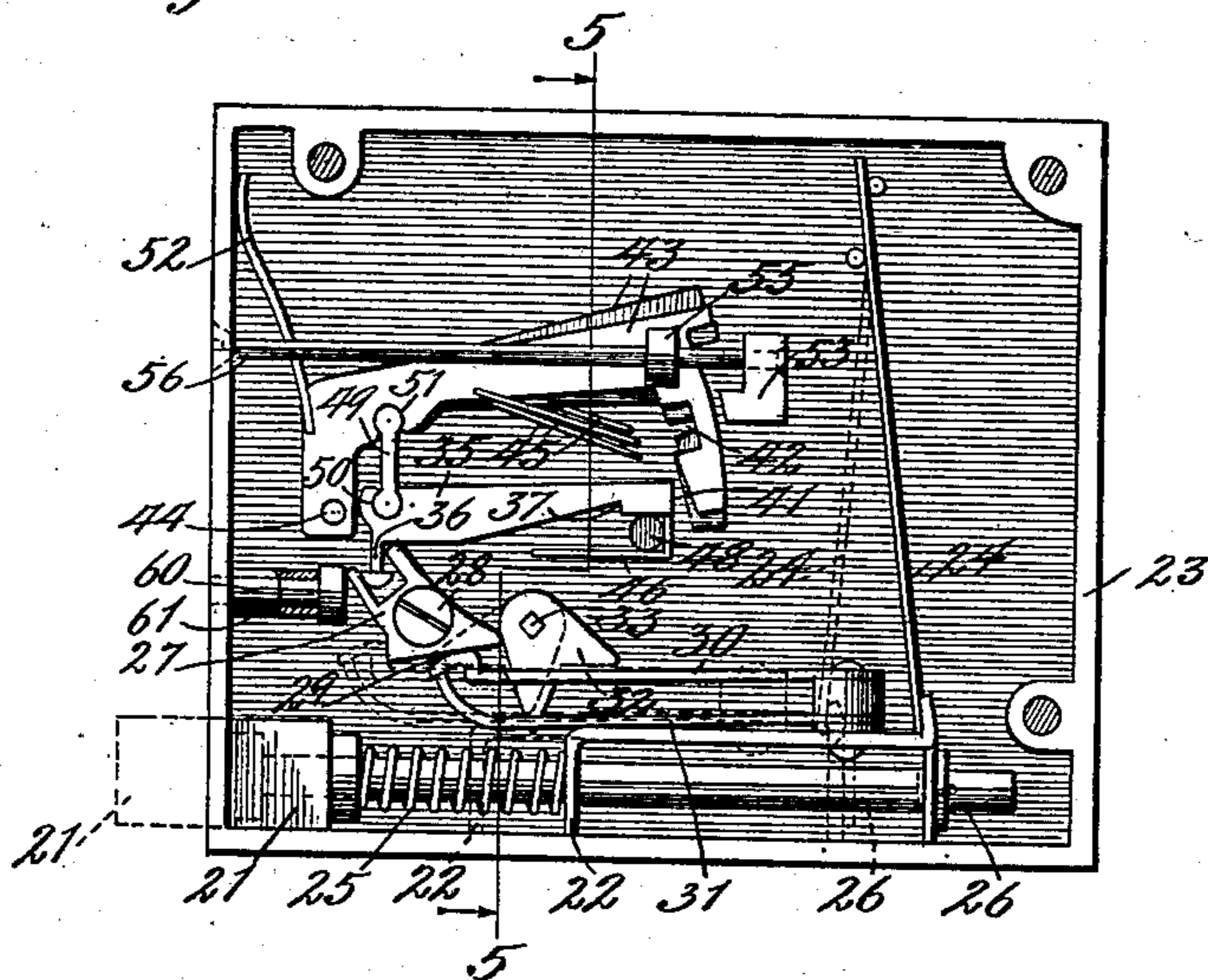


899,266.

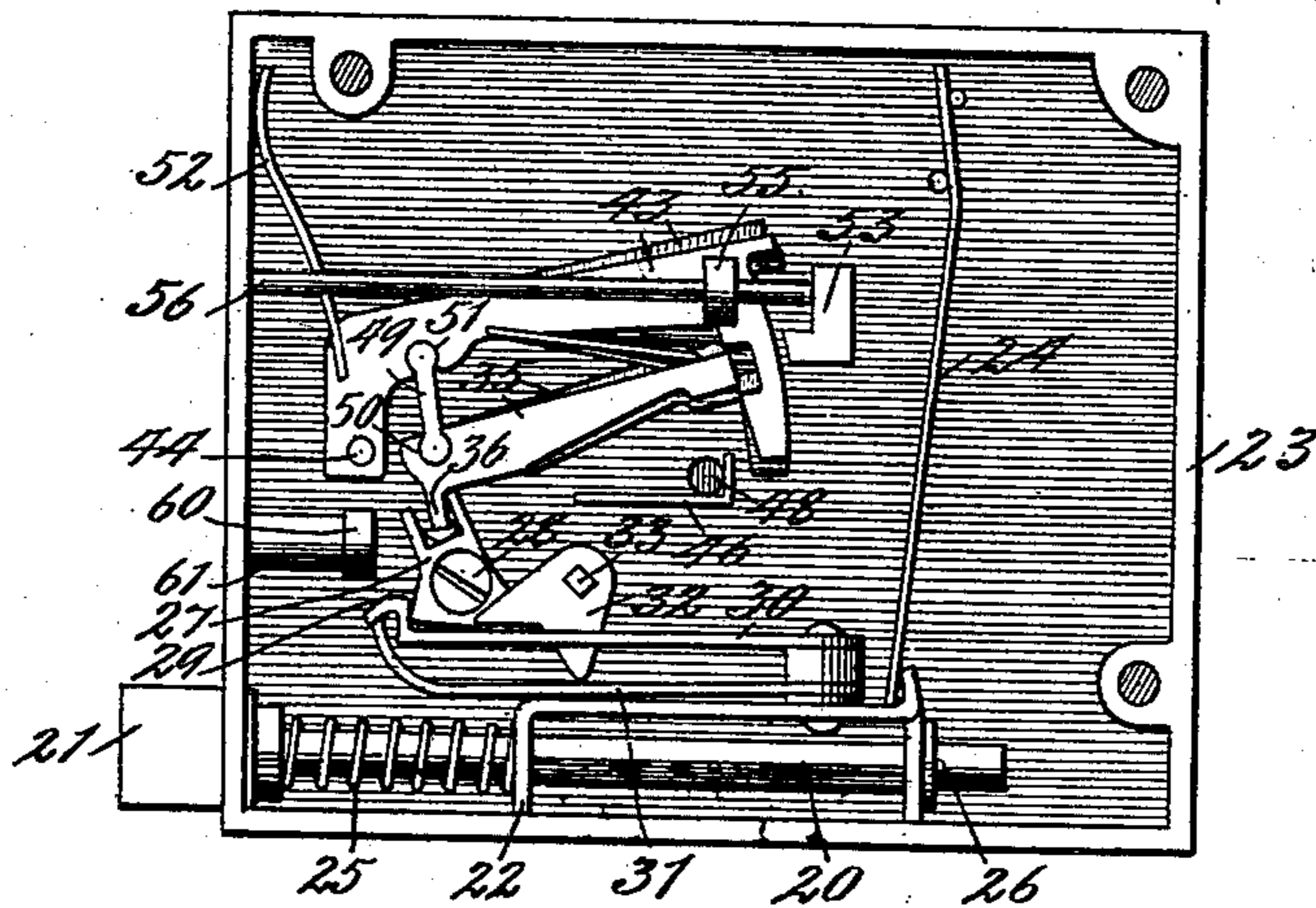
S. H. SHANK.  
LOCK.  
APPLICATION FILED APR. 3, 1908.

Patented Sept. 22, 1908.  
3 SHEETS—SHEET 1.

*Fig. 1.*



*Fig. 2.*



Witnesses:

*Ed. D. Perry*

*Robert H. Weir*

Inventor:

*Simon H. Shank*

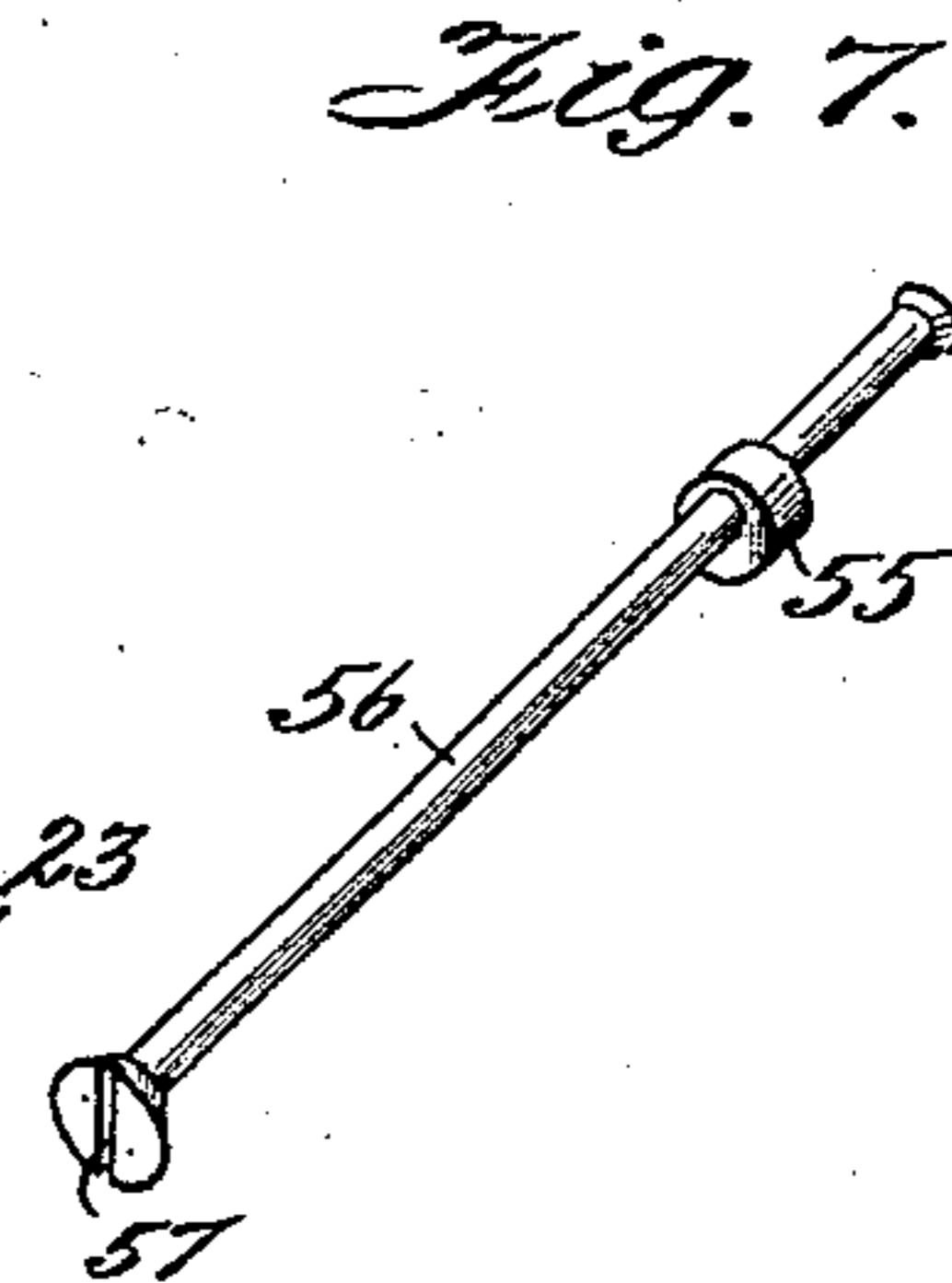
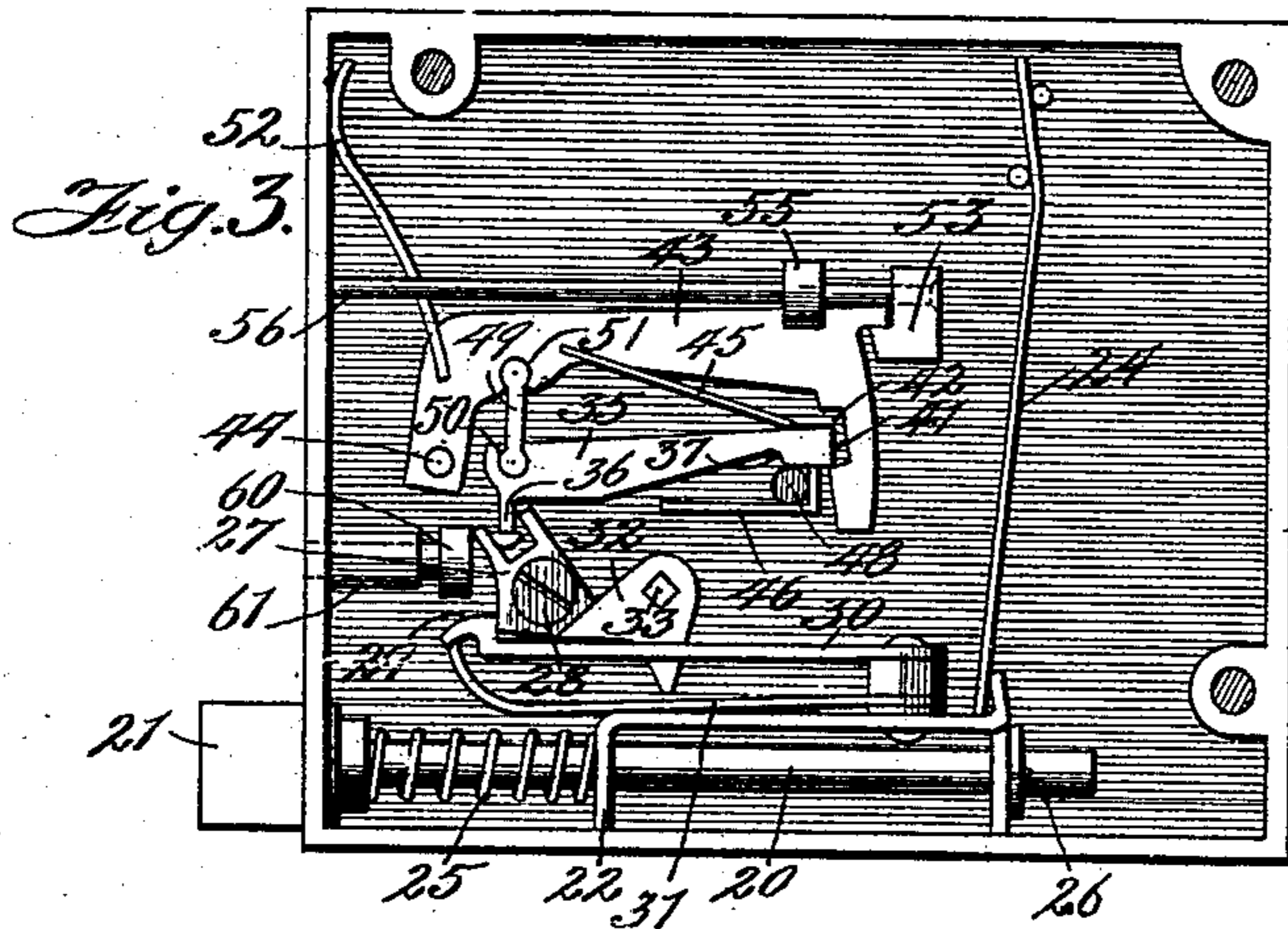
*By Cheever & Cox*

*Attys.*

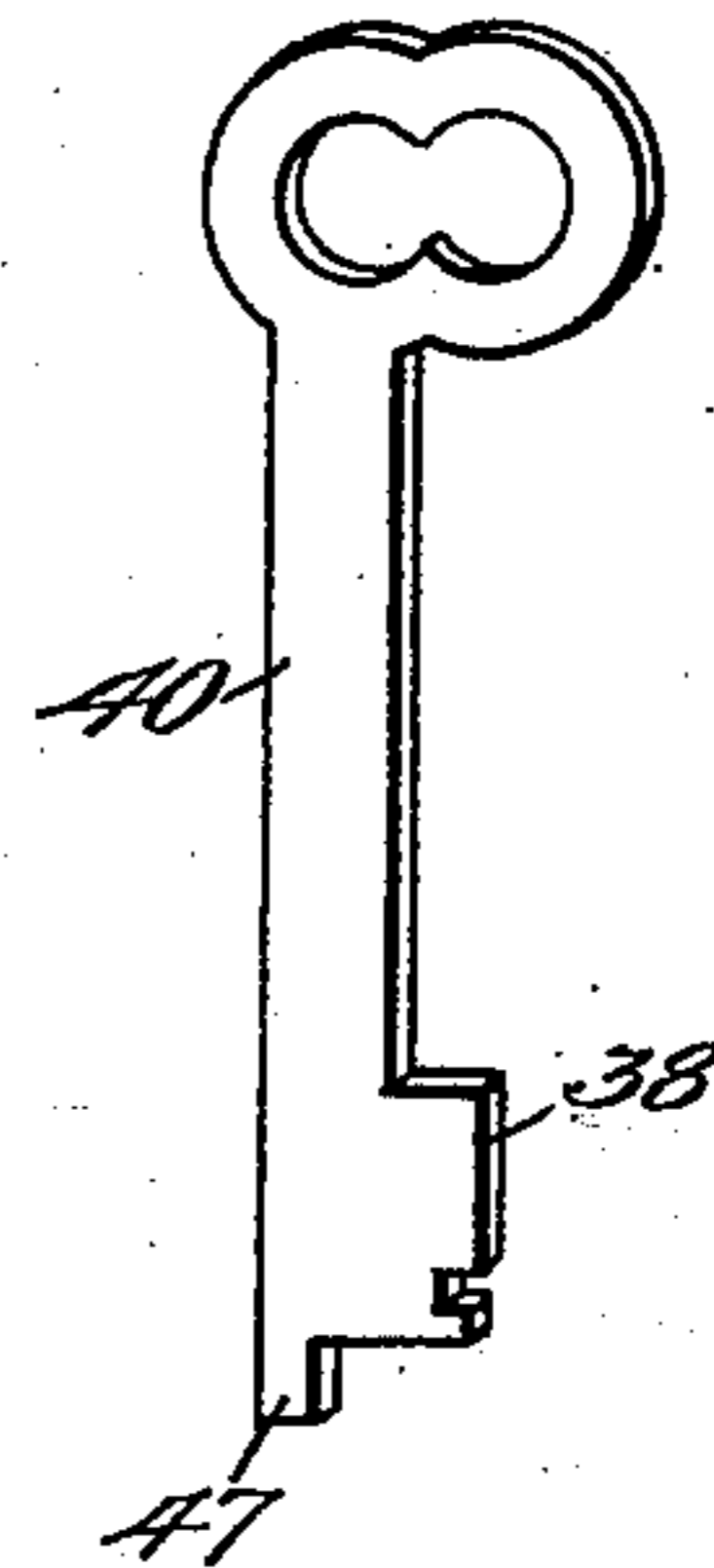
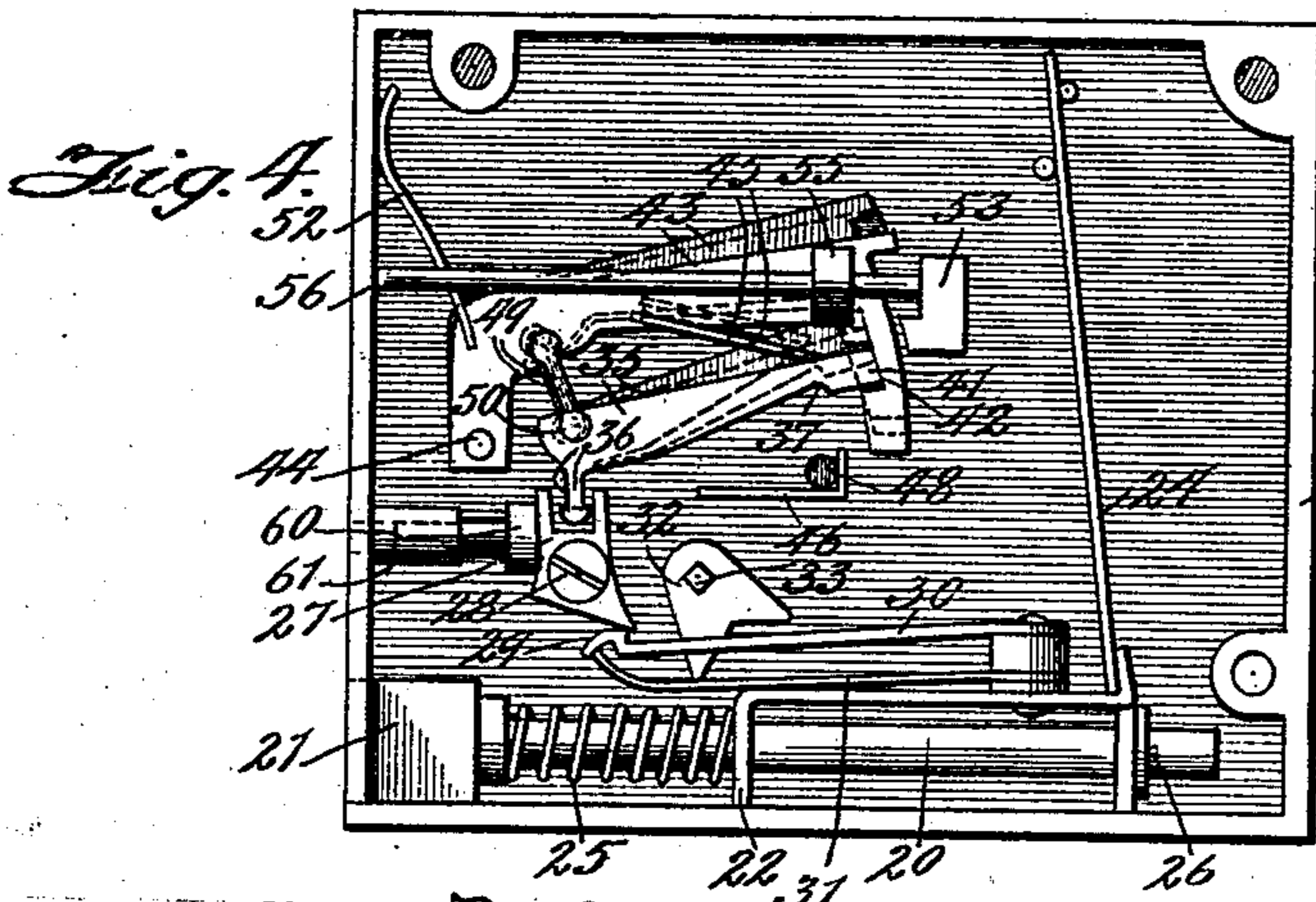
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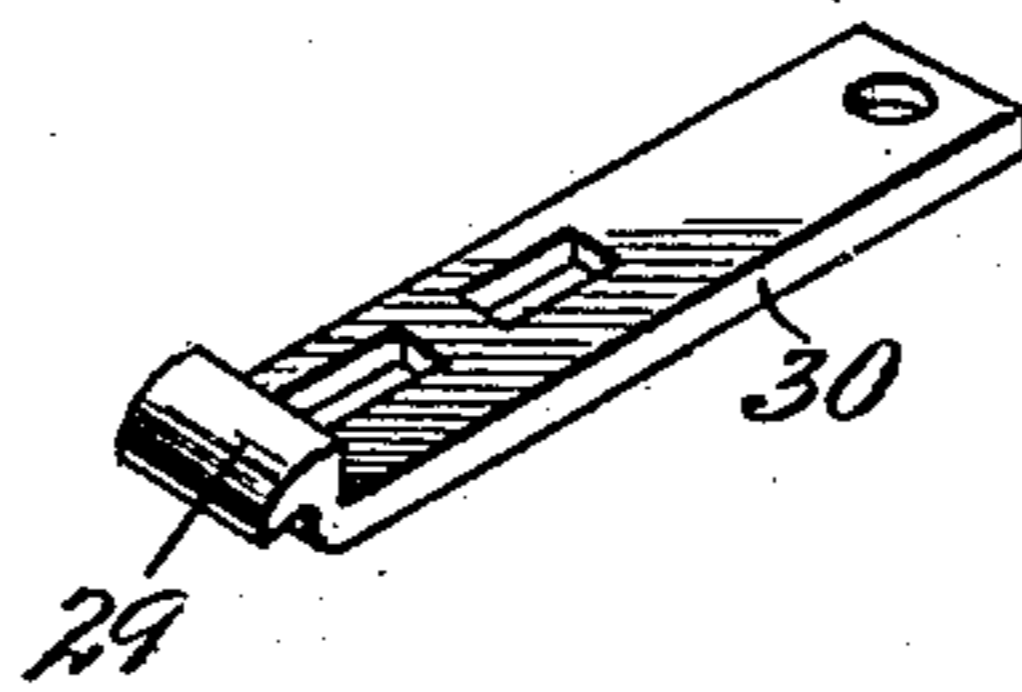
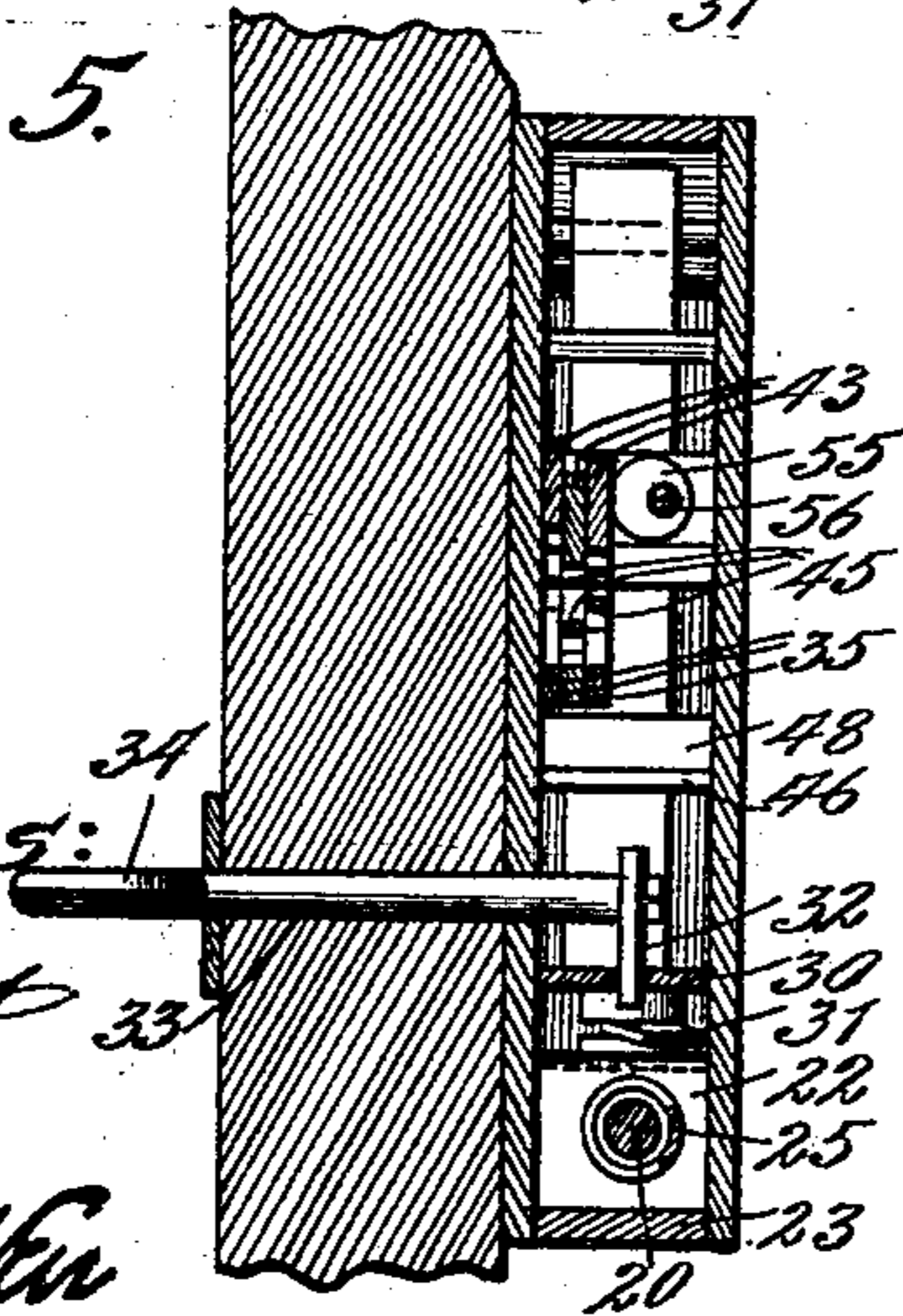
Patented Sept. 22, 1908.  
3 SHEETS—SHEET 2.



*Fig. 8.*



*Fig. 5.*



Witnesses:

*And Perry*

*Robert Allen*

Inventor:

*Simon H. Shank*

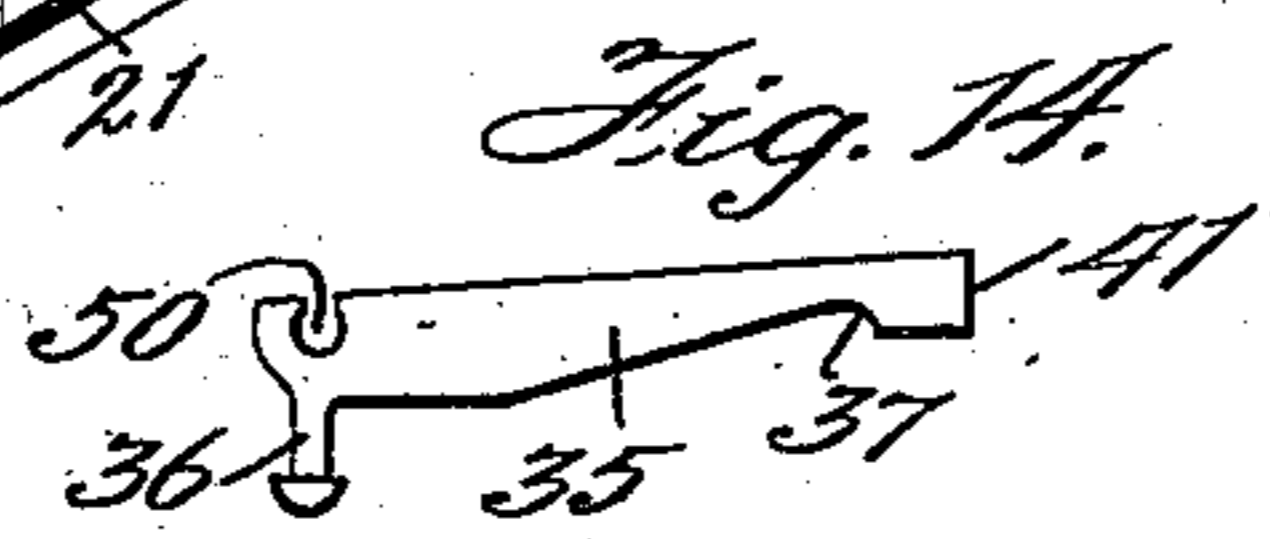
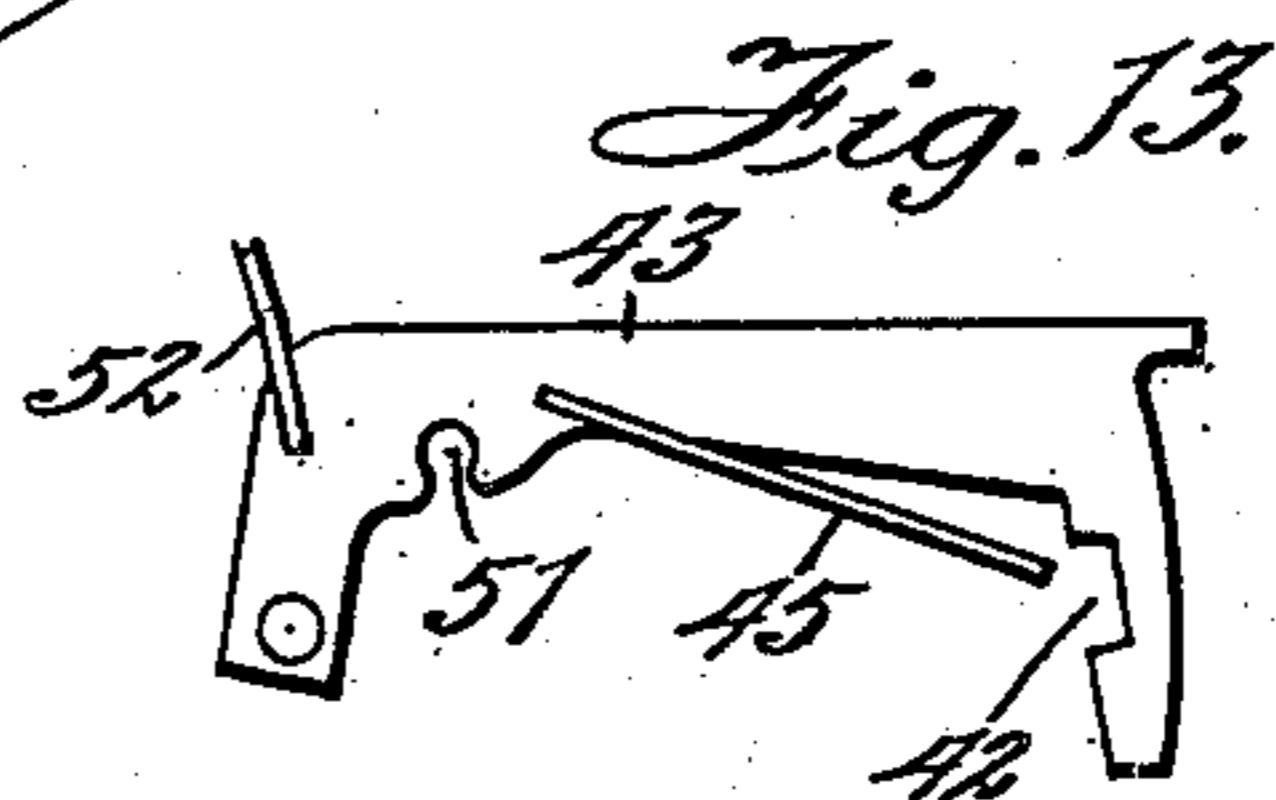
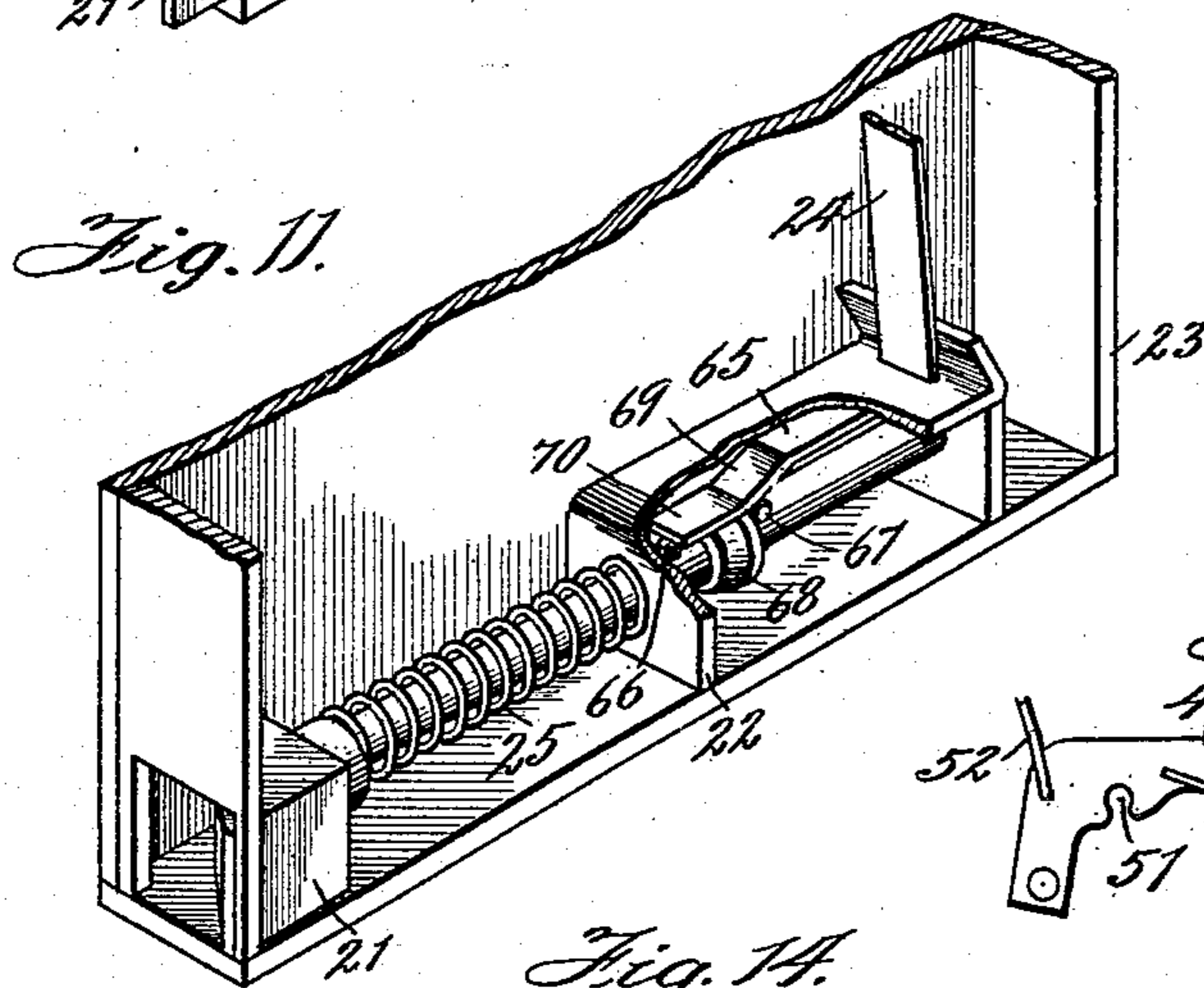
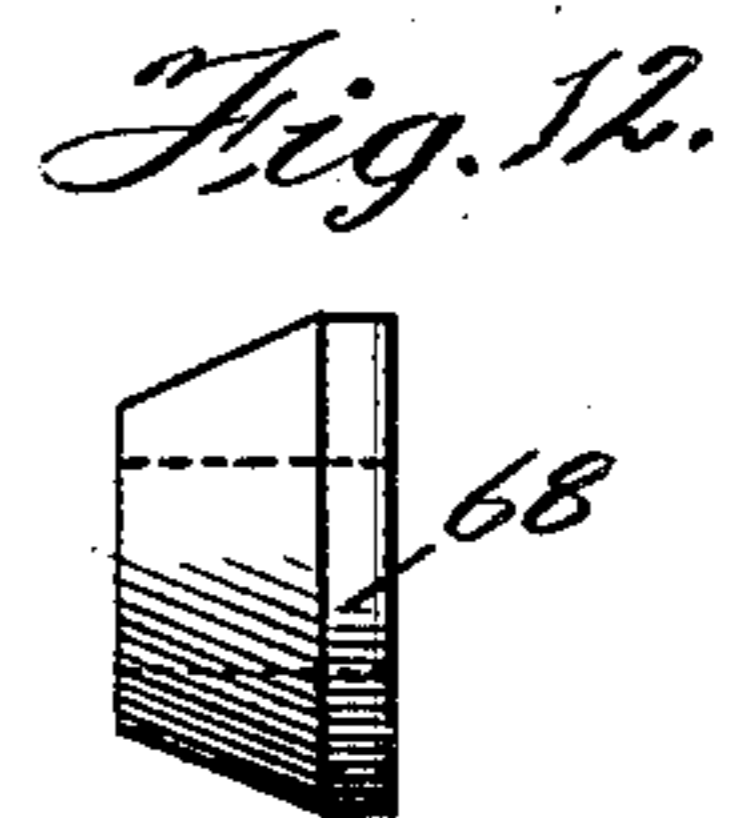
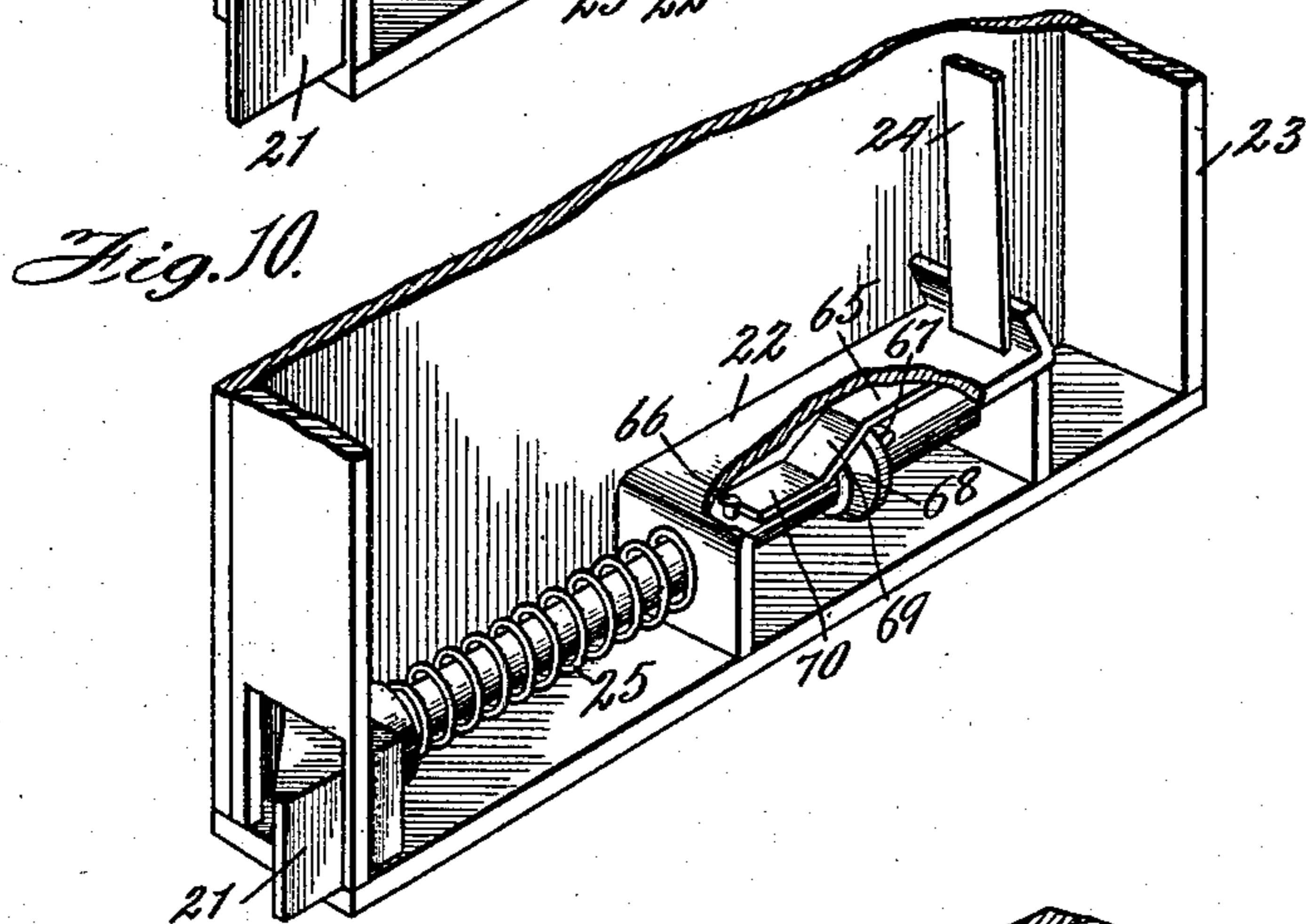
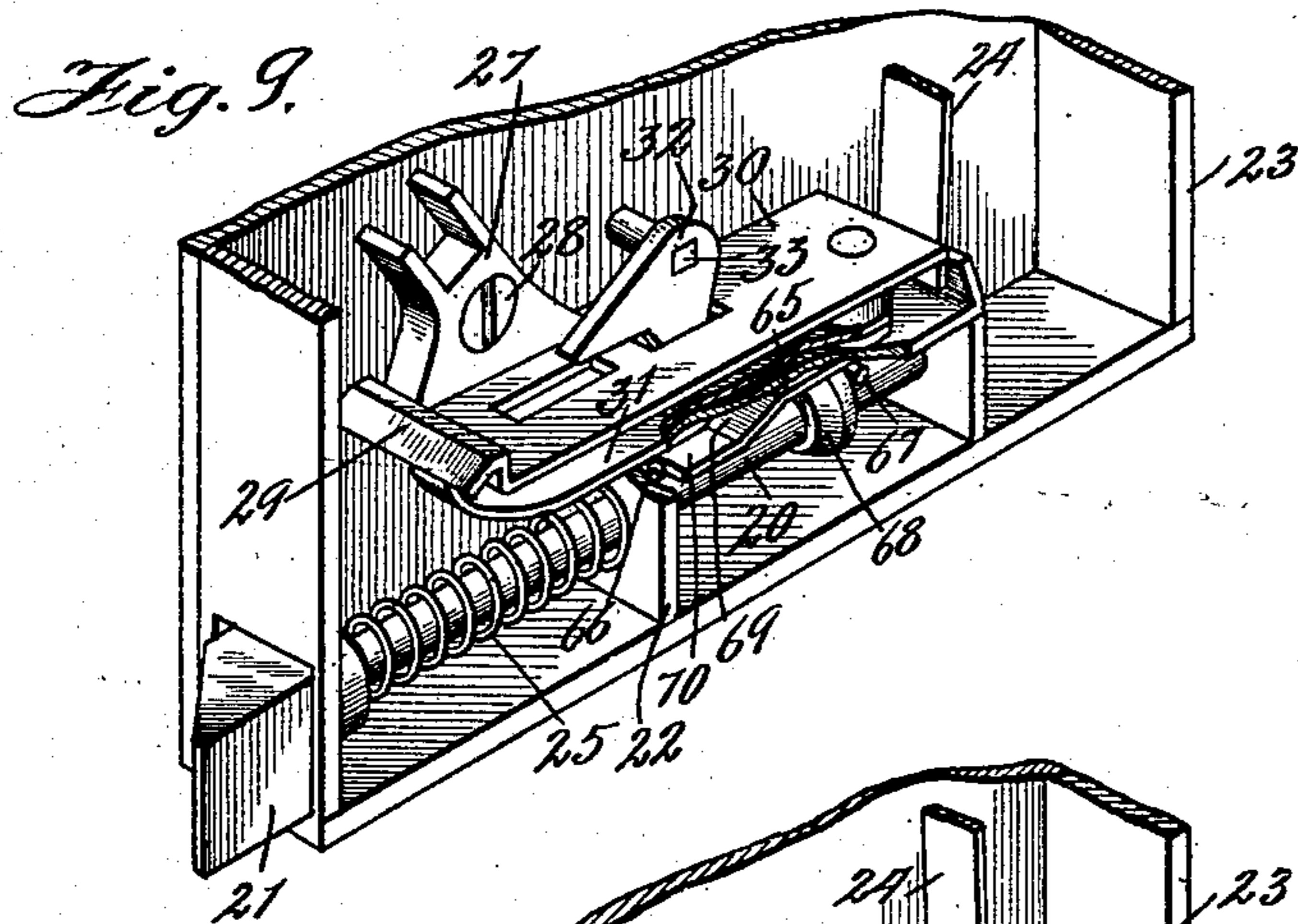
By *Cheever & Cox*

*Attys.*

899,266.

S. H. SHANK.  
LOCK.  
APPLICATION FILED APR. 3, 1908.

Patented Sept. 22, 1908.  
3 SHEETS—SHEET 3.



Witnesses:  
*Ed. D. Perry*  
*Robert H. Weir*

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*Atty.*

# UNITED STATES PATENT OFFICE.

SIMON H. SHANK, OF CHICAGO, ILLINOIS.

## LOCK.

No. 899,266.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed April 3, 1908. Serial No. 424,854.

*To all whom it may concern:*

Be it known that I, SIMON H. SHANK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Locks, of which the following is a specification.

My invention relates to locks, especially key operated spring locks.

The object of the invention is to provide a lock adapted to be adjusted to the key. In such a lock it is possible to make an infinite variety of keys by notching the bit differently, each key perfectly fitting the lock as soon as the proper adjustment of the lock has been made.

It is also an object to provide means for preventing the inward forcing of the bolt by applying a jimmy or similar tool directly thereto from the outside of the lock.

I accomplish my objects by the mechanism illustrated in the accompanying drawings, in which:

Figures 1, 2, 3 and 4 are side views of the lock with one cover removed showing the parts in the different relations which they assume during the cycle of operation. Fig. 5 is a transverse sectional view taken on the line 5—5 Fig. 1. Figs. 6 and 7 are perspective views of parts of the lock. Fig. 8 is a perspective view of the type of key employed. Figs. 9, 10 and 11 are perspective views of the mechanism for preventing forcing of the bolt. Fig. 12 is a view of the slip ring which forms one of the parts of the mechanism for preventing forcing of the bolt. Fig. 13 is a side view of one of the wards, and Fig. 14 is a side view of one of the tumblers.

Similar numerals refer to similar parts throughout the several views.

To facilitate an understanding of the invention it will be stated that in general, my lock includes a series of tumblers which when operated by the key release the bolt and permit the spring to retract it. These tumblers are limited in their movement by a series of adjustable wards, and unless the wards are in proper adjustment they will prevent the tumblers from moving sufficiently to release the bolt. Means are provided for adjusting the wards onto the key while the key is in the lock and it may be said therefore that with my invention the lock may be adjusted to fit the key instead of requiring the fitting of the key to the lock. This not only permits the key to be made

with a great range of variation in the notches but avoids the necessity of exercising great care in the making of the key. The key may be made without any particular care as to the depth of the different notches and after the notches are made the lock can be adjusted to fit them.

Referring now to the drawings, the bolt 20 has a beveled head 21 as is usual in spring locks. The bolt has a sliding bearing in a frame 22 which is itself slidable in the lock casing 23 in the direction of the length of the bolt. This frame is constantly urged backward (to the right, Figs. 1 to 4) by means of a spring 24. A compression spring 25 is interposed between frame 22 and head 21 for urging the bolt forward to locked position. The influence of spring 25 is limited by means of a pin 26 which is secured in the bolt behind some portion of frame 22. As a result, when the frame is back the bolt will be held back, but when the frame is forward the bolt may be forward or back, although the spring 25 tends to hold it forward. When the lock is not in use the parts will occupy the position shown in Fig. 1, the frame and bolt both being back.

The frame is held in forward position against the influence of spring 24 by means of a catch 27 pivoted on the stud 28 fastened in the casing. This catch is adapted to engage a shoulder 29 which is connected to frame 22 so as to move back and forth therewith. In the preferred construction this shoulder is formed upon the flexible arm 30 fastened in any suitable manner to the frame and urged toward catch 27 by means of a spring 31 which is also carried by frame 22. The frame 22 with its arm 30 may be moved forward against the force of spring 24 by means of the lever 32 rigidly fastened to the shaft 23 which is provided with a head 34 for rotating the shaft. The preferred construction is best shown in Figs. 5 and 6 taken in connection with Figs. 1 to 4. As readily apparent from these figures, the arm 30 is apertured to receive the points of the lever 32. These points engage the apertured arm 30 much in the manner that gear teeth engage a rack and by rotating shaft 33 the frame 22 may be held forward or back. The head 34 of bolt 33 is so arranged as to come inside of the door and is not accessible from the outside thereof.

The catch 27 tends normally to occupy the position shown in Figs. 1 and 2, that is, the

position where it will be automatically engaged by the shoulder 29 on the member 30 when the frame 22 is moved forward. The catch is so formed that when rotated in the proper direction (which is clockwise in the drawings) the catch will release arm 30, and permit spring 24 to retract frame 22 and bolt 20. The catch 27 is rotated in this clockwise direction by means of the tumblers 35, one of which is shown separately in Fig. 14. Practically any articulate connection between the catch 27 and tumbler 35 would answer, but in the present instance this connection is made by means of a projection 36 formed upon the tumbler 35 and entering a notch provided for it in said catch. The tumblers, of which there may be any suitable number, each have a shoulder 37 adapted to be engaged by the bit 38 of the key 40, shown separately in Fig. 8. These tumblers each have a head 41 adapted to enter a notch 42 formed in the cooperating ward 43, one of these wards being shown separately in Fig. 13. These wards are pivoted upon the pin 44 which is fastened to the lock casing 23, and there is a separate ward for each tumbler. The parts are so arranged that unless the wards are in position where the heads of the tumblers may enter the notches in the wards, the tumblers will be prevented from moving enough to rotate the catch 27 sufficiently to release the frame 22. Springs 45, carried in the present instance by the wards tend to hold the tumblers down in contact with the stop 46 rigidly fastened to the casing of the lock, this position being illustrated in Fig. 3. In the design of lock here shown the tumblers "float" that is to say have a movement other than a mere plain rotary movement in a plane parallel to the side of the lock. This is to permit the free ends of the tumblers to be first raised and then moved forwards toward the notches when the key is rotated. The mountings by which such movement is permitted consists of links 49 which have heads formed at either extremity, one head being adapted to enter the notch or socket 50 in the tumbler and the other the notch or socket 51 in the cooperating ward.

Each ward is urged in a clockwise direction about its pivot 44 by means of a spring 52 one end of which is secured to the ward and the other abuts a suitable portion of lock casing as shown for example in Figs. 1 to 4. The clockwise rotation of the wards about their pivot 44 is limited, when said wards are otherwise free to move, by a fixed stop 53 as indicated in Figs. 1 to 4. The means for holding the wards in position after they are adjusted will vary for different forms of lock, a rim lock for example having a different holding means from a mortise lock. For the sake of illustration I have shown holding means adapted for a mortise lock consisting of an eccentric 55 rigidly fastened to a shaft

56 at one end of the casing and at the other end in the stop 53. This shaft, which is shown separately in Fig. 7 has a head 57 by which it may be rotated. When shaft 56 is rotated to one position the eccentric 55 will release the wards and when rotated to another position will bear forcibly against them and hold them rigidly in the position to which they are set.

To illustrate the cooperation between the key, tumblers and wards, let it be supposed that the wards are adjusted to the position shown in Fig. 1, and held there by the eccentric 55. Let it be supposed also that the tumblers are down in normal or rest position as also shown in this figure. If now, the key be inserted in the lock with the pin 47 in the hole 48 with the bit 38 horizontal and extending to the left, and the key be then rotated in a clockwise direction the bit will lift the different tumblers to different heights depending upon the depths of the notches in the bit. If the notches in the bit are properly cut they will raise the tumblers just the right amount so that the heads 41 will enter the notches 42 in the wards, thus permitting the tumblers to move to the right sufficiently to cause the release of the frame 22. If the bit is improperly notched of course it will not raise the tumblers the right amount to enter the wards and will prevent the unlocking of the bolt. It is obvious that the wards might be set and a key afterwards be fitted to raise the tumblers the right amount for such adjustment. In my lock, however, means are provided for adjusting the wards to the key after the latter has been formed. This will now be described.

A setting member 60 is slidably mounted in a stationary bearing 61 in such position that when forced inward it will rotate the catch 28 in a clockwise direction. This is accessible from the outside of the lock. In operating the setting means the key is first withdrawn and the tumblers allowed to drop to normal position shown in Fig. 1. The eccentric 55 is then rotated to such position as to release the wards 35, which permits them to drop to lowest position shown in Fig. 3. The heads 41 of the tumblers are then on a level with the notches 42 in the wards. The locksmith then pushes the member 60 inwards and causes the heads to enter the notches, Fig. 3 showing this movement partially completed. As soon as the member 60 has pushed the tumbler-heads in as far as they will go, the tumblers and wards become interlocked to the extent that the raising of the tumblers will cause the raising of the wards. The key is then inserted and rotated to vertical position, thus bringing the tumblers with their mating wards to various elevations depending upon the depths of the respective notches. The wards are then fixed in this position by means of the eccen-

tric 55, and will remain there after the key is withdrawn and the tumblers have dropped back to normal position. After this, the lock cannot be unlocked unless the tumblers are raised just the proper amounts. It will thus be seen that the lock is adjustable to the key, in the notching of which no special care for depth need be taken. It will also be seen that there is practically no limit to the number of variations which are possible especially if three or four tumblers with their wards are employed.

I will now describe the means for preventing the unauthorized forcing of the bolt. This mechanism is best shown in Figs. 9 to 12 inclusive and comprises a spring latch 65 which is carried by the sliding frame 22 in such position that when said frame and the bolt 20 are in forward or locking position the forward end of said latch will engage the pin 66 in said bolt and prevent inward movement of the latter. This condition of the parts is shown in Fig. 9. A pin 67 is rigidly fastened in the casing of the lock in such manner as to limit the backward movement of the ring 68 which loosely encircles bolt 20. Latch 65 has a shoulder 69 which is so formed that the portion 70 in front of the shoulder tends to lie close to the side of the bolt so as to engage the pin 66. The function of the ring is to hold the portion 70 elevated during a certain period of the cycle of operation in order to permit the bolt to move inward once and once only after the parts have been set so that the mechanism will act as a spring lock. Shoulder 69 is beveled in such manner as to permit the ring 68 to slip under the portion 70 of the latch when forced to do so by stationary pin 67. When this action occurs the frame is back and the bolt is being slid back as indicated in Fig. 11.

The action of the parts will be best understood by following the program of operation of the parts when the lock is in actual use, this program being as follows: Let it be supposed that the lock is upon the door of a room or apartment from which the owner wishes to exclude the public. The lock will be so placed upon the door that the handle 34 will come on the inside of the door and the beveled side of the head 21 of the bolt will strike the striking plate upon the door casing as the door is being closed. Normally, when the lock is not in active use, the frame 22 and the bolt 20 will be retracted or in back position and the stationary pin 67 will cause the ring 68 to lie beneath the depressed forward portion 70 of latch 65, as shown in Fig. 11. When the owner wishes to go out and lock the door behind him he first turns the handle 34 so as to move the frame 22 forward where the catch 27 will engage the shoulder 29 on arm 30. After the lock is thus set by the operator with the sliding frame and bolt forward, he closes the door which causes the

bolt to be forced into the lock. This causes the pin 66 in the bolt to move backward and force the ring 68 back behind the shoulder 69 thus letting latch 65 down as indicated in Fig. 9. As soon as the door is completely shut, the bolt will spring forward and pin 66 will be carried to a position in front of the end of the latch as shown in Figs. 9 and 10. The bolt can not then be forced back again as long as frame 22 remains forward because pin 68 would strike the forward end of the latch. The only way in which the bolt can be released is by inserting the key and raising the tumblers in the proper manner to cause catch 27 to release the frame and permit the spring 24 to move said frame to back position shown in Fig. 11. The backward movement of the frame and bolt will tend to move ring 68 back with them but such movement of the ring will be prevented by the stationary pin 67, and said ring will be forced under the depressed portion 70 of the latch; or in other words the backwardly moving frame will drag the forward depressed portion 70 of latch 65 up over the ring thereby elevating the latch to a position where it will be inoperative upon pin 66. This completes the cycle of operation and the parts are ready to be again put into locking condition by rotating the handle 34 in such direction as to again bring the frame 22 forward.

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

1. In a lock, the combination of a bolt, a key operated tumbler, connections between said bolt and said tumbler for engaging and releasing the latter, an adjustable ward adapted to interfit with said tumbler, means for holding said ward in set position and mountings whereby the tumbler is permitted to float in a plane parallel to the side of the lock for entering and leaving said ward.

2. In a lock, the combination of a bolt, a key operated tumbler, connections between said bolt and said tumbler for engaging and releasing the latter, an adjustable ward adapted to interfit with said tumbler, means for holding said ward in set position and mountings whereby the tumbler is permitted to float in a plane parallel to the side of the lock for entering and leaving said ward, and springs for acting upon said tumbler for holding it near the key hole where it may be acted on by the key.

3. In a lock, the combination of a bolt, a frame wherein said bolt is slidably mounted, said frame being slidable within the lock casing in a direction lengthwise of the bolt, a spring for holding said frame back, a catch for holding said frame forward, means for moving the frame forward into engagement with said catch, a key operated tumbler for disengaging said catch from said frame and means for preventing movement of the tumbler except in a predetermined path.

4. In a lock, the combination of a bolt, a frame wherein said bolt is slidingly mounted, said frame being slidable within the lock casing in a direction lengthwise of the bolt, a  
5 spring for holding said frame back, a catch for holding said frame forward, means for moving the frame forward into engagement with said catch, a key operated tumbler for disengaging said catch from said frame, an  
10 adjustable ward for the tumbler and means for holding the ward in set position.

5. In a lock, the combination of a bolt, a frame wherein said bolt is slidingly mounted, said frame being slidable within the lock casing in a direction lengthwise of the bolt, a  
15 spring tending to hold said frame back, a catch for holding said frame forward, means for moving the frame forward into engagement with said catch, a key operated tumbler for disengaging said catch from said  
20 frame, an adjustable ward for the tumbler, and an eccentric operable from outside the lock for holding the ward in set position.

6. In a lock, the combination of a casing, a  
25 bolt slidable therein, a frame slidable in the casing lengthwise of the bolt, a catch mounted on the casing, a yieldable arm mounted on said sliding frame and having a shoulder adapted to be engaged by said catch, a spring  
30 for retracting said frame, hand operated means for moving said frame forward against the force of said spring and causing the catch to engage the shoulder upon said yieldable member, a key operated tumbler for operating  
35 said catch to release the frame and a ward for said tumbler.

7. In a lock, in combination with a casing, a bolt slidable therein, a frame sliding in the casing lengthwise of the bolt, a spring tending  
40 to urge said frame backwards, hand operated means for moving said frame forward against the force of the spring, a catch mounted in said casing and adapted to hold said frame forward, a tumbler, an adjustable  
45 ward for said tumbler adapted to interfit therewith when in normal position, a setting member adapted to move the tumbler and ward into mating relation, a key for raising both tumbler and ward, and adjusting means  
50 for holding said ward in raised position.

8. In a lock, in combination with a casing, a bolt slidable therein, a frame sliding in the casing lengthwise of the bolt, a spring tending  
55 to urge said frame backwards, hand operated means for moving said frame forward against the force of the spring, a catch mounted in said casing and adapted to hold said frame

forward, a tumbler, an adjustable ward for said tumbler adapted to interfit therewith when in normal position, a setting member  
60 adapted to move the tumbler and ward into mating relation, a key for raising both tumbler and ward, adjusting means for holding said ward in raised position and means for subsequently returning the tumbler to normal  
65 position independently of the ward.

9. In a spring lock, the combination with the lock casing, of a sliding bolt, a frame slidable within the casing independently of the bolt in a direction parallel therewith, a spring  
70 latch secured to said frame and tending to engage the bolt to prevent backward movement thereof when the frame is forward, a latch-fitting member slidingly mounted on said bolt, and a projection secured to the lock casing  
75 in position to act upon the latch-fitting member for forcing it into engagement with the latch to hold said latch out of engagement with said bolt.

10. In a spring lock, the combination with  
80 the lock casing, of a sliding bolt, a frame slidable within the casing, independently of the bolt in a direction parallel therewith, a spring latch secured to the frame and tending to engage the bolt to prevent backward movement  
85 thereof when the frame is forward, a latch-lifting ring slidingly mounted on said bolt and a pin secured to the lock casing in position to act upon said ring to force it beneath the latch to hold said latch out of engagement  
90 with said bolt.

11. In a spring lock, the combination with the lock casing, of a sliding bolt, a frame slidable within the casing, independently of the bolt in a direction parallel therewith, a spring  
95 latch secured to the frame and tending to engage the bolt to prevent backward movement thereof when the frame is forward, a latch-lifting ring slidingly mounted on said bolt and a pin secured to the lock casing in position  
100 to act upon said ring to force it beneath the latch to hold said latch out of engagement with said bolt, a spring interposed between said frame and said bolt for forcing said bolt outwards and means for limiting the outward  
105 movement of the bolt relatively to the frame.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

SIMON H. SHANK.

Witnesses:

HOWARD M. COX,  
C. J. CHRISTOFFEL.