

No. 654,609.

Patented July 31, 1900.

A. CRAMOND.

SLIDING DOOR LOCK.

(Application filed Aug. 30, 1899.)

(No Model.)

3 Sheets—Sheet 1.

FIG 2

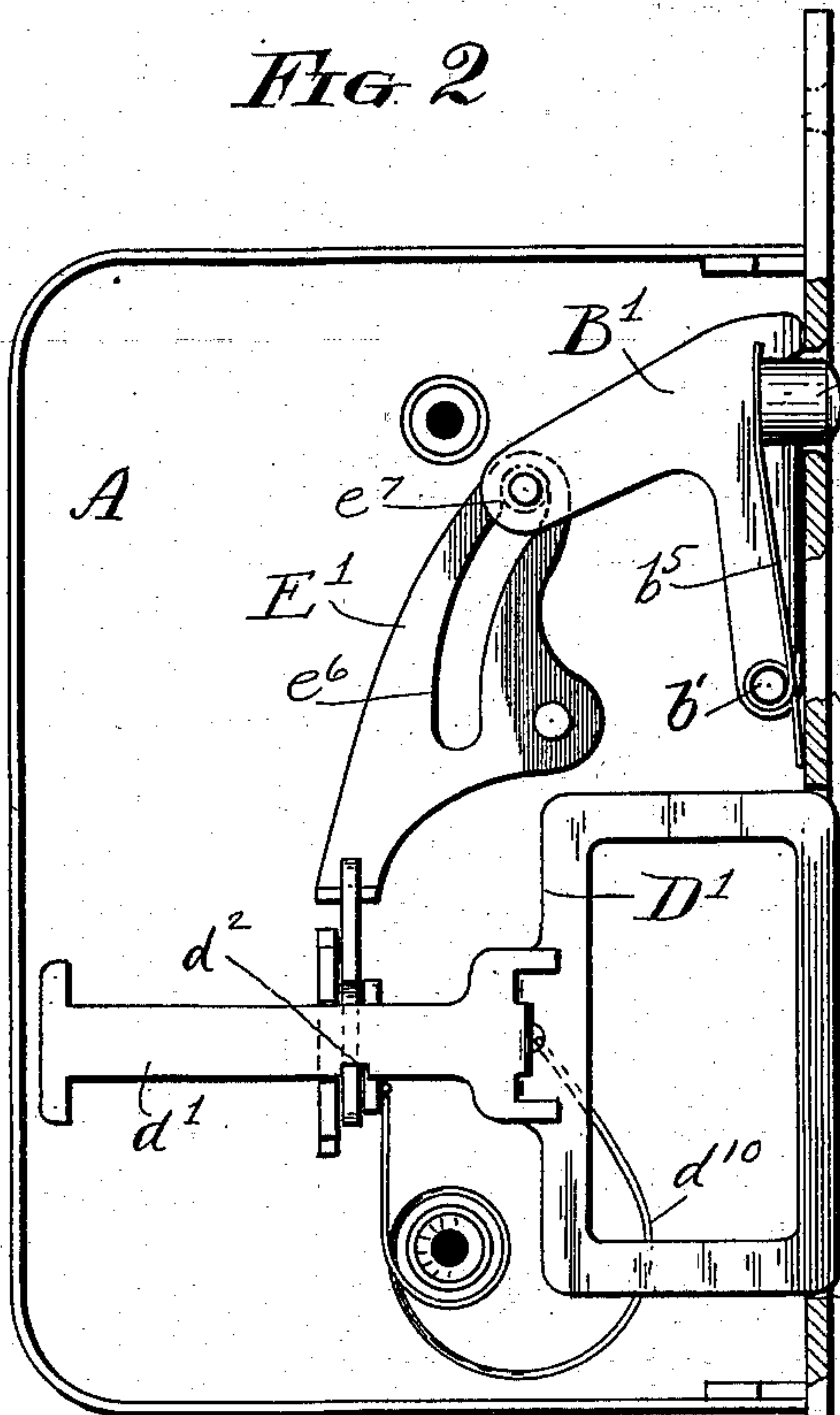


FIG 1

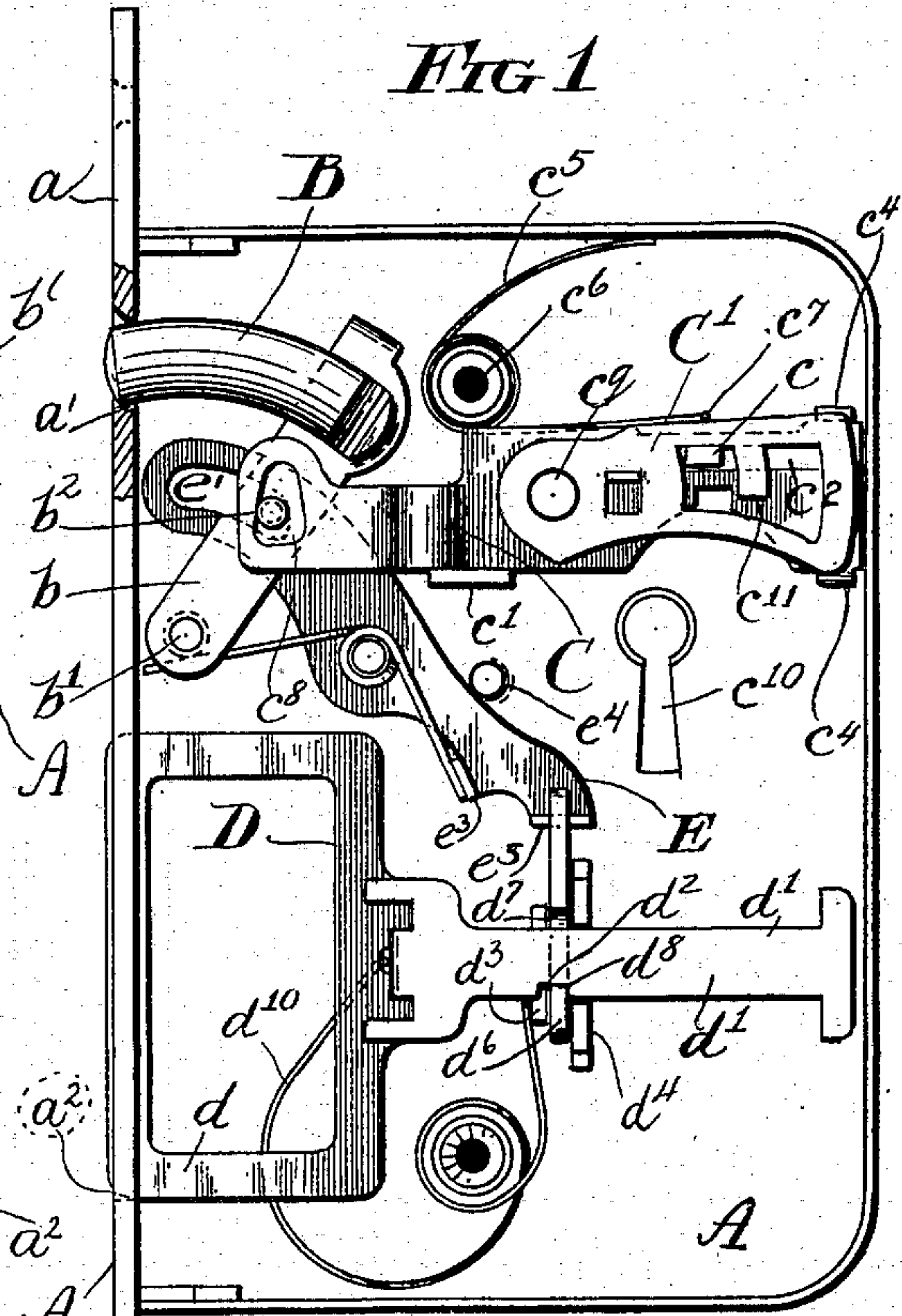


FIG 7

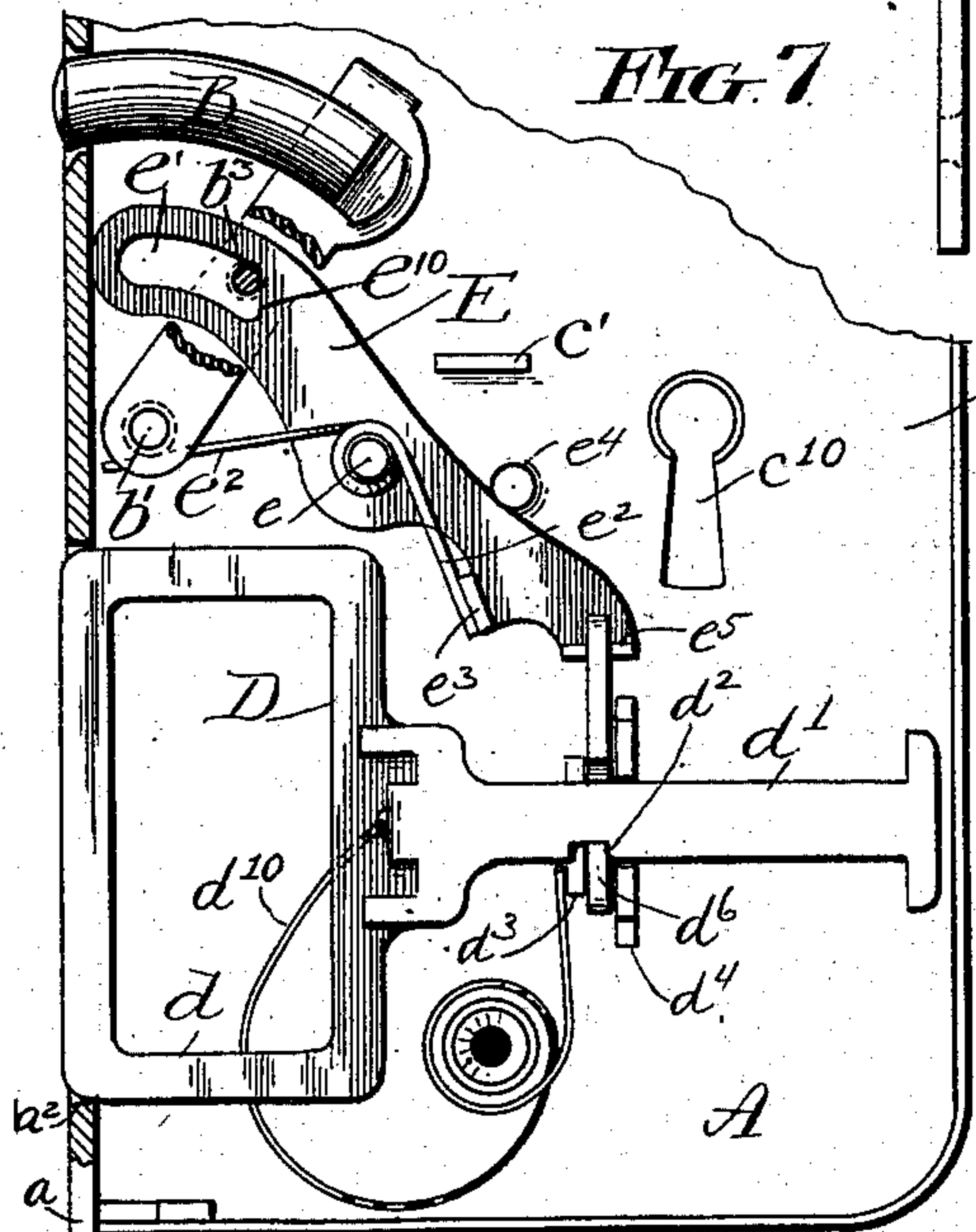
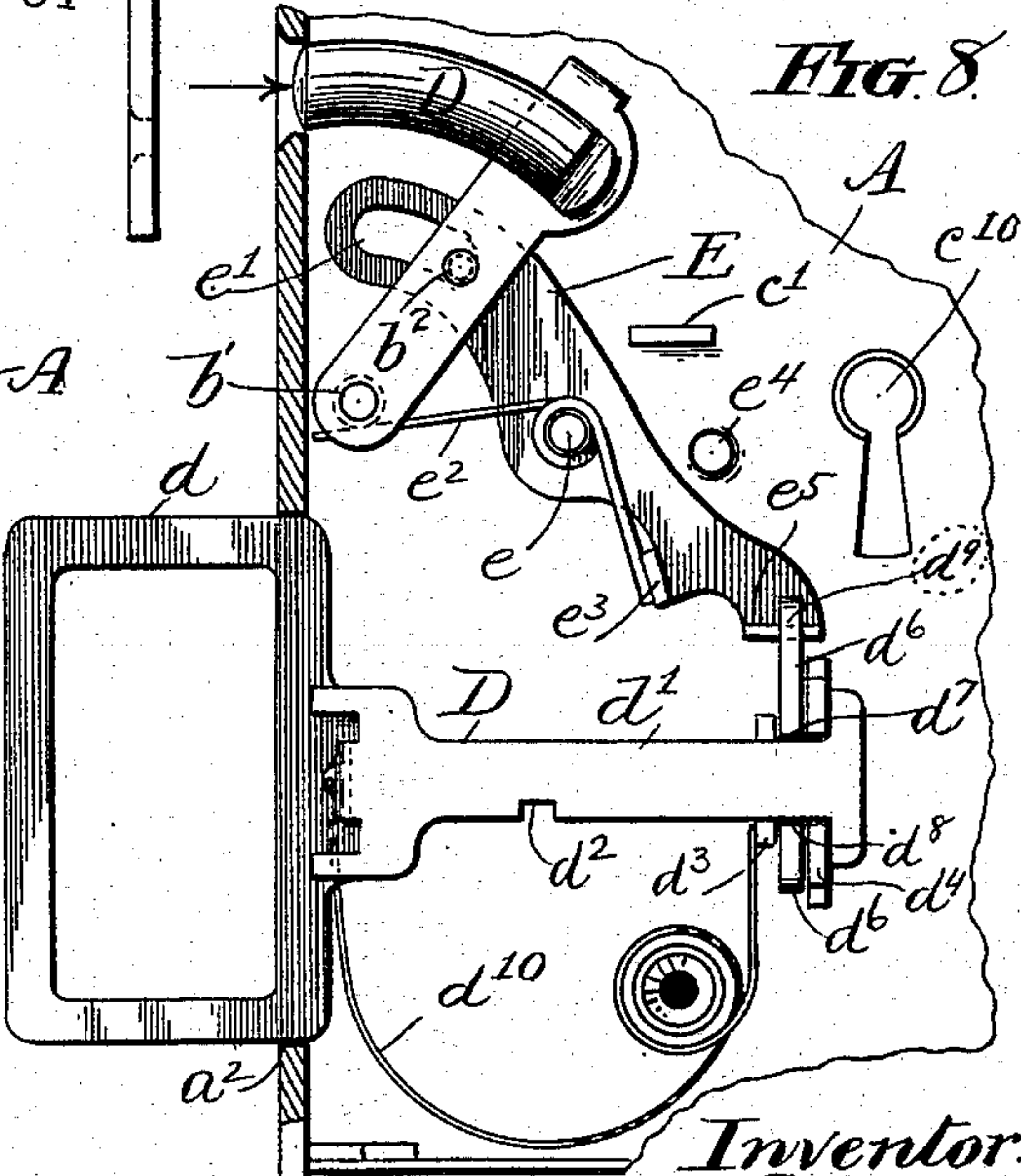


FIG 8



Witnesses:
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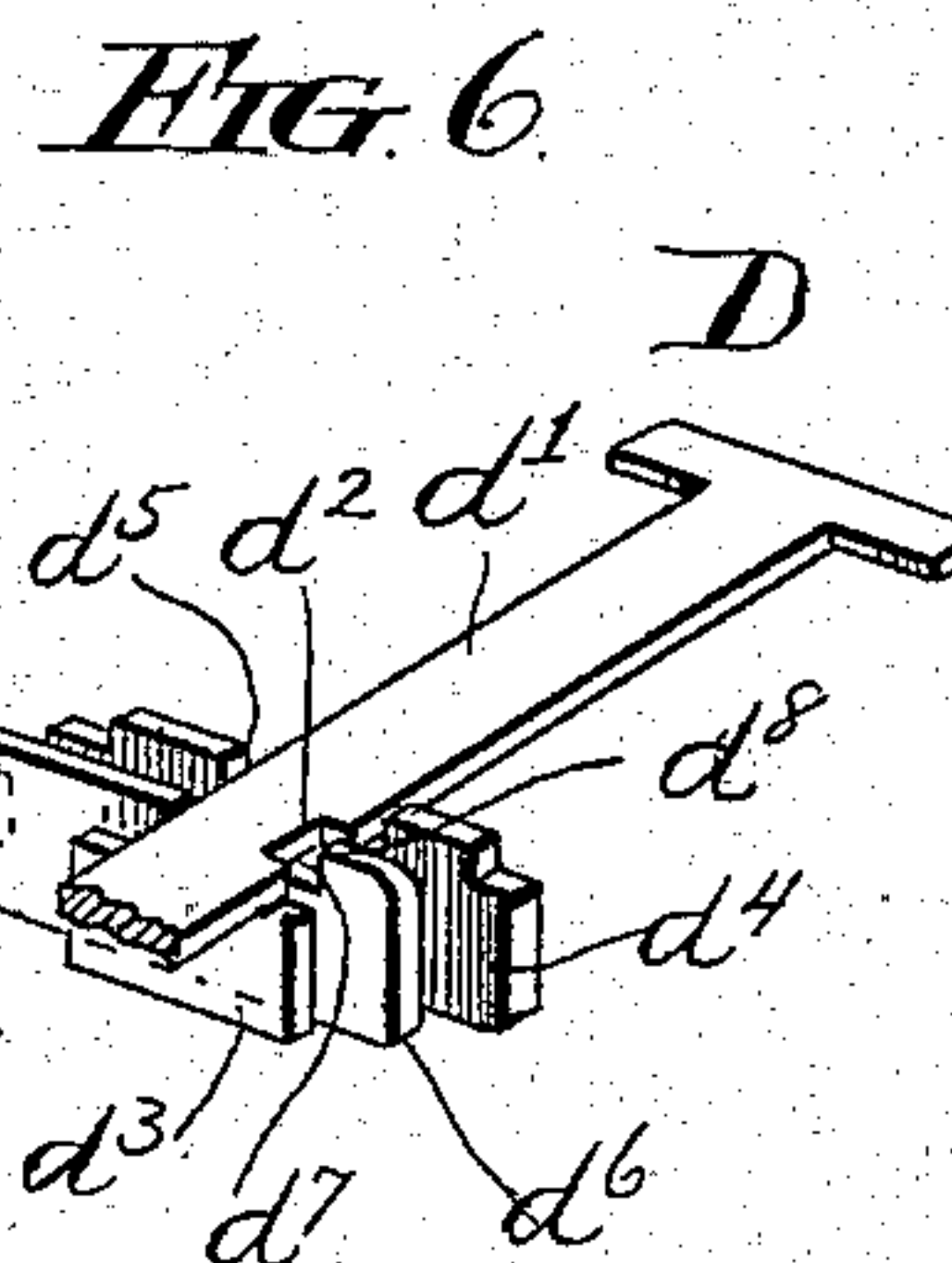
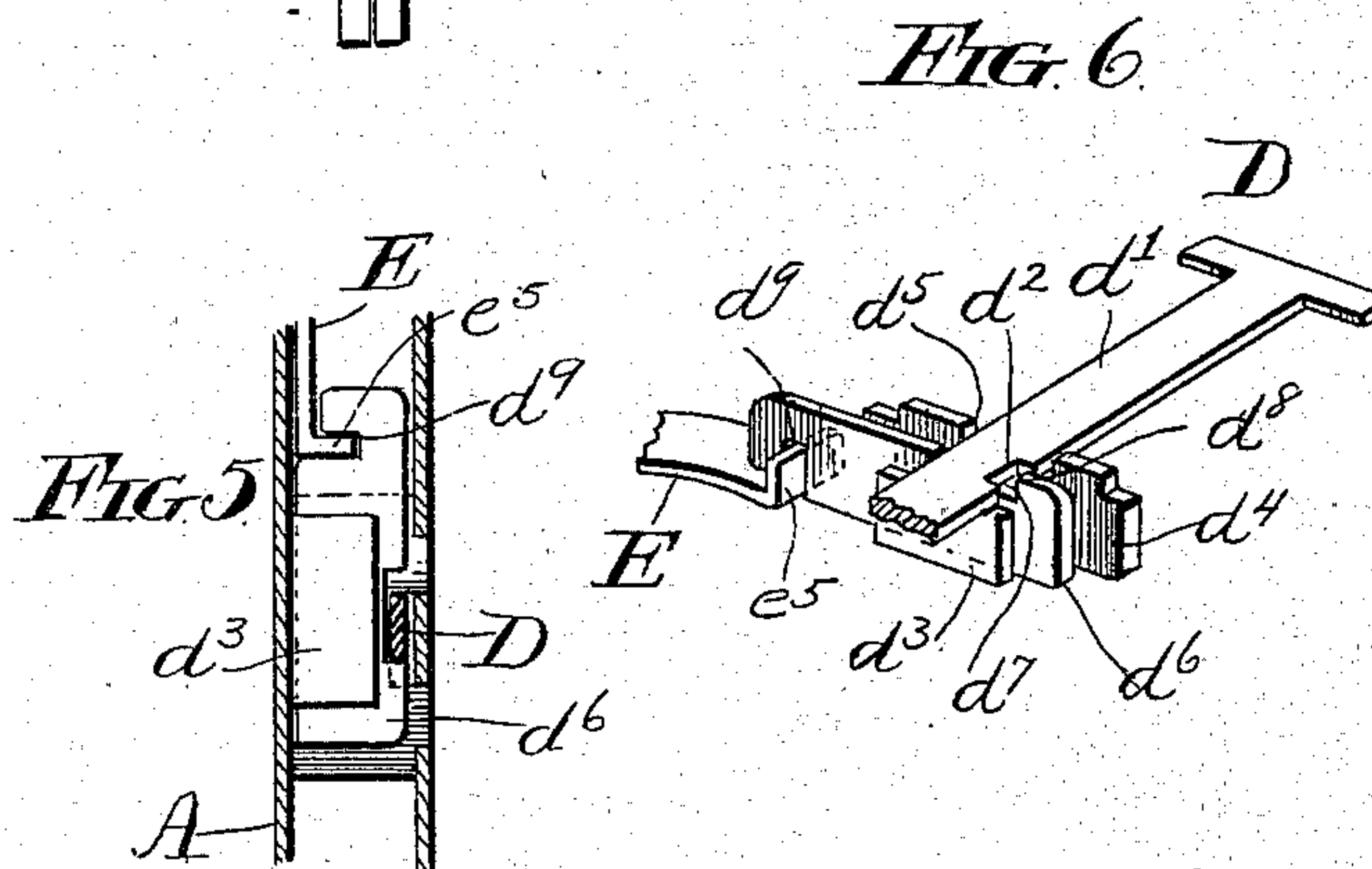
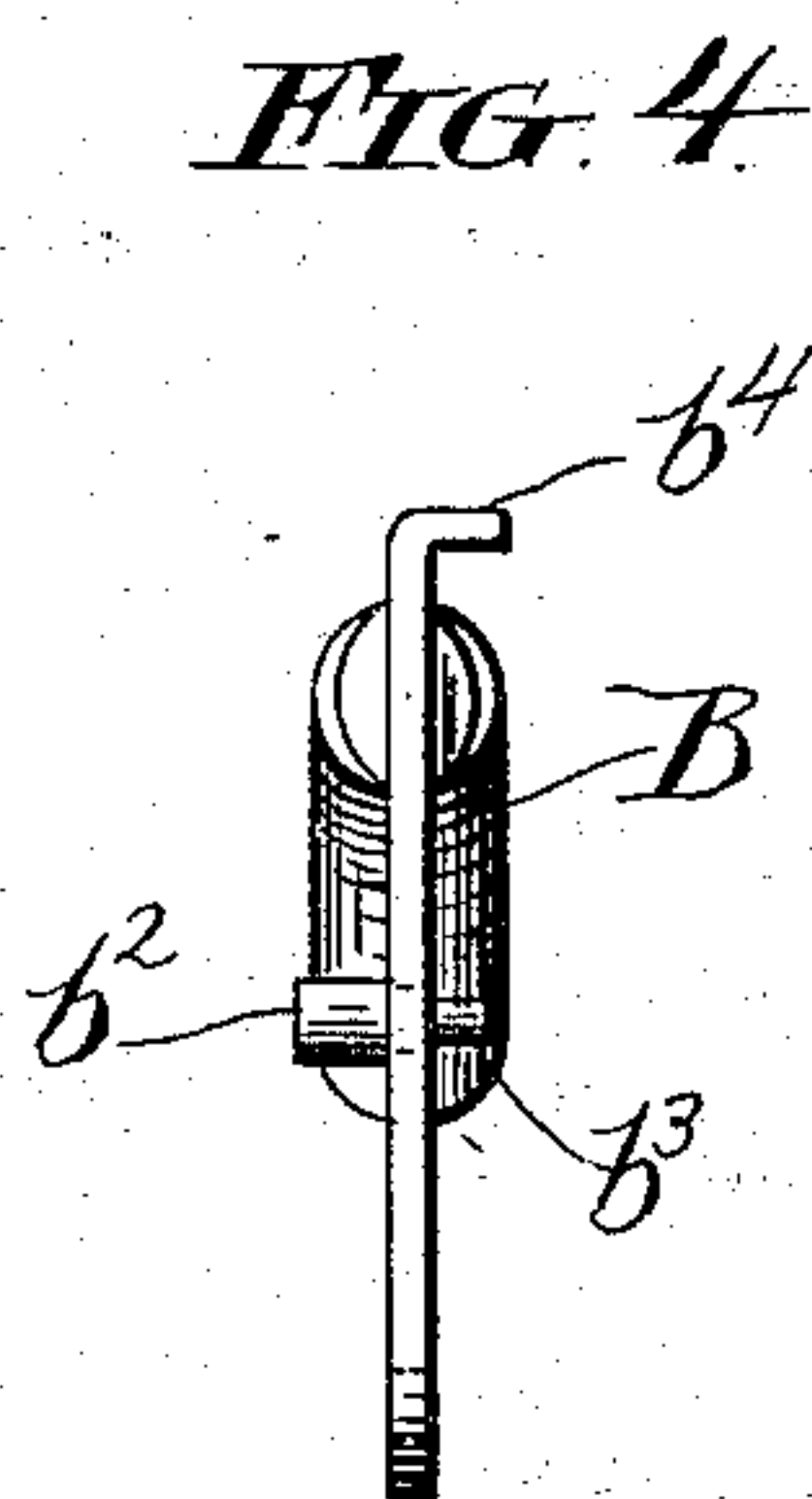
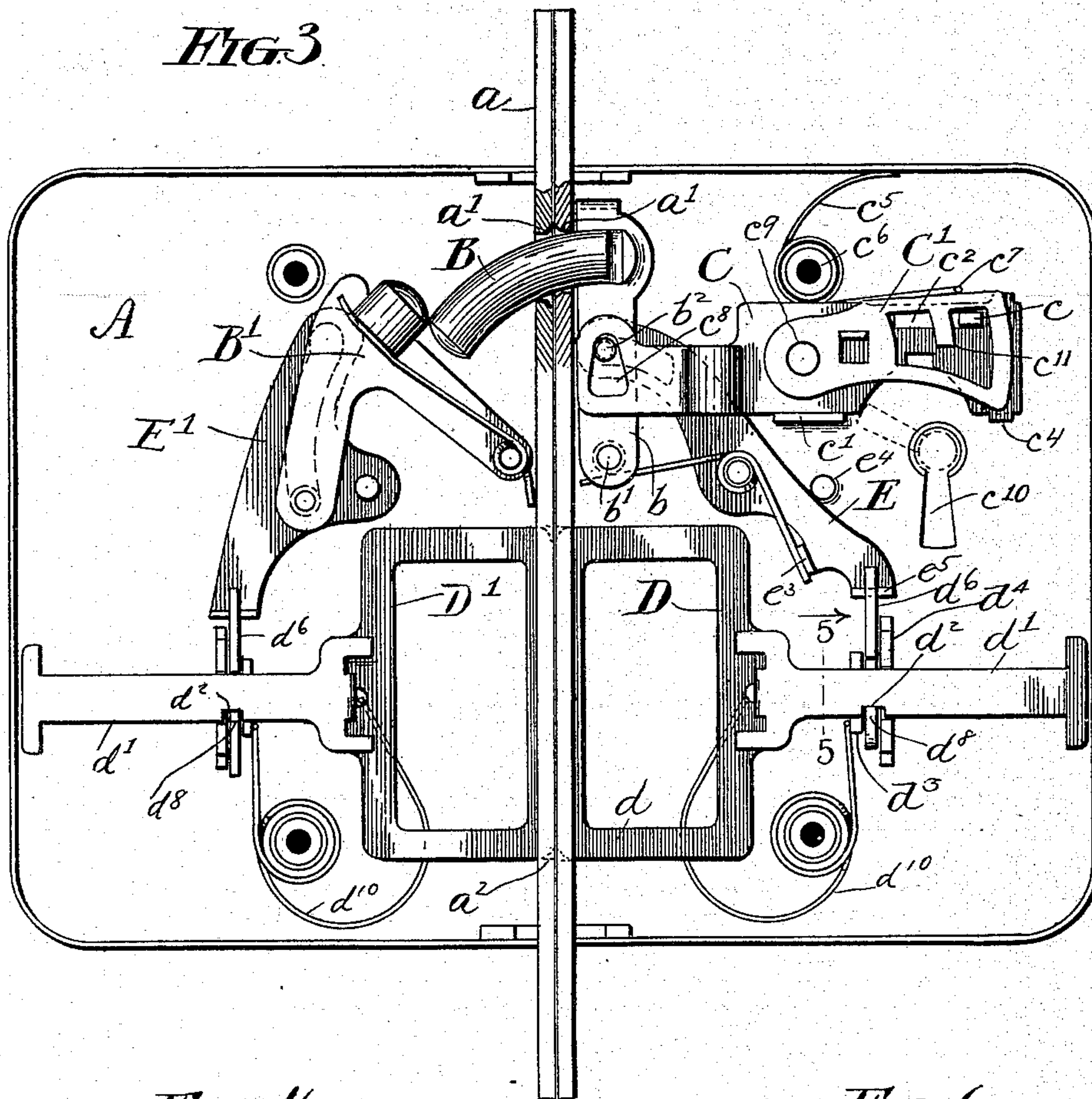
Inventor.
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A. CRAMOND.
SLIDING DOOR LOCK.

(Application filed Aug. 30, 1899.)

(No Model.)

3 Sheets—Sheet 2.



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No. 654,609.

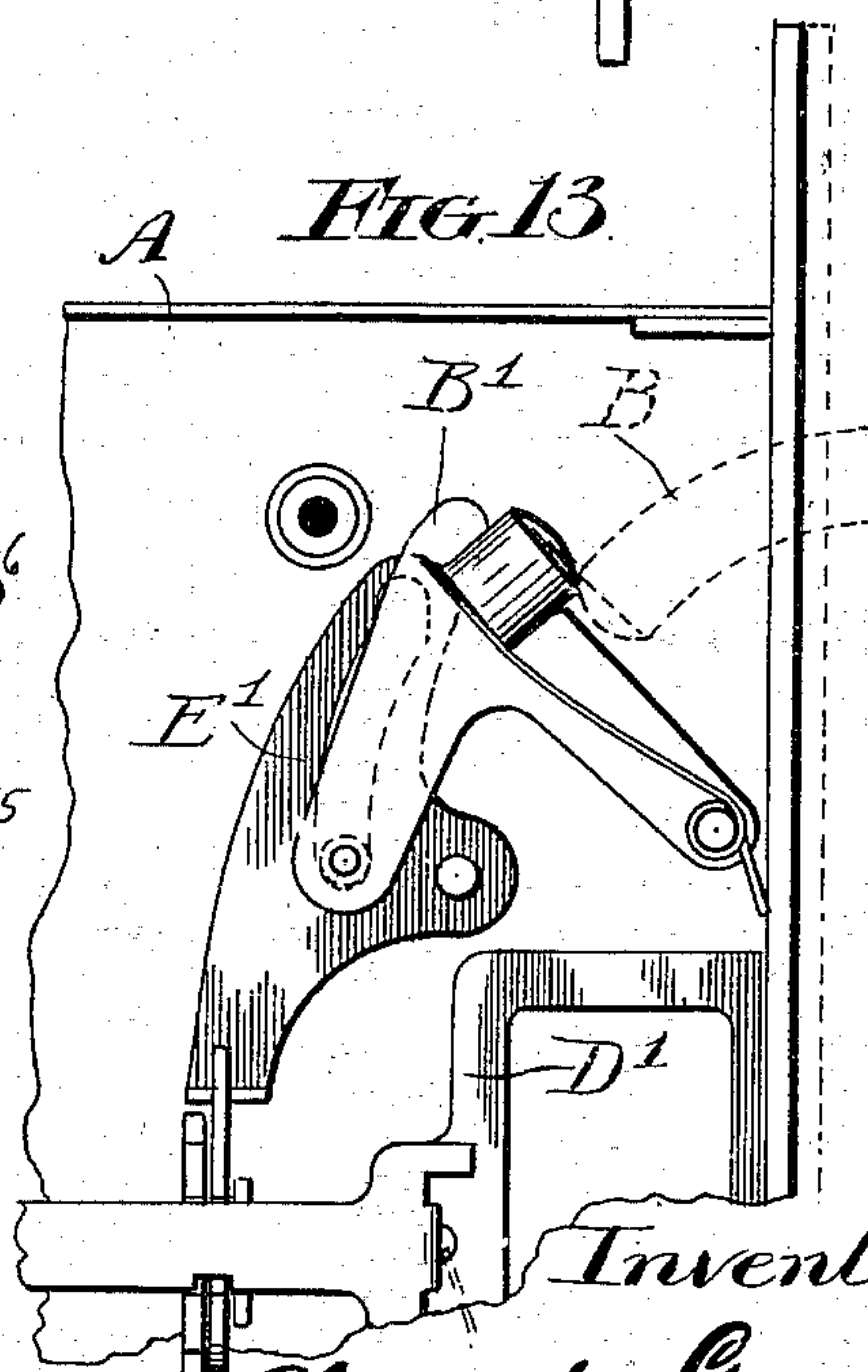
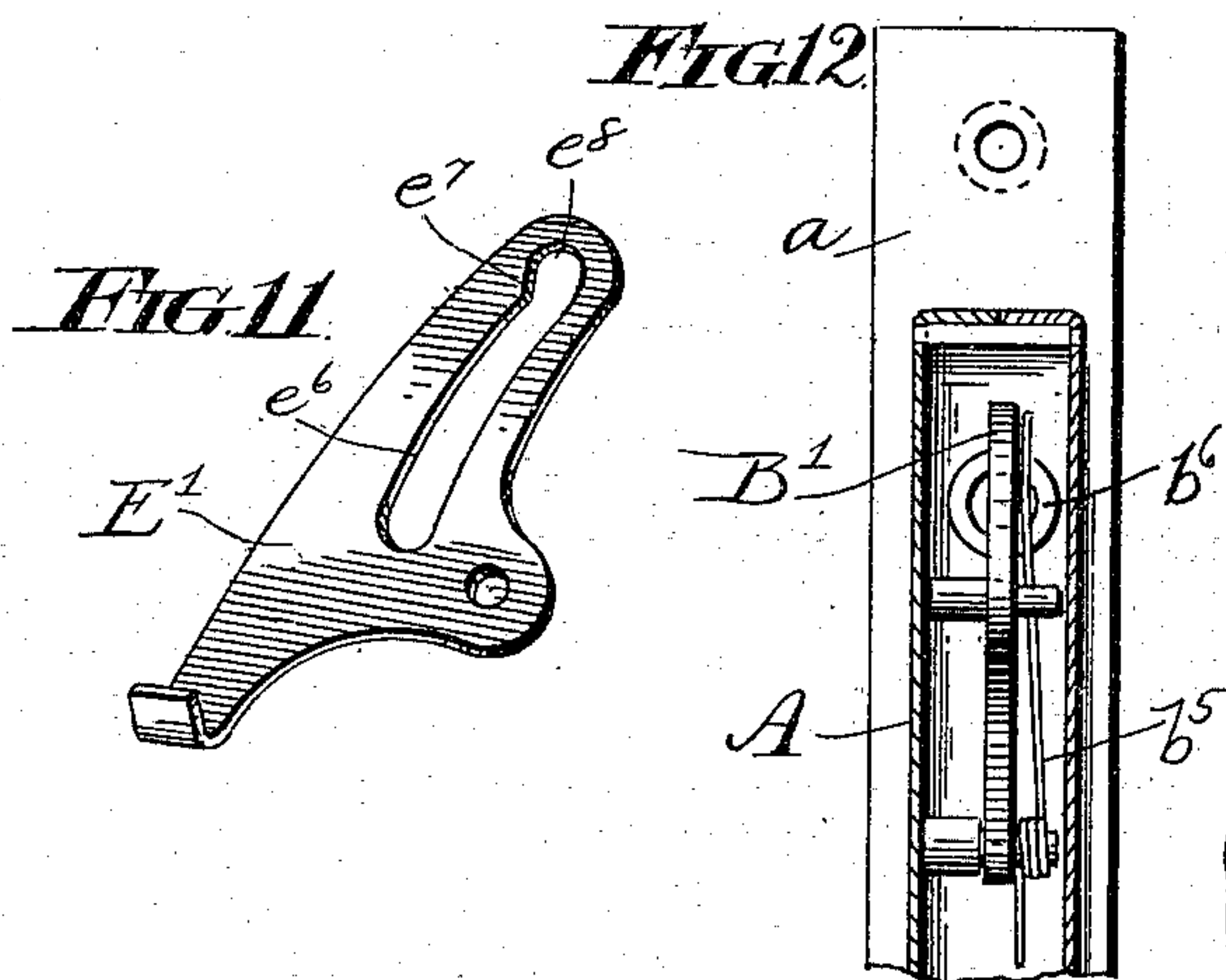
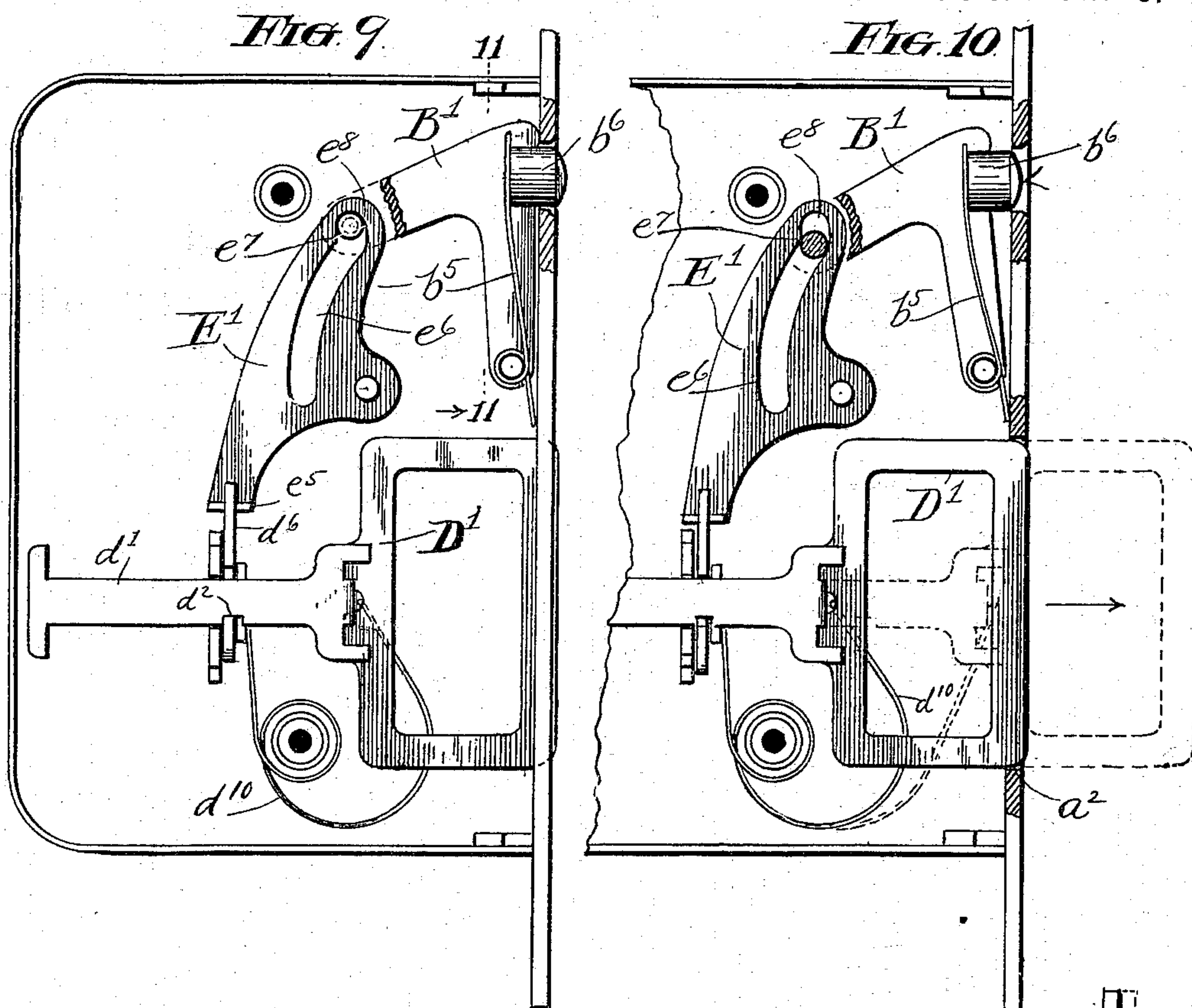
Patented July 31, 1900.

A. CRAMOND.
SLIDING DOOR LOCK.

(Application filed Aug. 30, 1899.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

ALEXANDER CRAMOND, OF LYONS, IOWA, ASSIGNOR TO THE UNITED STATES STEEL LOCK COMPANY, OF SAME PLACE.

SLIDING-DOOR LOCK.

SPECIFICATION forming part of Letters Patent No. 654,609, dated July 31, 1900.

Application filed August 30, 1899. Serial No. 728,966. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER CRAMOND, a citizen of the United States, residing at Lyons, in the county of Clinton and State of Iowa, have invented certain new and useful Improvements in Sliding-Door Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates especially to the class of locks used upon sliding doors; and its objects are to provide a lock for such use in which the pull is automatically locked in its normal retracted position and is automatically thrown or thrust to its position of use by very slight pressure of the finger upon the push-pin or locking-bolt on the key side and upon a corresponding push-pin on the strike side and in which the locking-bolt upon the lock side locks into the recess in the face-plate of the strike side, in which the push-pin upon that side normally lies.

With these ends in view I have devised the novel construction, of which the following description, taken in connection with the accompanying drawings, is a specification.

In locks of this character each of the doors of a pair of sliding doors is provided with a pull by which to operate it, the pull normally lying in a case in a mortise in the door. In this specification the part of the mechanism comprised within the case on that side which is operated by the key to lock the doors together is designated as the "lock" side, being shown at the right hand of Figure 3, while the other side is designated the "strike" side, being shown at the left hand of Fig. 3.

In the accompanying drawings, comprising three sheets, the same reference-letters refer to the same or corresponding parts in the several views.

In the drawings, Fig. 1 is a side elevation of the parts on the key side of the lock, the side plate or cap of the case being removed and the relation shown being that taken when the parts are in normal positions. Fig. 2 is a similar view of the parts on the strike side, the parts here also being in their normal positions. Fig. 3 is a side elevation of the two sides of the lock, showing the parts in their

relative positions when the locking-bolt is thrust to secure the doors together. Fig. 4 is a rear edge view of the locking-bolt or push-pin upon the lock side and its shank. Fig. 5 is a detail sectional view on the line 5 5 of Fig. 3, and Fig. 6 is a perspective view of parts of the lock and release mechanism of the pulls. Figs. 7 and 8 are side elevations showing the parts to release and operate the pull on the key side, Fig. 7 showing the relation of the parts when the pull is retracted and Fig. 8 the relation when it is released. Figs. 9 and 10 are side elevations showing the parts to release and operate the pull on the strike side, Fig. 9 showing the positions of the parts when the pull is in its normal retracted position and Fig. 10 the position just at the moment of the release of the pull, the dotted lines showing the position when the pull is completely thrust. Fig. 11 is a perspective of the release-lever on the strike side. Fig. 12 is a rear edge view of the operating-lever on the strike side, and Fig. 13 is a side elevation showing the operating-lever of the strike side withdrawn to the position it occupies when the locking-bolt engages its recess. It is understood, of course, that in the several views showing elevations the cap of the case is removed.

The reference-letter A denotes a lock-case of ordinary construction, and *a* its face-plate, the latter being provided with a circular recess *a'* and with a lower rectangular recess or opening *a''*, for purposes hereinafter described.

Referring now especially to Figs. 1, 4, 5, 7, and 8, which illustrate the construction of the lock side, or that side in which the key is inserted, B denotes the locking bolt or hook, which is curved or hooked in the usual manner, its shank *b* being formed at an acute angle to the bolt proper and pivoted upon a stud *b'*, which projects from the lock-case near the face-plate, so that when the bolt is thrown it will curve downwardly to engage an opening in the face-plate of the supplemental portion or strike side of the lock in such manner that the sliding doors will be securely locked together, as more fully hereinafter set forth. Stud *b''* project from the shank of the bolt upon opposite sides thereof, respectively, the

combined height of these studs being preferably equal to the inside thickness of the case to preserve the parts in position, these studs having certain other mechanical functions, as will be more fully hereinafter pointed out. The free end of the shank is provided with an ear or projection b^4 , which serves as a bearing upon the inner side of the case when the bolt is operated to preserve its alinement, this construction being clearly indicated in the detail view shown in Fig. 4.

The reference-letter C denotes the carrier, which rests upon and is guided in its forward and backward movements by studs c c' , that project from the lock-case in the usual manner, the stud c entering an elongated slot c^2 in the carrier to preserve its alinement and the carrier having two end lugs c^4 to provide a space between the carrier and case for the coiled spring c^5 , so that the latter will not interfere with the operation of the carrier. This spring surrounds the upper screw-post c^6 of the case, one end bearing against the top rim of the case and the other being bent upwardly and hooked, as at c^7 , to engage over the edge of the carrier C and the tumbler C' . The forward end of the carrier is provided with a slot c^8 , that engages the stud b^2 on the shank of the bolt, this opening being somewhat greater in diameter than the stud and enlarged at its lower end, so that the bolt may have a slight inward movement beyond its normal retracted position independently of the carrier, for a purpose that will be presently described.

The pull D consists of the handpiece d , of usual form, and the shank d' , which is preferably a rectangular strip of sheet metal having a T-shaped inner end or head and a notch or recess d^2 in its lower edge near its junction with the handpiece. The handle d normally lies in the slot a^2 of the face-plate and is automatically thrown out to position to be grasped by the hand by suitable mechanism, hereinafter described. The shank is of less width than the handle and is secured to one edge thereof, its rear end resting upon and being held in proper alinement by a shelf or projection d^3 , extending from the lock-case. A guide-shelf d^4 also extends from the lock-case parallel and in proximity to the shelf d^3 and is cut away or recessed at d^5 to provide a guideway for the shank, the recess being of the width of the body of the shank, so that the T-head of the shank may not pass through it, but will abut on the shelf d^4 to limit the throw of the pull. A locking-plate d^6 is arranged between the shelf d^3 and the guide d^4 and is provided with a recess d^7 in its upper face adapted to be brought into register with the recess or guideway d^5 of the shelf d^4 , the lower faces of these recesses being of approximately the same height as the rest or shelf d^3 , so that their three faces may be in line to provide a bearing for the shank in its movements. The plate d^6 is adapted to be reciprocated up and down in its guideway between the parts d^3 and d^4 by mechanism

presently to be described, and when the pull is in its normal retracted position the relation of parts and the movements thereof are such that the lower lug d^8 of the plate d^6 is projected into the slot d^2 of the shank to lock the pull in retracted position against the tension of the spring d^{10} , which is suitably arranged to exert a constant pressure to thrust the pull forward to its outer position. These parts and their relative different positions are clearly indicated in Figs. 1, 5, 6, and 8. In the last two figures the recess of the locking-plate d^6 is shown as registering with that of the guide d^4 to allow the shank of the slide D to freely move back and forth, while in Figs. 1 and 5 the lug d^8 of the locking-plate engages the recess of the shank to hold it in its retracted position.

As shown in Figs. 5 and 6, the locking-plate is provided with a slot d^9 in its upper end to take over and interlock with an angular projection or ear e^5 on the end of the operating or release lever E. This lever is pivoted upon a post or stud e of the lock-case, which also receives the spring e^2 , one end of which is adapted to bear against any suitable part, as the stud b' , the other end taking against an upwardly-projecting ear or boss e^3 on the lower end of the release-lever and tending to hold the same against its limit-stop e^4 , whereby the parts are returned to the position shown in Figs. 1 and 5. The release-lever E is of irregular shape, as shown in the drawings, being curved slightly to the rear of the case below its pivot to engage the bifurcated or slotted end of the sliding lock-plate d^6 and slightly forward toward the face-plate at its upper end to engage the stud b^3 on the shank of the locking-bolt. It is provided near its upper end with a curved slot e' , which is struck on the arc of a circle having the stud b' as its center and which receives the stud b^3 of the locking-bolt. The stud normally rests at the end of the slot that is toward the center of the case, this end having a slightly-oblique face to form a cam-surface e^{10} , as shown in Fig. 7, and the relation of parts is such that the locking-bolt may be projected or thrust outwardly to its locking position by the key operating on the carrier and tumbler in the usual manner without in any way disturbing the release-lever or its associated parts, the lug b^3 then traversing the slot e' of the lever, while on the other hand the locking-bolt may be retracted slightly beyond its normal position to operate the release-lever of the pull by the action of the stud b^3 upon the cam end of the slot e' without in any way disturbing the carrier and its associated lock mechanism, the lug b^2 of the locking-bolt then moving in the slot c^8 , which, as before stated, is larger than the lug to permit the movement of the lug rearwardly independently of the carrier.

From a consideration of the foregoing description, taken in connection with the illustration, it will be apparent that, with respect

to the key side of the lock, the construction is such as to permit the lock to be operated without disturbing the pull and to permit the pull to be thrust without disturbing the lock mechanism. The action of throwing and retracting the locking-bolt by the key being the same as is usual in this class of locks does not require explanation in detail. This operation does not influence the release mechanism of the pull, owing to the fact that the slot e' of the lever E is struck on the arc of the circle in which the stud b^3 of the locking-bolt travels. On the other hand, when it is desired to throw the pull on this side of the lock it is only necessary to press slightly on the face of the locking-bolt, which normally lies flush with the face-plate of its case, a beveled recess being provided in the face-plate for convenience of operation. When the bolt is in its normal position, the stud b^3 rests against the top of the cam e^{10} of the slot e' , as in Fig. 7, and a slight backward movement of the bolt under the pressure of the finger will cause the lug b^3 to move over the cam of the release-lever E, and thereby rock it upon its pivot against the tension of its spring, and its lower end will push the locking-plate d^6 downward until its lug d^8 moves out of the recess d^2 of the shank of the pull, when the spring d^{10} will cause the pull to move forward into its position of use, the T-head of the shank limiting its movement, as in Fig. 8. As before stated, the stud b^2 merely moves in the enlarged slot c^2 of the carrier during this operation, not moving the carrier. It will be apparent that in this construction the part B performs the function of a locking-bolt and of a finger-piece or push-pin to release the pull.

Referring now particularly to Figs. 2 and 9 to 13 of the drawings, it will be seen that the operative parts on the strike side are assembled in a lock-case similar to that already described and having a face-plate provided with a circular recess and elongated slot, as before. The construction of the pull D' and its associated parts, except the release-lever, is identical with that heretofore described, and hence it is not necessary to describe the same in detail, the same reference-letters indicating the same parts in each instance. The release-lever E' for the pull on the strike side is in the form of a slightly-curved plate having a perforated ear to pivot it upon its stud e , as clearly shown in Fig. 11, the lever being connected to its associated lock-plate d^6 in the same manner as previously described. The lever is provided with a slot e^6 in its upper end, the upper portion of the slot being slightly irregular by reason of an inwardly-facing boss or cam e^7 , formed by an oblique portion e^8 , leading outwardly from the slot and which has an upper cam end e^9 , as shown in Fig. 11. The operating-lever B' is preferably struck in the form shown in Figs. 9 and 10 and is pivoted upon a suitable stud b' , projecting from the lock-case

near its face-plate, this stud also forming the bearing for a suitable spring b^5 , one end of which may bear upon the face-plate of the case and the other against any suitable part of the lever—as, for example, the finger-piece b^6 —which projects through the recess a' flush with the outer surface of the face-plate. The lever is provided with a stud b^3 on its under face and with a projection or stud b^2 upon its upper face, as shown in Fig. 12, the latter stud being adapted to rest against the under side of the cap or cover to hold the former in its position within the slot e^6 of the release-lever E'. The stud b^3 normally lies in the oblique end e^8 of the slot e^6 of the release-lever E', and when pressure is exerted upon the finger-piece b^6 the action of the stud at the inception of its motion is to pass over the cam e^7 , as clearly shown in Fig. 10, and cause the lever E' to rock slightly rearwardly upon its pivot, thus retracting the lock-plate from engagement with the recess d^2 of the shank of the pull and permitting the pull to be thrown by its spring to the position shown by dotted lines in the manner before described. After the stud b^3 has passed the projection e^7 of the slot it may continue to traverse the slot without further affecting the lever E', the slot then being in the arc of the circle traversed by the stud. This latter effect permits the finger-piece and its operating-lever B' to be retracted far enough into its case to allow the locking-bolt B to engage the recess a' in the face-plate of the strike side, in which the finger-piece b^6 normally rests, thus securely locking the two doors together, as clearly shown in Fig. 3. The position of the parts on the strike side when the push-pin is forced backwardly upon its pivot to enable the locking-bolt to engage its recess is clearly shown in the view in Fig. 13, which indicates in detail the various positions assumed by the parts on the strike side at such time. It will be observed that the recesses d^2 in the shanks of the pulls are slightly wider than the lock-plates d^6 , this construction being provided so that when the doors are locked together, as in Fig. 3, the pulls may be slightly forced backwardly into their respective cases when they come in contact with each other upon the locking together of the two sides of the lock.

By the construction above described the parts of the lock are greatly improved and simplified, as it does away with the necessity of providing an additional recess or keeper in the face-plate on the strike side to receive the locking-bolt, the recess for the finger-piece or push-pin of the pull-operating mechanism in this instance performing this additional function. The operating-lever B' is returned to its normal position after either its partial retraction to release the pull or its full retraction to permit the locking-bolt to engage its recess by the spring b^5 , and in either case its stud b^3 , acting upon the cam end of the slot e^8 of the lever E', causes this lever to re-

sume its normal position and to draw its sliding lock-plate d^6 into the slot d^3 of the shank of the pull. By employing a construction of this character the finger-pieces or push-pins for releasing the pulls are made to perform the additional function of providing means to lock the doors together, it being understood that the locking-bolt upon the key side is also a finger-piece or push-pin to release its associated pull and that the finger-piece upon the strike side is an auxiliary or supplemental part of the locking means in that its retraction permits the bolt to engage its recess.

It is apparent that on either side of the lock the pull is automatically locked when retracted to its normal position by the lock-plate d^6 , which takes into the slot d^3 under the stress of its associated spring. On the other hand, each pull is automatically shot or thrown to its position of use by its spring d^{10} when slight pressure is applied to its push-pin, only such pressure being required as is necessary to rock the release-lever against the tension of its spring e^2 or b^5 , as the case may be, and the prolonged pressure necessary when the pulls are projected only by pressure on the finger-pieces is avoided.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lock for sliding doors, a pair of pulls and a pair of push-pins for the pulls, the push-pin on one side being adapted to be projected into the recess of the other push-pin as a locking-bolt.

2. In a lock for sliding doors, a pair of pulls and a push-pin for each pull, the pin on one side adapted to be retracted to two positions, and the pin on the other side adapted to be retracted to one position and also to be projected into the recess of the first push-pin to lock the parts together.

3. In a sliding-door lock, a pull and a push-pin therefor on the key side thereof, means to project the push-pin beyond its normal position, combined with a pull and a push-pin therefor on the strike side, and means to permit the retraction of the latter push-pin beyond its normal position, whereby the two sides may be locked together.

4. In a sliding-door lock, a pair of push-pins and a pull controlled by each pin, lock mechanism adapted to throw the pin on the key side as a locking-bolt, and means on the strike side whereby the push-pin thereof may be forced back beyond its normal position by the locking-bolt.

5. In a sliding-door lock, a pair of pulls and a push-pin for each pull, means to project the pin on one side into the recess of the pin on the other side, release mechanism intermediate each pin and its pull, and means whereby the pulls may be slightly retracted within their respective cases when the parts are locked together.

6. In a sliding-door lock, a pull and a push-pin therefor on the key side thereof, means

to operate the pin as a locking-bolt, in combination with a pull and a push-pin therefor on the strike side, controlling means for the latter pull, a lever engaging the controlling means and provided with a slot having an oblique portion, and a stud on the pin normally resting in said oblique portion and adapted to move the lever in its passage therefrom.

7. In a sliding-door lock, a pull and a push-pin therefor on the key side thereof, means to operate the pin as a locking-bolt, in combination with a pull and a push-pin therefor on the strike side, controlling means for the latter pull, a lever engaging the controlling means and provided with a slot having a cam and a cam end, and a stud on the pin adapted to move the lever in opposite direction by contact with said cam or cam end respectively.

8. In a sliding-door lock, the combination of a spring-pressed pull having a notched shank, a reciprocating lock-plate having a lug normally engaging the notch of the shank, a lever engaging the plate, and a push-pin engaging the lever.

9. In a sliding-door lock, a spring-pull having a notched shank, a lock-plate sliding in a suitable guideway and having a slotted end, a lever having an ear to engage the slot of the plate, and a push-pin for the lever.

10. In a sliding-door lock, a lock-case provided with projections on its inner face to form a guideway, a lock-plate adapted to slide in said guideway and having a locking-lug, a spring-pull having a slotted shank to receive the lug, and means to operate the plate.

11. In a sliding-door lock, a spring-pull having a notched shank, a sliding lock-plate having a lug to interlock with the slot of the shank, a spring for the lock-plate, and means to operate the plate against the tension of the spring.

12. The combination with a locking-bolt and a spring-pull, a carrier to operate the bolt, a lever to control the pull, connections providing lost motion between said bolt and carrier when the bolt is retracted as a push-pin, and connections providing lost motion between said bolt and lever when the bolt is operated by the carrier.

13. The combination with the bolt and spring-pull of a sliding-door lock, of means to lock the pull in its retracted position, and a lever, one of whose arms engages the locking means of the pull and the other engages the bolt, whereby pressure on the bolt when in its normal position releases the pull-locking means.

14. The combination with a pivoted locking-bolt having a stud, and a carrier having a recess of greater diameter than said stud adapted to be engaged thereby, of a spring-pull, means to retain the pull in normal position, and means actuated by the bolt to release the pull, whereby the pull is thrown without affecting the carrier.

15. The combination with a spring-pull and a pivoted bolt, of means to retain the pull, a release-lever actuated by the bolt, and a carrier loosely engaging the bolt, whereby the carrier throws and retracts the bolt, but permits the bolt to move independently to operate the release-lever.

16. The combination with a pivoted bolt having a stud on each face of its shank, a carrier loosely engaging one stud, and a lever loosely engaging the other stud, of a spring-pull, means to lock the pull in retracted position, but released by the lever, whereby the bolt is adapted to be operated by the carrier and to operate the locking means of the pull.

17. The combination with a pivoted bolt having a stud on each face of its shank, a carrier having a recess of greater diameter than said studs and engaging one of them, of a spring-pull having a notched shank, a sliding plate engaging said notch, and a lever, one of whose ends engages the sliding plate, the other being slotted to receive one of the studs of the shank.

18. The combination of a bolt having a stud on each face of its pivoted shank, a carrier loosely engaging one stud, a spring-pull, retaining means for the pull, and a spring-lever for the retaining means, one end of said lever loosely engaging the second stud of the shank.

19. The combination with a spring-pull, release mechanism therefor, of a push-pin adapted to operate the release mechanism at the beginning of its movement and then move independently thereof.

20. The combination with a spring-pull, and a pivoted push-pin, of means to retain the pull, and a lever adapted to operate the retaining means only at the initial movement of the push-pin.

21. The combination with a spring-pull and a pivoted push-pin having a stud, means to retain the pull in retracted position, a lever

connected at one end with said retaining means and having a slot at its other end to receive the stud, the slot being irregular at one end whereby the body of the slot is caused to assume a position in the line of the travel of the stud at its initial movement.

22. The combination of a pivoted push-pin having a stud, a lever having a slot to receive the stud and provided with a cam normally resting against the stud, a spring-pull, and means to release the pull connected with said lever.

23. The combination with a push-pin and a spring-pull, of a locking-plate engaging the pull when retracted, a spring therefor, and means operated by the pin upon its return to normal position to cause the plate to engage the pull.

24. The combination of a spring-pull, a catch to retain the pull in its normal position, a lever controlling the catch and having a slot provided with a cam and a cam end, a spring push-pin having a stud adapted to contact with said cam when the pin is retracted and with said cam end when the pin is restored to its normal position.

25. The combination of a spring-pull, a push-pin to release the pull, and means whereby the push-pin may be moved beyond its releasing position to uncover its recess.

26. The combination with a lock-case having a recess in its face-plate and a pivoted push-pin normally lying in said recess, of a spring-pull adapted to be thrown at the initial movement of the pin, and means whereby the pin may be further retracted by pressure of a locking-bolt entering its recess.

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

ALEXANDER CRAMOND.

Witnesses:

M. J. GABRIEL,
J. W. CLAUSON.