

E. C. BELKNAP & E. H. JACKSON.
COMBINED LATCH AND BOLT MECHANISM.
APPLICATION FILED MAR. 3, 1908.

976,773.

Patented Nov. 22, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

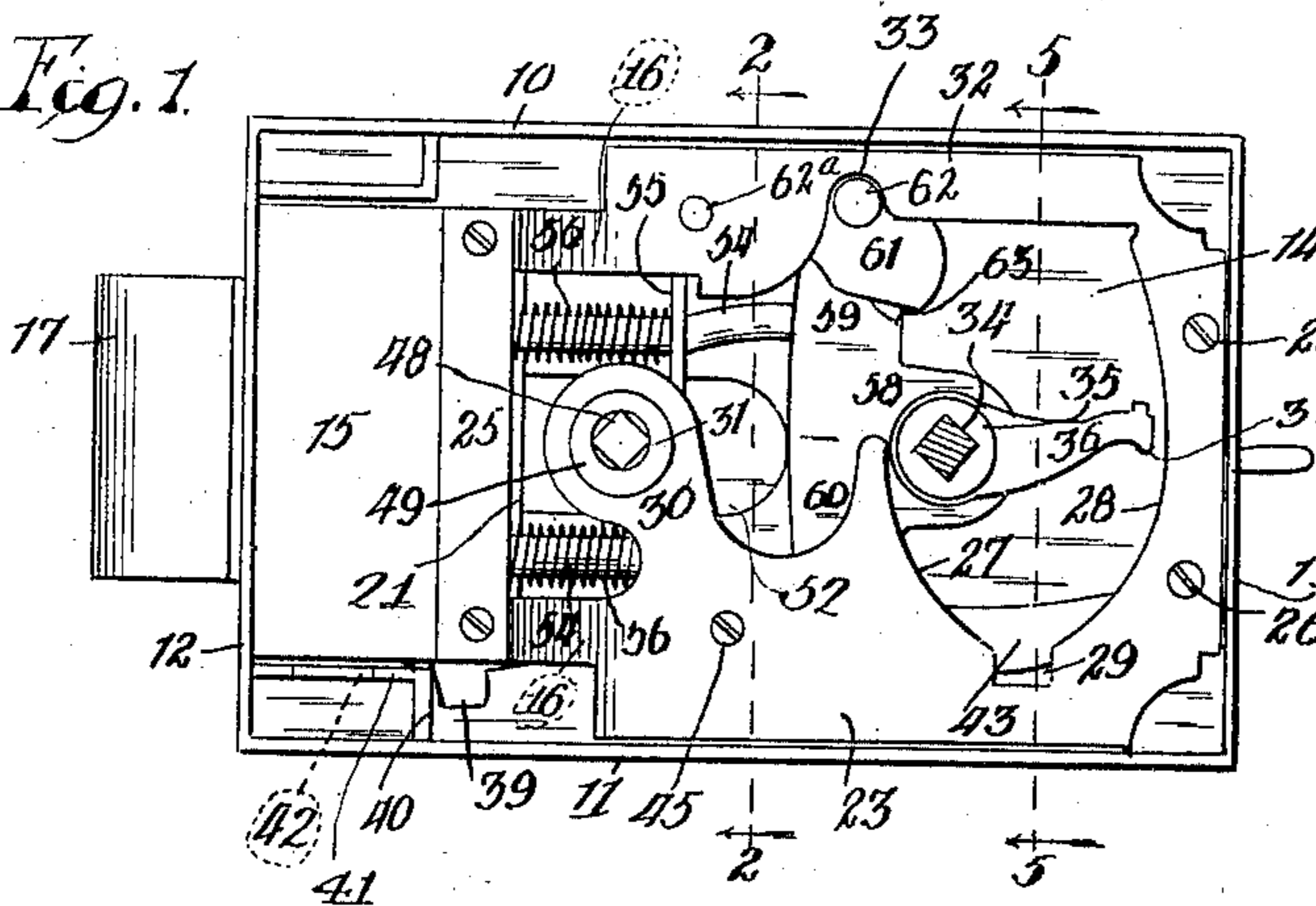


Fig. 2.

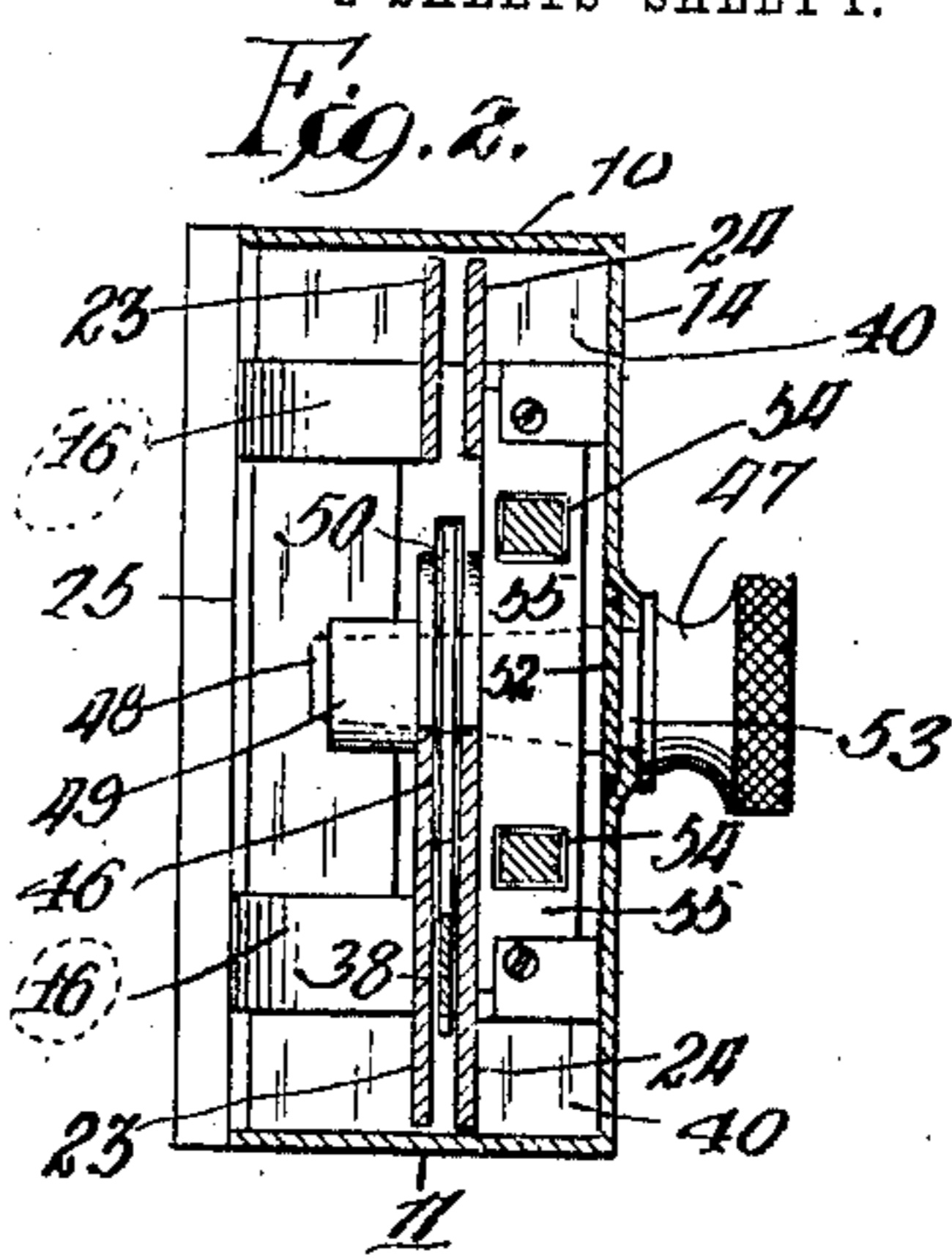


Fig. 3.

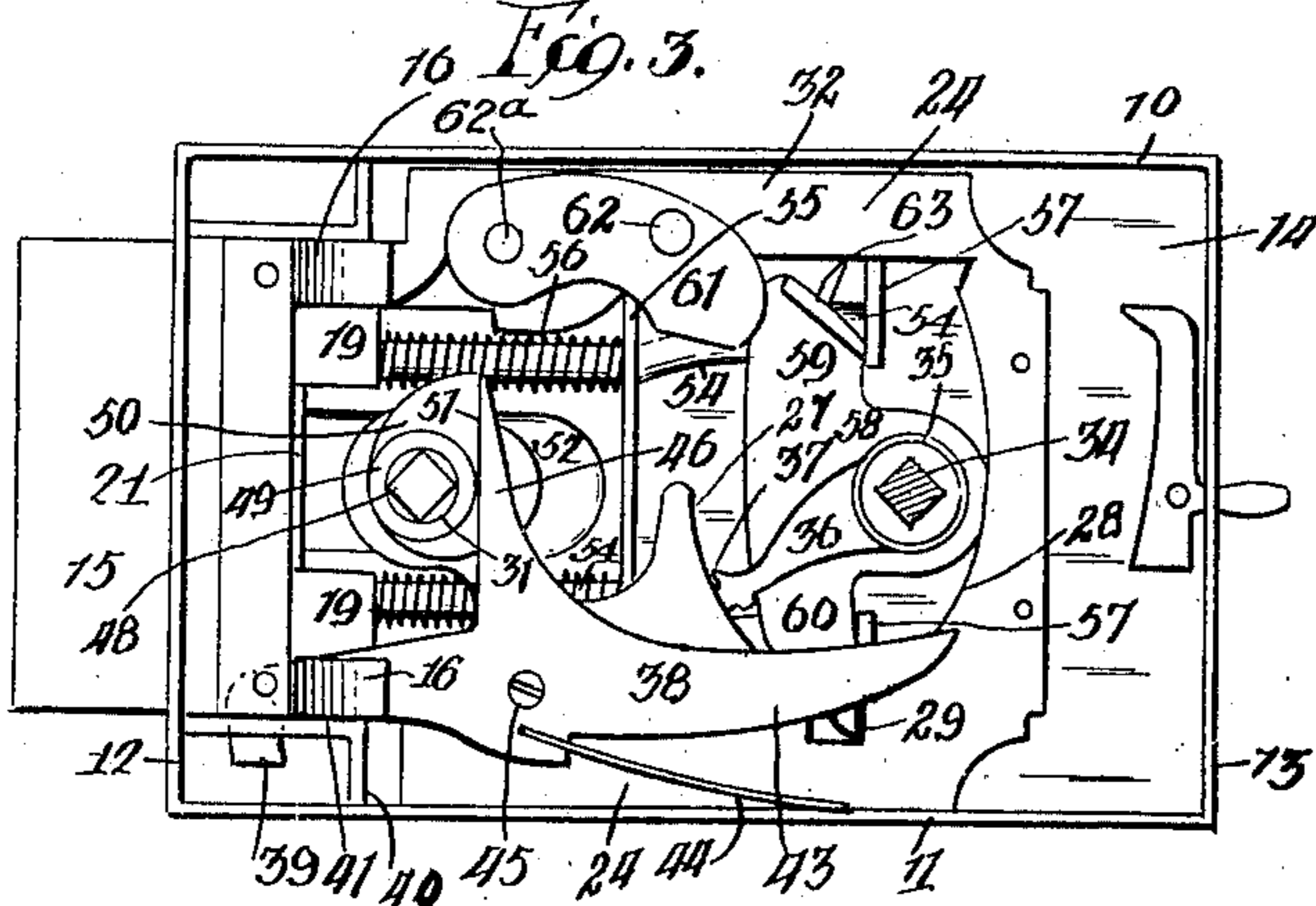


Fig. 4.

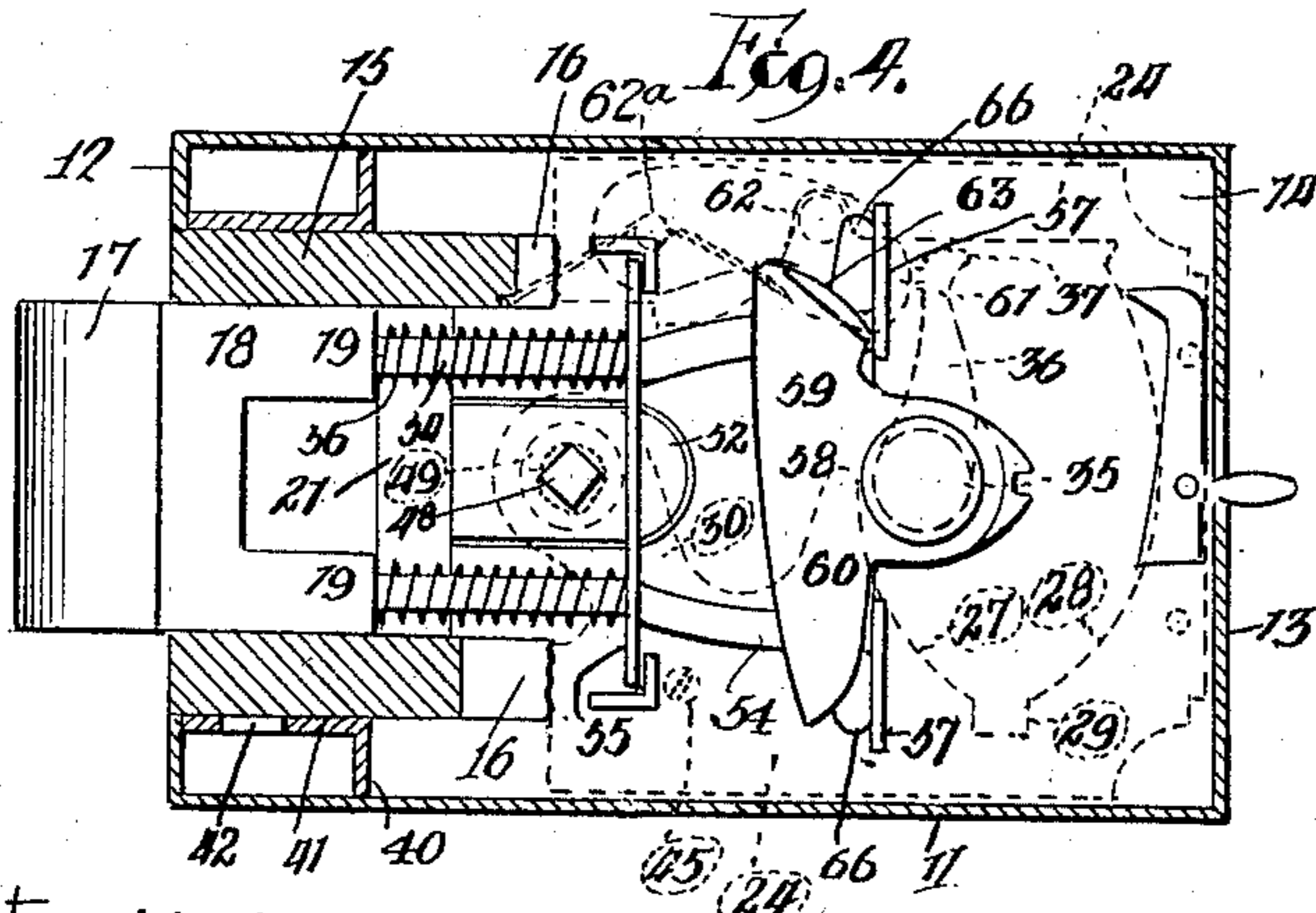
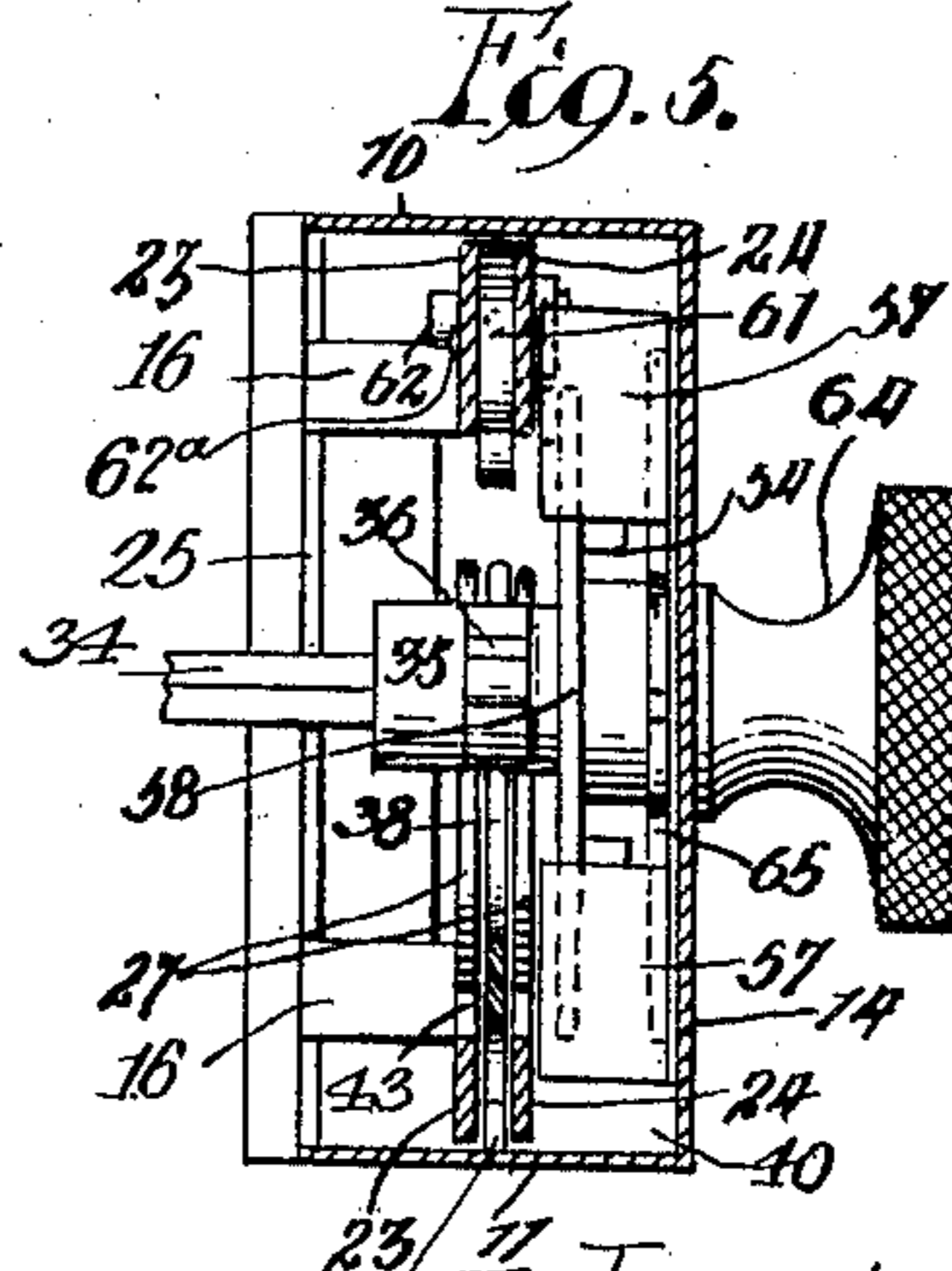


Fig. 5.



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2 SHEETS—SHEET 2.

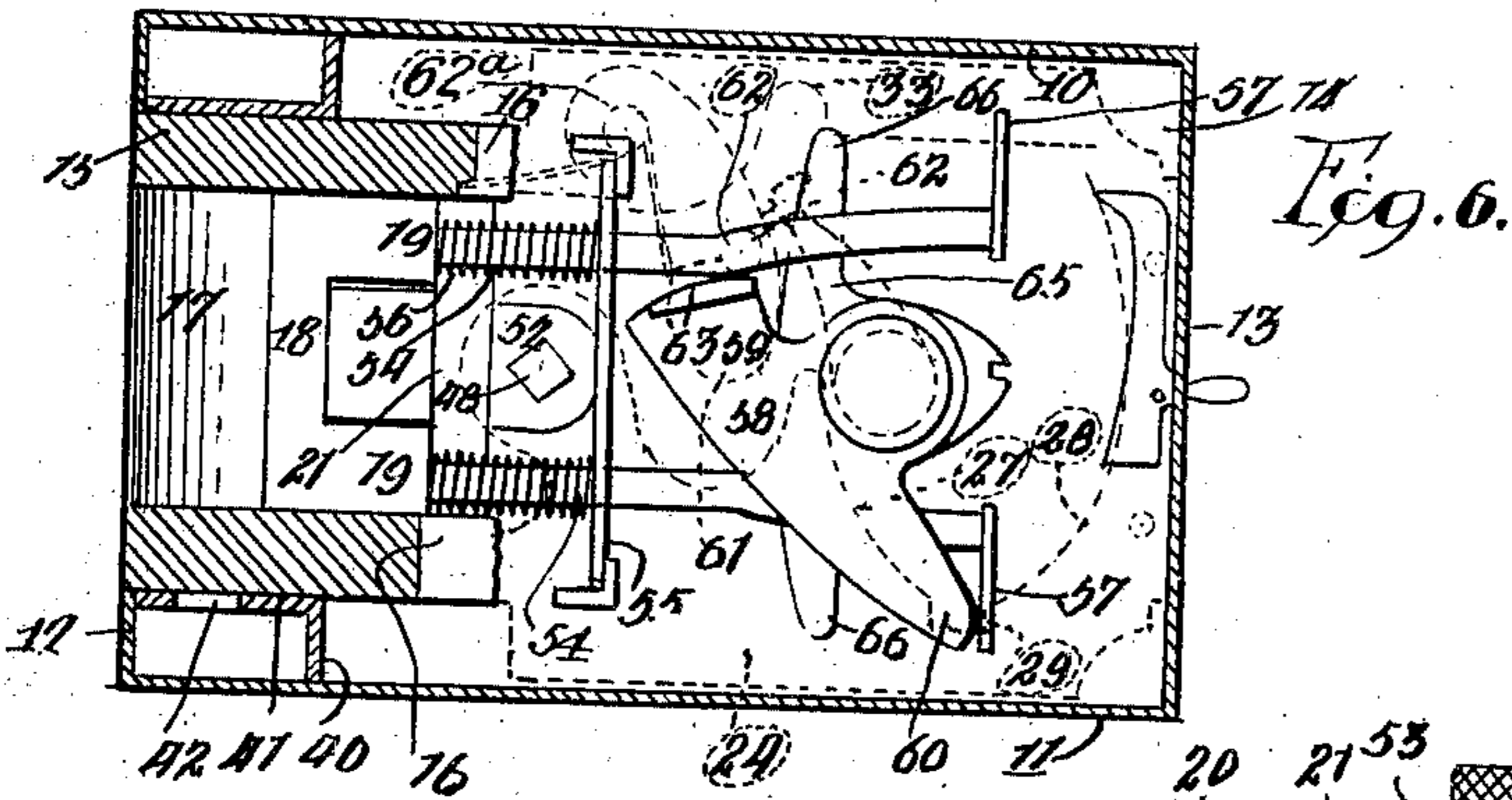


Fig. 6.

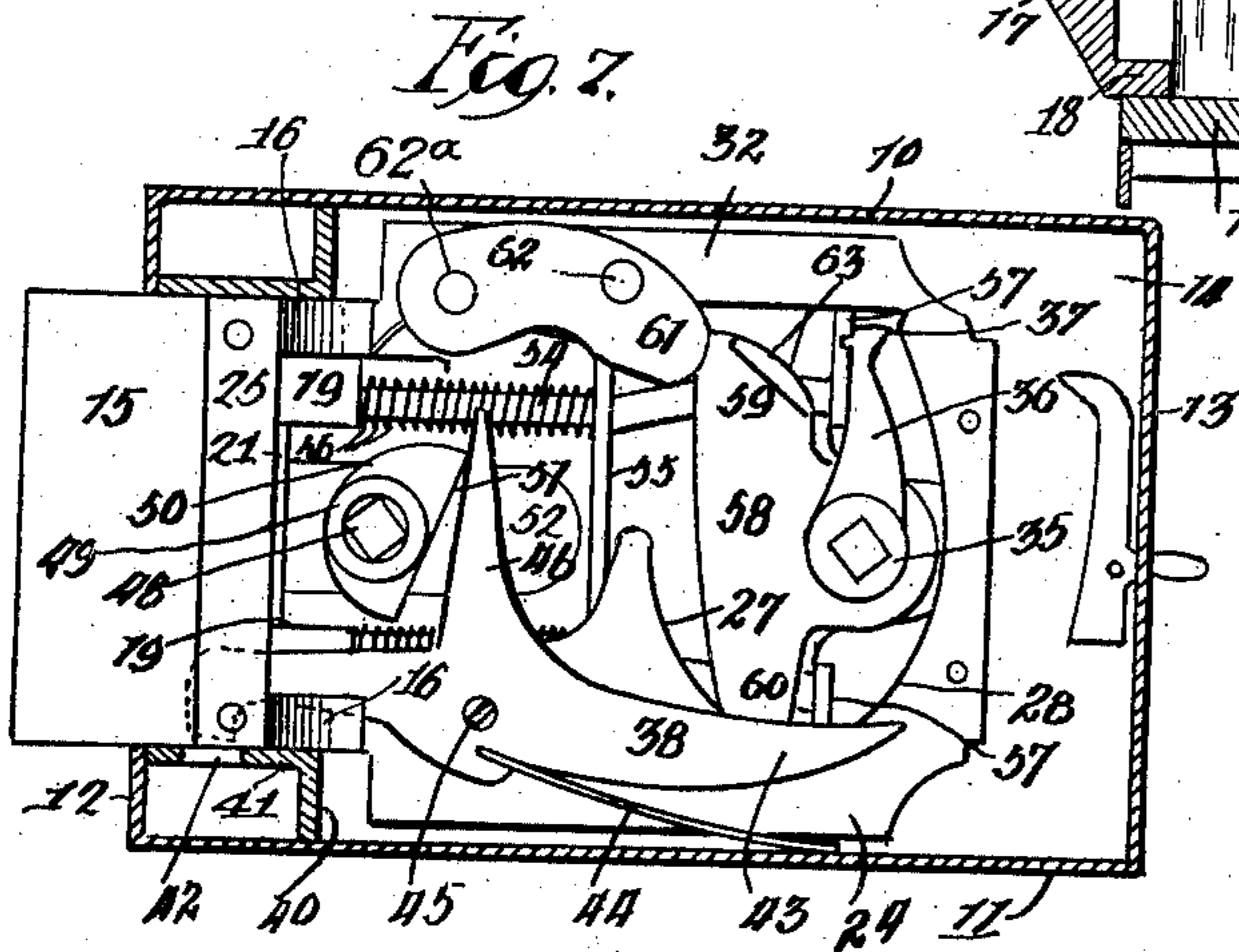


Fig. 7.

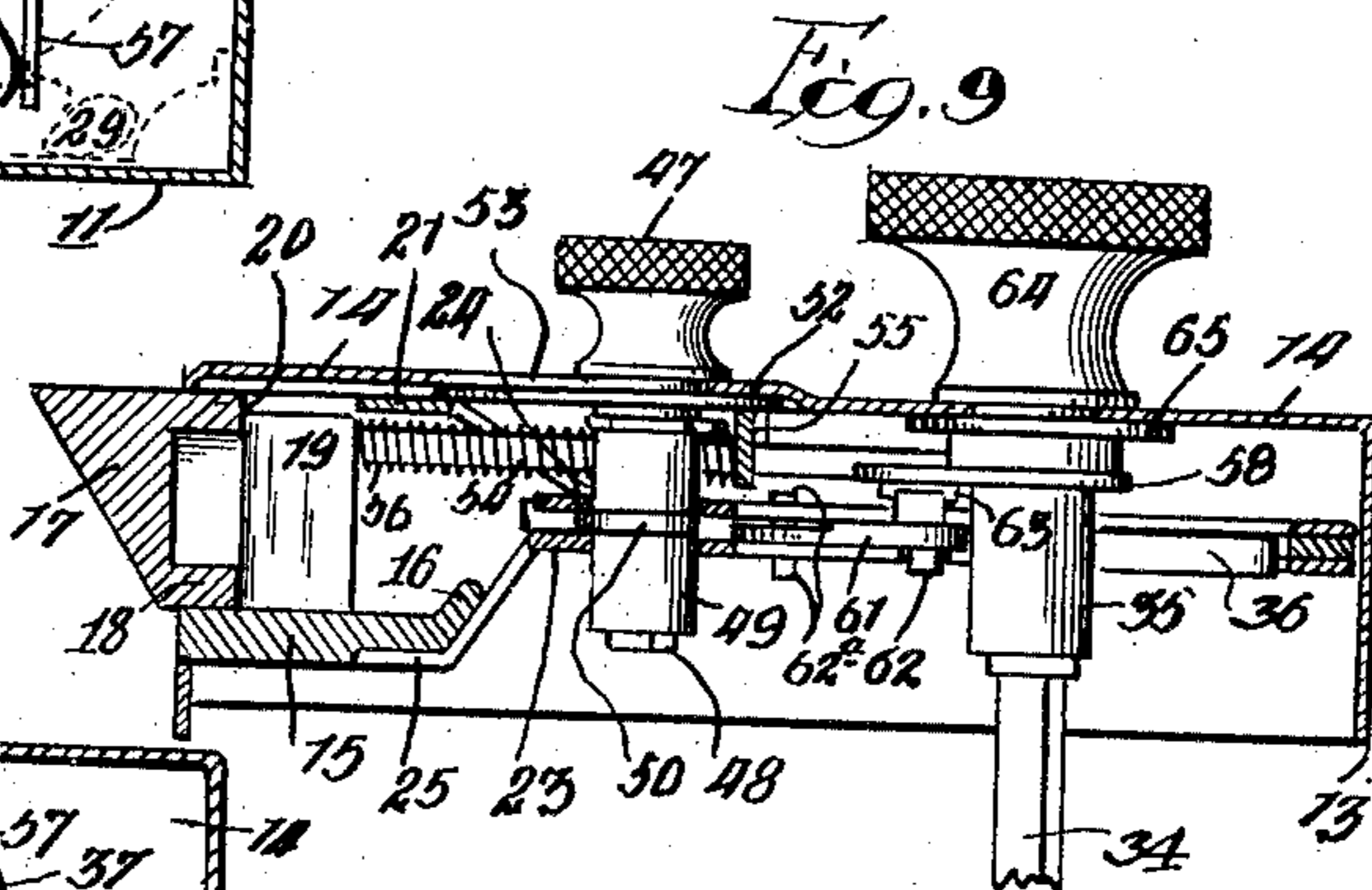


Fig. 9.

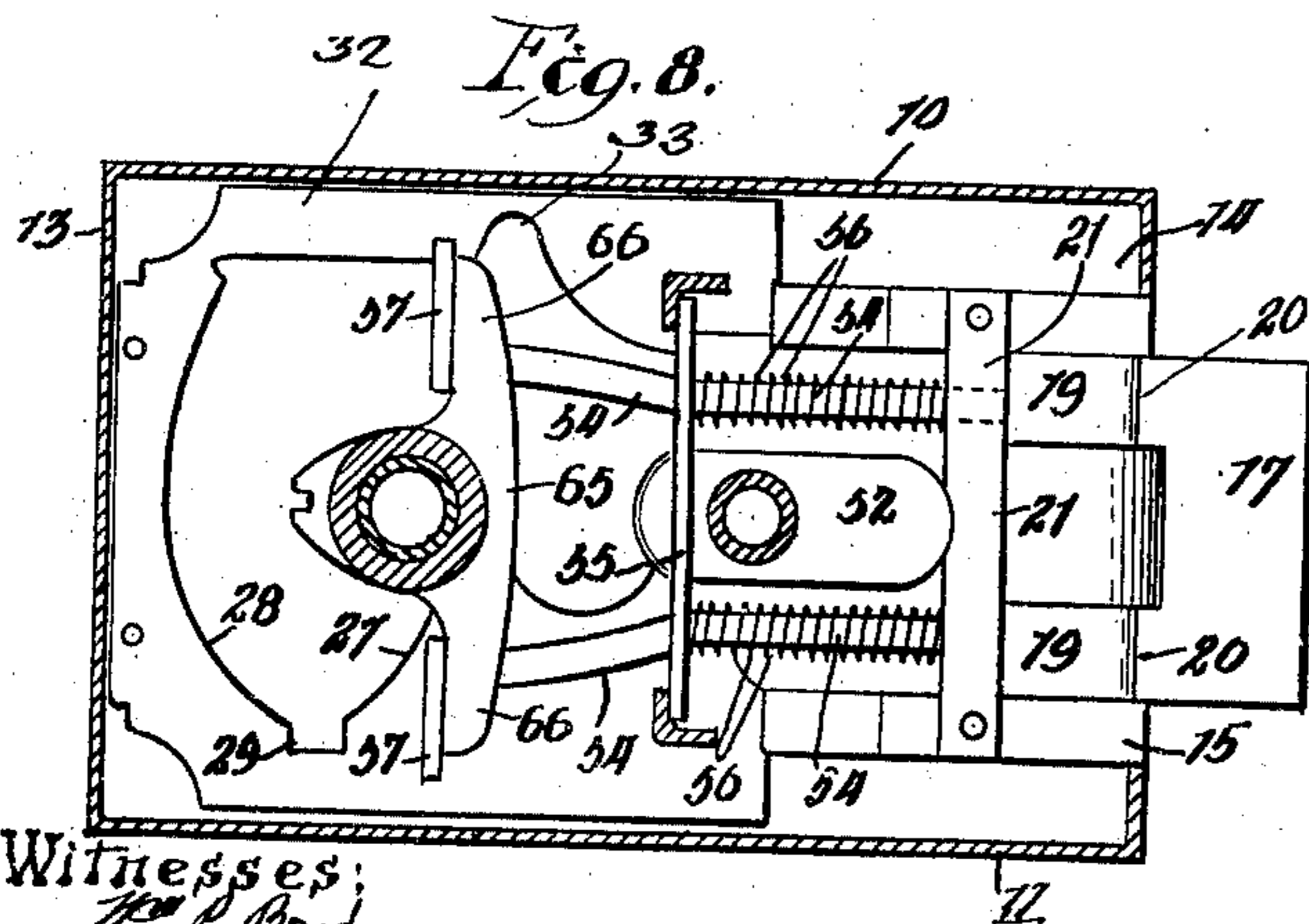


Fig. 8.

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UNITED STATES PATENT OFFICE.

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COMBINED LATCH AND BOLT MECHANISM.

976,773.

Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed March 3, 1908. Serial No. 418,922.

To all whom it may concern:

Be it known that we, EDWIN C. BELKNAP and ERSKINE H. JACKSON, both citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combined Latch and Bolt Mechanism, of which the following is a specification.

10 This invention is intended more particularly for use as a night latch, although the same may be used in connection with the usual knobs as a regular or mortise lock.

15 The object of the invention is to so arrange the parts that both the latch and the bolt may be actuated by the same shaft, which simplifies the construction and renders it extremely strong and compact.

20 Another object of the invention is to provide mechanism for locking the bolt when both in retracted and projected positions, which prevents the forcing back of the bolt by the use of a tool or instrument entered into position to engage the end of the bolt 25 when projected.

30 The invention relates to a lesser or supplemental inner knob, whereby the bolt may be projected and retracted and the locking mechanism therefor actuated independently of the main inner knob and independently of the use of the key.

35 The invention also relates to the arrangement of the latch within the bolt and to the construction and arrangement of the operating mechanism as a whole and the individual parts thereof.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

40 In the drawings, Figure 1 is a side elevation of the mechanism in normal position, with the latch projected and the bolt retracted; Fig. 2 a cross sectional view of the same, taken on line 2—2 of Fig. 1 looking in the direction of the arrows, the intermediate cam lever being removed; Fig. 3 a side elevation showing the outer half of the bolt shank plate removed and the bolt thrown into projected position; Fig. 4 a side elevation, showing both halves of the bolt shank plate removed; Fig. 5 a cross sectional elevation, taken on line 5—5 of Fig. 1 looking in the direction of the arrows, the key-operated shaft being cut off; 55 Fig. 6 a view, similar to Fig. 4, showing both the bolt and the latch retracted; Fig. 7

a view similar to Fig. 3, showing the tumbler arm on the lesser bolt thrown to allow retraction of the bolt; Fig. 8 a side elevation, taken in reverse position to that shown 60 in the remaining figures; and Fig. 9 a sectional plan view taken through the center of the mechanism, the key-operated shaft being cut off.

The mechanism is contained within a box- 65 like casing, comprising upper and lower walls 10 and 11, respectively, front and rear walls 12 and 13, respectively, and an outer side wall 14. The bolt, as shown, comprises a square head 15, from which inwardly extend a pair of rearwardly converging arms 16, best shown in Fig. 9. The bolt is hollow on its interior and has entered therein a latch comprising a beveled head 17 and a square shank 18, which latter is cut 70 away, in its center, to provide upper and lower ears or lugs 19, best shown in Fig. 4. The straight, non-beveled side of the latch head lies flush with the inner side of the bolt, and, as shown in Fig. 8, is provided 80 with a shoulder 20, which is adapted to abut against a cross bar 21 which extends across the bolt and affords a stop or abutment for limiting the retraction of the latch. The bar 21, in conjunction with the three sides 85 of the bolt, provides a secure inclosure for the latch within the bolt.

The converging arms 16 on the bolt provide means for the attachment thereto of a bolt shank plate, which comprises duplicate 90 outer and inner sections 23 and 24, respectively, as shown in Figs. 1 and 3, which sections are, in general, of the same shape and are each provided with a forward neck portion 25, which necks are connected with the 95 bolt by means of the rearwardly converging arms 16, one of which is shown in Fig. 3 by the removal of the outer section 23 of the bolt shank plate. The sections of the shank plate are of generally rectangular 100 formation, and are connected together by means of screws 26 in such manner as to provide a suitable space intermediate the sections for the reception of mechanism to be hereinafter described. The sections of 105 the shank plate are each cut away, in the center, in such manner as to provide a curved forward cam surface 27, which extends substantially half way across the sections, and a rear curved cam surface 28, 110 which extends the full distance across the interior or cut away portion of the sections

of the shank. This gives to the rear portion of the opening in the shank plate an incomplete oval formation, and at the lower end of such opening is a rectangular notch or recess 29. Forward of the oval opening and immediately adjacent the necks 25 on the sections of the shank plate are a pair of necks 30 provided with journal holes 31 which are located immediately behind the center of the bolt and in substantial alignment with the inner ends of the arms 16 thereon. The upper sides 32 of the sections of the shank plate are of barlike formation and are each provided, about midway of the entire length of the sections, with a semi-circular recess 33, the function of which will hereinafter appear. The duplicate sectional formation of the shank plate is such that the two sections form a substantially integral structure cut away intermediate the sections to provide space for the reception of the necessary mechanism; but the cam surfaces heretofore described provide, in effect, but a single surface for the action thereon of the movable portions of the mechanism.

Within the oval shaped opening provided by the cam surfaces above described may be placed a transversely extending square shaft 34 which connects with a suitable lock, preferably of cylinder formation, not shown. The shaft is entered into a sleeve 35, which carries an arm 36 of sufficient length to act against the cam surfaces before mentioned. When the arm is thrown to its rearmost position, as shown in Fig. 1, the bolt shank mechanism as a whole, with the bolt attached thereto, will be retracted. The arm is provided, at its end, with a finger 37 which is adapted to engage the notch 29 when turned to its lowermost position, and thereafter, by continued movement, throw the bolt into its projected position.

Intermediate the two sections of the bolt shank plate is located a trip lever 38 provided, at its forward end, with a depending trip finger 39, which finger, when the bolt is retracted, abuts against the inner wall 40 of an L-shaped plate, in the top wall 41 of which is located an opening 42 of a size to receive the finger when the bolt is thrown into projected position. The inner end 43 of the lever occupies a position immediately above the notch 29 and in the line of travel of the arm 36, in which position it is held elevated by a flat spring 44 entered into the lower edge of the lever. The lever is pivoted, near its center, by a pivot pin 45, which is entered through the two sections of the shank plate; and the lever is further provided with a vertically extending arm 46 which affords supplemental means for actuating the lever. When the parts are in the position shown in Fig. 1, the bolt will be locked in retracted position by the engagement of the finger 39 with the wall 40; and

when the bolt is in projected position the parts will be held locked by the entrance of the finger 39 into the opening 42 in the wall 41.

In order to actuate the bolt, independently of the main shaft, a supplemental or lesser inner knob 47 is provided, which has inwardly extending therefrom a square shaft 48, which carries a journal sleeve 49 mounted within the journal holes 31 formed in the companion arms 30 of the bolt shank sections. The journal sleeve is provided, intermediate the sections of the bolt shank plate, with a double arm 50 having a flat acting edge 51 in tangential relation therewith and in contact with the forward edge of the arm 46 on the lever 38, which arrangement enables the trip lever to be actuated by movement of the supplemental or lesser knob in either direction. The square shaft on the lesser knob is rotatably mounted within a slide plate 52, which is slidably mounted within a slot 53 in the inner wall of the casing, which arrangement permits the supplemental or lesser knob to thrust forward and retract the bolt mechanism as a whole.

The latch operating mechanism is as follows: The lugs 19 on the latch head have entered therein the forward ends of a pair of rearwardly extending latch bars 54 which are suitably spaced to clear the lesser knob mechanism. The latch bars are entered through a guide bar 55, between which and the lugs 19 are interposed coil springs 56 which serve to hold the latch normally in projected position. Each of the latch bars is provided, at its end, with a stop or abutment 57, which is of suitable dimensions to afford shoulders on both the inside and outside of the latch bar. The shoulders, when the latch is projected, occupy positions on opposite sides of the hub or sleeve 35 of the arm 36, the inner end of which hub or sleeve furnishes an axis or bearing for a T-shaped tumbler arm 58 having upper and lower members 59 and 60, respectively, the latter of which engages one of the shoulders or abutments on the lower latch bar, as best shown in Fig. 4. The T-shaped tumbler arm is loosely mounted on the sleeve 35, so that the latter may be moved independently thereof; and, in order to impart an actuating movement to the tumbler arm, by the upward swinging of the arm 36, an intermediate cam lever 61 is provided normally pressed upward by means of a spring. This intermediate cam lever 61 is provided with inner studs 62 and is pivoted, near its top, on outer studs 62^a between the sections 23 and 24 of the bolt shank plate 22. The inner studs 62 are adapted to enter the recesses in the two sections of the bolt shank plate. The inner stud 62, when the bolt shank is retracted as shown in Fig. 1, is adapted, when slightly depressed, to bear against the

beveled cam surface 63 formed on the rear upper edge of the section 59 of the tumbler arm.

In order to operate the latch from within, independently of a movement of the main shaft 34, a main knob 64 is provided, which knob has connected therewith a latch tumbler arm 65, the ends 66 of which engage the inner shoulders afforded by the stops or abutments 57.

In use, with the parts in normal position as shown in Fig. 1, the latch may be operated from without as by means of a key which will rotate the shaft 34 which swings the arm 36 into position to engage the free end of the cam lever 61, the under lug 62 of which thereafter bears against the sloping cam surface 63 on the member 59 of the T-shaped arm. This serves to impart a movement to the loosely mounted tumbler arm 58, which causes the lower end thereof to engage with the shoulder on the lower latch bar, so that continued movement of the tumbler arm retracts the latch, and this retracting movement can be made very considerable in degree by reason of the wide swing of the tumbler arm. We do not show the key and key socket, as it is evident that any form of key and socket may be used to impart rotation to the shaft. Of course, only keys of the proper shape and size can be inserted into the socket, and, therefore, in order to rotate the shaft 34 the proper key must be used. However, we do not include in our invention the form of key and socket, and therefore it is unnecessary to describe or illustrate them further, it being understood that the shaft 34 will be properly connected to the key and socket in such way as to be rotated when the key is turned. In a similar manner the latch can be retracted by the movement of the main inner knob independently of the movement of the main shaft as actuated by the key, the loosely mounted tumbler arm 58 being free to move with respect to the latch tumbler arm 65. When it is desirable to throw the bolt by locking the door from without, this result can be accomplished by turning the main shaft 34 to bring the finger 37 into engagement with the forward edge of the notch 29, which serves to depress the inner end of the trip lever 38, so that a continued movement of the arm 36 will carry forward the bolt shank plate and with it the bolt, the latch, meanwhile, remaining stationary, so that when the bolt is thoroughly projected the flat side of the latch will form, in effect, one of the sides of the bolt, giving to the complete bolt a rectangular formation. In like manner, when it is desirable to project the bolt from within, such result can be accomplished by slightly turning the supplemental or lesser knob in either direction sufficiently to disengage the trip lever from

its abutment, thereafter sliding the lesser arm forward, which carries with it the entire bolt mechanism. When it is desirable to unlock the bolt and thereafter retract the latch, this result can be accomplished by turning the main or key shaft in reverse direction, which throws the trip lever 38 and thereafter retracts the bolt, after which a continued movement of the main shaft brings the arm 36 into engagement with the cam lever 61 and serves to actuate the latch 17 and permit the door to be opened. The formation is one which permits a complete revolution of the main shaft, and, therefore, the key, which is essential in the use of key cylinders in which the key must be entered and withdrawn at the same point in the revolution of the mechanism. The lock is one which is extremely compact and substantially symmetrical in construction, so that the lock can be turned either side up to accommodate doors having a right or left hand swing, and the bolt shank plate within the casing can be likewise reversed to change the bevel of the latch. In this manner doors of all styles can be accommodated. The lock is one which can be used either as a mortise lock or as a face lock, and the great size and throw of the bolt and the latch, in comparison with the relatively small size of the casing and the compactness of the mechanism, render it highly efficient for the purpose intended.

What we regard as new and desire to secure by Letters Patent is:

1. In a lock of the class described, the combination of a bolt, a latch slidable within the bolt head, a main shaft, mechanism actuated by a movement of the main shaft for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, and an intermediate member mounted to engage said latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and the bolt can both be actuated by movements of the main shaft, substantially as described.

2. In a lock of the class described, the combination of a bolt, a latch slidable within the bolt head, a main shaft, mechanism actuated by a movement of the main shaft for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, an intermediate member mounted to engage said latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and the bolt can both be actuated by movements of the main shaft, and supplemental mechanism, independent of the main shaft, for moving the bolt, substantially as described.

3. In a lock of the class described, the combination of a bolt, a latch slidable within the bolt head, a main shaft, mechanism actuated by a movement of the main shaft

for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, an intermediate member mounted to engage said latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and the bolt can both be actuated by movements of the main shaft, and a trip mechanism mounted in position to be thrown by a movement of the bolt actuating mechanism for locking the bolt in retracted and projected positions, substantially as described.

4. In a lock of the class described, the combination of a bolt, a latch slidable within the bolt head, a main shaft, mechanism actuated by a movement of the main shaft for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, an intermediate member pivoted to engage said latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and the bolt can both be actuated by movements of the main shaft, supplemental mechanism, independent of the bolt shaft, for moving the bolt, and a trip mechanism mounted in position to be thrown by either the main bolt actuating mechanism or the independent mechanism for locking the bolt both in retracted and projected positions, substantially as described.

5. In a lock of the class described, the combination of a slidable bolt and a latch slidably mounted within the bolt, a shank frame secured to and movable with the bolt, a main shaft entered through the frame and provided with an arm adapted to engage the frame for projecting and retracting the bolt, a tumbler arm rotatably mounted in axial alinement with the main shaft and adapted to actuate the latch, an intermediate cam lever mounted on the shank frame and adapted, when the bolt is retracted, to be engaged by the arm on the main shaft, and, when thus engaged, to impart a movement to the tumbler arm, substantially as described.

6. In a lock of the class described, the combination of a slidable bolt and a latch slidably mounted within the bolt, a shank frame secured to and movable with the bolt, a main shaft entered through the frame and provided with an arm adapted to engage the frame for projecting and retracting the bolt, a tumbler arm rotatably mounted in axial alinement with the main shaft and adapted to actuate the latch, an intermediate cam lever mounted on the shank frame and adapted, when the bolt is retracted, to be engaged by the arm on the main shaft, and, when thus engaged, to impart a movement to the tumbler arm, a trip arm pivoted to the shank frame and having one end in the line of travel of the first mentioned arm, and provided at its other end with a finger adapted to hold the bolt lock in retracted

and projected positions, substantially as described.

7. In a lock of the class described, the combination of a slidable bolt and a latch slidably mounted within the bolt, a shank frame secured to and movable with the bolt, a main shaft entered through the frame and provided with an arm adapted to engage the frame for projecting and retracting the bolt, a tumbler arm rotatably mounted in axial alinement with the main shaft and adapted to actuate the latch, an intermediate cam lever mounted on the shank frame and adapted, when the bolt is retracted, to be engaged by the arm on the main shaft, and, when thus engaged, to impart a movement to the tumbler arm, and a slidably mounted supplemental or lesser knob connected with the shank frame and adapted to actuate the latter independently of the main shaft, substantially as described.

8. In a lock of the class described, the combination of a slidable bolt and a latch slidably mounted within the bolt, a shank frame secured to and movable with the bolt, a main shaft entered through the frame and provided with an arm adapted to engage the frame for projecting and retracting the bolt, a tumbler arm rotatably mounted in axial alinement with the main shaft and adapted to actuate the latch, an intermediate cam lever mounted on the shank frame and adapted, when the bolt is retracted, to be engaged by the arm on the main shaft, and, when thus engaged, to impart a movement to the tumbler arm, a trip arm pivoted to the shank frame and having one end in the line of travel of the first mentioned arm, and provided at its other end with a finger adapted to hold the bolt lock in retracted and projected positions, and a supplemental or lesser knob rotatably and slidably mounted and provided with a bar adapted to engage the trip lever for throwing the same and thereafter actuating the bolt independently of the main shaft, substantially as described.

9. In a lock of the class described, the combination of a slidable bolt, a latch slidably mounted within the bolt, a bolt shank frame comprising two sections cut away on their interior to provide forward and rear curved surfaces, a main shaft entered through the cut away shank frame and provided with an arm adapted to engage either of said curved surfaces, a trip lever pivoted between the members of the shank frame and having its rear end normally in the line of travel of the arm and having at its forward end a finger, an L-shaped wall provided in its top with a hole adapted to receive the finger when forwardly moved, the inner section of said wall affording an abutment for the finger when retracted, a tumbler arm mounted in axial alinement with

the shaft, a cam lever pivoted between the members of the shank frame in position to be engaged by the arm when the frame is retracted and to permit the unimpeded movement of the arm when the frame is projected, a lug on said cam lever positioned to be thrown into engagement with one end of the tumbler arm when the cam lever is engaged by the arm on the main shaft, and a bar connected with the latch and provided with a stop adapted to be engaged by the other end of the tumbler arm, substantially as described.

10. In a lock of the class described, the combination of a slidable bolt, a latch slidably mounted within the bolt, a bolt shank frame comprising two sections cut away on their interior to provide forward and rear curved surfaces, a main shaft entered through the cut away shank frame and provided with an arm adapted to engage either of said curved surfaces, a trip lever pivoted between the members of the shank frame and having its rear end normally in the line of travel of the arm and having at its forward end a finger, an L-shaped wall provided in its top with a hole adapted to receive the finger when forwardly moved, the inner section of said wall affording an abutment for the finger when retracted, a tumbler arm mounted in axial alinement with the shaft, a cam lever pivoted between the members of the shank frame in position to be engaged by the arm when the frame is retracted and to permit the unimpeded movement of the arm when the frame is projected, a lug on said cam lever positioned to be thrown into engagement with one end of the tumbler arm when the cam lever is engaged by the arm on the main shaft, a bar connected with the latch and provided with a stop adapted to be engaged by the other end of the tumbler arm, and a trip lever pivoted between the sections of the shank frame and having one end normally projected in the line of travel of the arm on the main shaft and having at its opposite end a finger adapted, when the lever is not depressed, to hold the bolt lock in projected or retracted position, substantially as described.

11. In a lock of the class described, the combination of a bolt, a latch, a main shaft, mechanism actuated by a movement of the main shaft for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, an intermediate member mounted to engage said

latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and the bolt can both be actuated by movements of the main shaft, and a stop on the bolt for engaging the latch when the bolt and latch are both in projected position, whereby the latch cannot be retracted when the bolt is thrown, substantially as described.

12. In a lock of the class described, the combination of a bolt, a latch, a main shaft, mechanism actuated by a movement of the main shaft for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, and an intermediate member mounted to engage said latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and the bolt can both be actuated by movements of the main shaft, substantially as described.

13. In a lock of the class described, the combination of a bolt, a latch, a main shaft, mechanism actuated by a movement of the main shaft for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, an intermediate member mounted to engage said latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and the bolt can both be actuated by movements of the main shaft, and supplemental mechanism, independent of the main shaft, for moving the bolt, substantially as described.

14. In a lock of the class described, the combination of a bolt, a latch, a main shaft, mechanism actuated by a movement of the main shaft for operating the bolt, mechanism pivotally mounted in axial alinement with said shaft for moving the latch, an intermediate member mounted to engage said latch actuating mechanism and be engaged by the bolt actuating mechanism, whereby the latch and bolt can both be actuated by movements of the main shaft, and a trip mechanism mounted in position to be thrown by a movement of the bolt actuating mechanism for locking the bolt in retracted and projected positions, substantially as described.

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