of said arm 11. The long, middle part of the bolt member 10 extends to a point near the bottom of the casing and is provided with a forwardly-projecting locking arm 15.

The forwardly projecting locking arm 15 of the bolt member—the bolt proper—as well as that of the latch member—the latch

proper—is thickened as indicated in dotted lines in Figs. 1 and 4 and may be seen from Fig. 5 in connection with Fig. 2. The rear end of the arm 15 is provided at its lower edge with a downwardly projecting lug 14, lying in engagement with lug 5 of the latch member 4, said lug 5 projecting laterally from the latch arm 4 in the direction against the bolt member. The middle portion of the bell-crank 10 is provided near its center with a pin 16, arranged to engage the lug 9 of the latch member 2 and has a laterally extending lug 17 on its inner edge to engage with an operating lever 20, now to be described. The operating lever 20 for these double bell-cranks, or Z-shaped members 1 and 10, is preferably made in the form of a double-armed, approximately V-shaped nut with an angular opening 21 at the junction of said arms for the reception of a handle shank, not shown. When the door is locked, the cam arm 22 of this member 20 is disposed over and adjacent to the pin 8 of the latch 1 with its lower face adapted to engage said pin. To open the door, the member 20 is turned by means of an outside handle to bring the cam arm 22 against the pin 8 and move this pin downward by such turning of cam 22. Pin 8 being attached to the bell-crank of latch 1, this lever will turn around its pivot, part 4 of it moving downward and part 2 with the thickened locking part moving downward and at the same time backward in the direction against spring 18. By the downward movement of part 4 its lug 5 is disengaged from the rear edge of the lug 14 on the bolt 10. By the backward movement of part 2, pin 8 moves from cam arm 22 while by the turning of lever 20 its arm 23 approaches lug 17 of the bolt member. On further turning lever 20 arm 23 will come into engagement with lug 17 and thereby will begin to turn the bolt member 10 around its pivot, the long middle part and the locking part 15 with the lug 14 being moved backwardly in the direction against spring 18 in such turning. After the beginning of this backward movement pin 8 is released from arm 22 and this arm passes beneath said pin by the turning of lever 20. In spite of this disengagement the latch member 1 cannot return now into its starting position under the action of spring 18, because lug 5 of the latch part 4 is stopped by its upper edge lying against the lower edge of the backwardly moved lug 14. As the arm 22 now lies below the pin 8, the latch will not be moved when lever 20 is turned further on and the lug 14 will slide past the lug 5. On completion of this second turning period, the latch will advance again a little the moment the lower edge of the lug 14 leaves the upper edge of the lug 5, as the lug 5 is pressed into the recess in front of lug 14 under the action of spring 18. By this returning movement

of the latch member the latch lug 9 comes into contact with the bolt pin 16 and the parts are now in the position shown in Fig. 4. During the third and last turning period, the bolt and latch are simultaneously drawn back, the lug 9 pressing against the pin 16 and the arm 23 against the lug 17, and the door can then be opened. In this last period the lugs 5 and 14 are disengaged, lug 5 being moved downwardly and lug 14 backwardly. On releasing the handle or knob, the latch and bolt will advance only far enough to permit their bevel edges to project as shown in Figs. 4 and 5. This is caused by the latch lug 5 moving again upwards and the bolt with the lug 14 at the same time advancing so that lugs 5 and 14 come again into contact. When the lug 14 and the lug 5 are in contact, the latch and bolt are prevented from advancing any further.

On closing the door by slam, the bolt and latch come into locking position in the following manner: The latch and bolt bell-cranks being connected at their respective ends by a long, cylindrical, coiled spring, and the lever arm on which the spring acts for the bolt being of greater length than that of the latch, there is a greater pull exerted on the bolt than on the latch, therefore, the moment the door falls into the frame, the bolt will first catch and the latch will follow. By the bolt coming first into locking position, the lug 14 and the pin 5 do not come into contact and are not stopped thereby. Therefore, both bolt and latch will automatically go into full locking position. The unequal pull of the spring thus causes the bolt to shoot forward first. The handle or knob, by means of the lever 20, is turned at the same time into locking position in the following manner: On releasing the handle, the lever 20 is turned back, under influence of the spring, by the bolt lug 17 acting against the arm 23 of the nut 20. By the bolt first advancing and the latch pin 8 being, at this moment, in a corresponding distance from the fulcrum of the nut, the cam arm 22 will be moved above the pin 8, and the latter will, on advancing of the latch entirely turn back the nut into its original position, (shown in Fig. 1.) The other forms shown, differ from that above described only in the mode of opening by means of the handle and by using a double-bitted key from the side opposite the handle.

In the forms shown in Figs. 6 to 16, the handle 25, provided on the inside of the door moves in a plane perpendicular to the plane of the door, projecting into a notch of the slide 30, (Fig. 12). The movement with the hand, by means of this handle, will favor the self-acting closing of the door. This is accomplished when the handle has its position upwards or downwards, according to the direction into which the door is to be opened.

If the door is closed, and the handle kept in the hand, the pressure effect is such that when the door rests in the frame, the pull of the spring is increased the moment when the lock comes into locking position. To permit the employment of a handle projecting from the door, the usual nut is replaced by a slide 30 which will slide up or down according to the movement of the handle. This slide 30 transfers its motion partly also to a pivoted, double-armed lever 35, which, together with the slide, corresponds in its action with the lever 20 of Figs. 1 to 4. The slide further provides for the use of special tumblers for the key. In the form for hall and house doors, shown in Figs. 6 to 12, the locking operation is as follows: If the door is opened from inside, the handle 25 is raised vertically. The handle 25 is preferably made in the form of a double-armed lever, the shorter arm 26 of which catches into a notch *a* of the movable slide 30. The slide 30 has apertures *b* and *c*, in that surface which faces the interior of the lock casing, and the arm *d* of the pivoted lever 35 catches into the aperture *d*, and the other arm *e*, of said lever, engages with the latch end *f*, as shown in Fig. 6. The latch 40 and bolt 50 are both bell-cranks, the pivots 41 and 51 of which are at opposite ends of the lock.

The lower rearwardly extending arm of the latch lever 40 is bent upwardly at its free end to form the part *f*. The upper rearwardly extending arm of the bolt lever 50 is bent downwardly at its free end, to form the part *i*, which may engage with the upper end of the slide 30. The lower part of the lever 50 is provided with a rearwardly extending arm opposite to the bolt proper. The part *f* of the lever 40 corresponds to the pin 8 of the lever 1 of the first described form of lock, the part *i* of the lever 50 to the lug 17 of the lever 10, the pin *p* of the bolt member 50 to the pin 16 of the bolt member 10 and the lug *g* of the latch member 40 to the lug 9 of the latch member 1. The attaching notch for the spring on the latch member in this form of lock is arranged on its long middle part. Now, though the distance of this notch from the pivot 41 is greater than the distance of the notch in the upper rearwardly extending arm of the bolt lever 50 from the pivot 51, nevertheless the distance of the intersections of the axis of the spring 8 on the bolt and latch members from the said pivots is greater on the bolt member than on the latch member, just as in the case of the Figs. 1 to 5. Therefore also in this second form of lock a heavier pull is exerted by the spring 18 on the bolt than on the latch. By moving the outer handle 25 down, the slide 30 is first moved upwards, carrying with it the end *d* of the lever 35, the end *e* thereof is moved down and forces the arm *f* of the latch down and the latch 40 is withdrawn until the pin *g* pro-

vided on the rearwardly projecting part of the latch 40 and corresponding to lug 5 of the first form of lock, reaches the slot *h* in the lower rearwardly extending arm of the bolt member 50, and then the slide 30 strikes at the top against the depending arm *i* of the bolt 50 and forces it up and the bolt is thereby partly withdrawn. After this withdrawal of the bolt is commenced, the pin *g* will glide through the slot *h* and the arm *e* of the lever will move out of contact with the end of the latch. During the first part of these movements, the slide 30 has raised the tumbler 60 for the key, by means of the tumbler arm *k*, which projects into the opening *c* of the slide and is pushed aside by the shoulder *l* of it. The tumbler 60 is disposed on the same fulcrum 41 as the latch 40 and is raised until the slot *m* in the tumbler is opposite a pin *n* arranged on the bolt 50 near the free end of its lower rearwardly extending part. When the bolt commences to move backward by slide 30 striking against part *i*, the pin *n* will slip into the slot *m*. These movements are terminated as soon as the pin *g* has passed the slot *h*. The pin *g* touches the lug *o* of the bolt 50 corresponding to the lug 14 of the first form of lock while passing through the slot *h*, and the bolt is then held by the latch falling back a small turn and is prevented by the pin *g* through lug *o* from completely locking on the completion of the first turn, when the parts are in the position shown in Fig. 10. After the latch has advanced, the lug *g* of the latch 40 will rest against the pin *h* of the bolt 50. The slide 30 thus bearing only against the arm *i* of the bolt, the withdrawal of the latch and bolt is effected during the last half turn by the bolt pin *p* bearing on the latch. The tumbler 60 remains in the same position during the last half turn and will not bar the passage, and the pin *n* will slide to the end of the slot *m*. The door now being open, the outside handle is released, and the latch and bolt return half a turn and are held in the above described manner by the pin *g* meeting with the tooth *o*. When the door is pushed to, the latch and bolt will give way under the effect of the projecting bevel surfaces and come together with the other parts into locking position in the following manner: As described in connection with Figs. 1 to 5, the bolt will first slip out and the latch will follow and the pin *g* again slides through the slot *h* and pin *n* through the slot *m* of the tumbler and the lever slide 30 and outside handle 25 return into their original position, the same movements being made as described above, but in the reverse direction. When the door is opened from the outside with a stepped, double-bitted key 65, shown in Figs. 8 and 9, the various movements follow in the known manner, the lever 35, slide 30 and handle 25 are not moved, but one bit will act on the latch and release the same,

while the other bit will release the tumbler and turn back the bolt, notches being arranged for this purpose in the lower rearwardly extending parts of the bolt member, and the latch and bolt will yield in opposite directions. As a guide for the double-bitted key 65, a pin 66 is provided both in the back and in the cover of the lock. The tongues *s* of the pin open elastically and hold by means of friction the pin in a given position. Any number of tumblers may be used, as desired, herein only one tumbler being shown for the sake of simplicity.

A special form for house and passage doors is shown in Figs. 13 to 16. For the purpose of making the key with few steps, special tumblers have been omitted, but also here according to the style of lock as many tumblers may be employed, as desired. In the form shown in Figs. 13 to 16, no tumblers have to be raised and the slide is more simple, and the above-described bolt pin *n* is dispensed with. But in other respects, especially as to the opening and closing operation, this form of lock operates in the same manner as that shown in Figs. 6 to 12. For opening the door when using this form of lock, an outside handle projecting vertically, just as that shown in Fig. 12, is pressed and after a certain stroke, the latch and bolt reach the position in which they hold each other in intermediate position. On the stroke being continued, the bolt pin *p*² pressing on the latch lug *q*² will push the latch entirely back. On the door being closed, the latch and bolt will slide back by means of the projecting bevel surfaces, the bolt slips forward first the same as in the other forms and the other parts return into their original position.

For house and passage doors, it is desirable not to use a key and a stop gear is here provided for the purpose of putting the lock out of action and prevent the latch and bolt from coming into locking position. This is accomplished by inserting a taper pin 70 through the inside of the door and the lock. See Figs. 15 and 16. After the lock has been opened, the slot *v* in the rearwardly projecting part of the bolt member is above the holes *u* and *w* of the plates of the lock casing, and when the pin is inserted, the bolt is prevented from slipping forward, in consequence of which, the latch also will move forward only half a turn, the latter being held in the above-described manner in intermediate position. The bolt and latch have each two bevel surfaces *r*, *r*, and *t*, *t*, respectively, and can therefore yield both when the door is opened and closed. The door will thus open on a pressure exerted from the inside or the outside. The plug pin 70 allows the bolt to advance only so far as the length of the slot *v* will permit, and the length thereof corresponds to half a turn.

What I claim as new, and desire to secure by Letters-Patent is,—

1. In a self-closing lock and latch, the combination of a bell-crank latch member, a bell-crank bolt member, a spring connecting the arms of said members, the arm of the bolt member to which the spring is connected being longer than that of the latch to provide for a heavier pull on the bolt than on the latch and cause it to close first, and means for operating said members.

2. In a self-closing lock and latch, the combination of a bell-crank latch member, a bell crank bolt member, a spring connecting the arms of said members, the arm of the bolt member to which the spring is connected being longer than that of the latch to provide for a heavier pull on the bolt than on the latch and cause it to close first, and a lever fulcrumed in position to consecutively engage the latch and bolt members to simultaneously withdraw the bolt and latch.

3. In a self-closing lock and latch, the combination of a bell-crank latch member, a bell-crank bolt member, said members normally engaging each other, a spring connecting the arms of said members, a double-armed lever fulcrumed adjacent to said members, one of said arms being bent to engage the latch member and move it out of engagement with the bolt member, and the other arm adapted to engage said bolt member on its release from the latch to simultaneously withdraw said members.

4. In a self-closing lock and latch, the combination of a bell-crank latch member having a laterally-projecting pin, a bell-crank bolt member having a lug thereon, said members being normally engaged, a spring connecting the arms of said members, and a double-armed lever fulcrumed adjacent said members, one of said arms being arranged to engage a pin on the latch member to move it out of engagement with the bolt member, and the other arm adapted to engage the lug on the bolt member on its release from the latch member to withdraw said members simultaneously.

5. In a self-closing lock and latch, the combination of a bell-crank latch member having a lug and pin thereon, a bell-crank bolt member having a lug and a pin disposed thereon, a spring connecting the arms of said members, a double-armed lever fulcrumed adjacent said members, one of said arms being arranged to engage the pin on the latch member and move said latch out of engagement with the bolt member and the other arm adapted to engage the lug on said bolt member to cause the pin on said bolt member to engage the lug on the latch member, whereby said bolt and latch members are simultaneously withdrawn.

6. In a self-closing lock and latch, the combination of a bell-crank latch member, a bell-

crank bolt member, a spring connecting the arms of said members, the arm of the bolt member to which the spring is connected being longer than that of the latch and cause it to close first, a lever fulcrumed in position to consecutively and directly engage the latch and indirectly the bolt members to simultaneously withdraw the bolt and latch.

7. In a self-closing lock and latch, the combination of a bell-crank latch member, a bell-crank bolt member, a spring connecting the arms of said members, the arm of the bolt member to which the spring is connected being longer than that of the latch to provide for a heavier pull on the bolt than on the latch and cause it to close first, a lever fulcrumed in position to consecutively engage the latch and bolt members to simultaneously withdraw the bolt and latch, a handle, and means connecting said handle and lever, whereby the bolt and latch members are operated.

8. In a self-closing lock and latch, the combination of a bell-crank latch member, a bell-crank bolt member, a spring connecting the arms of said members, the arm of the bolt member to which the spring is connected being longer than that of the latch to provide for a heavier pull on the bolt than on the latch and cause it to close first, a lever fulcrumed in position to consecutively engage the latch and bolt members to simultaneously withdraw the bolt and latch, and means for holding said bolt in inactive position.

In witness whereof I have hereunto signed my name this twentieth day of February 1905, in the presence of two subscribing witnesses.

ARTHUR NATHAN.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.