

(Model.)

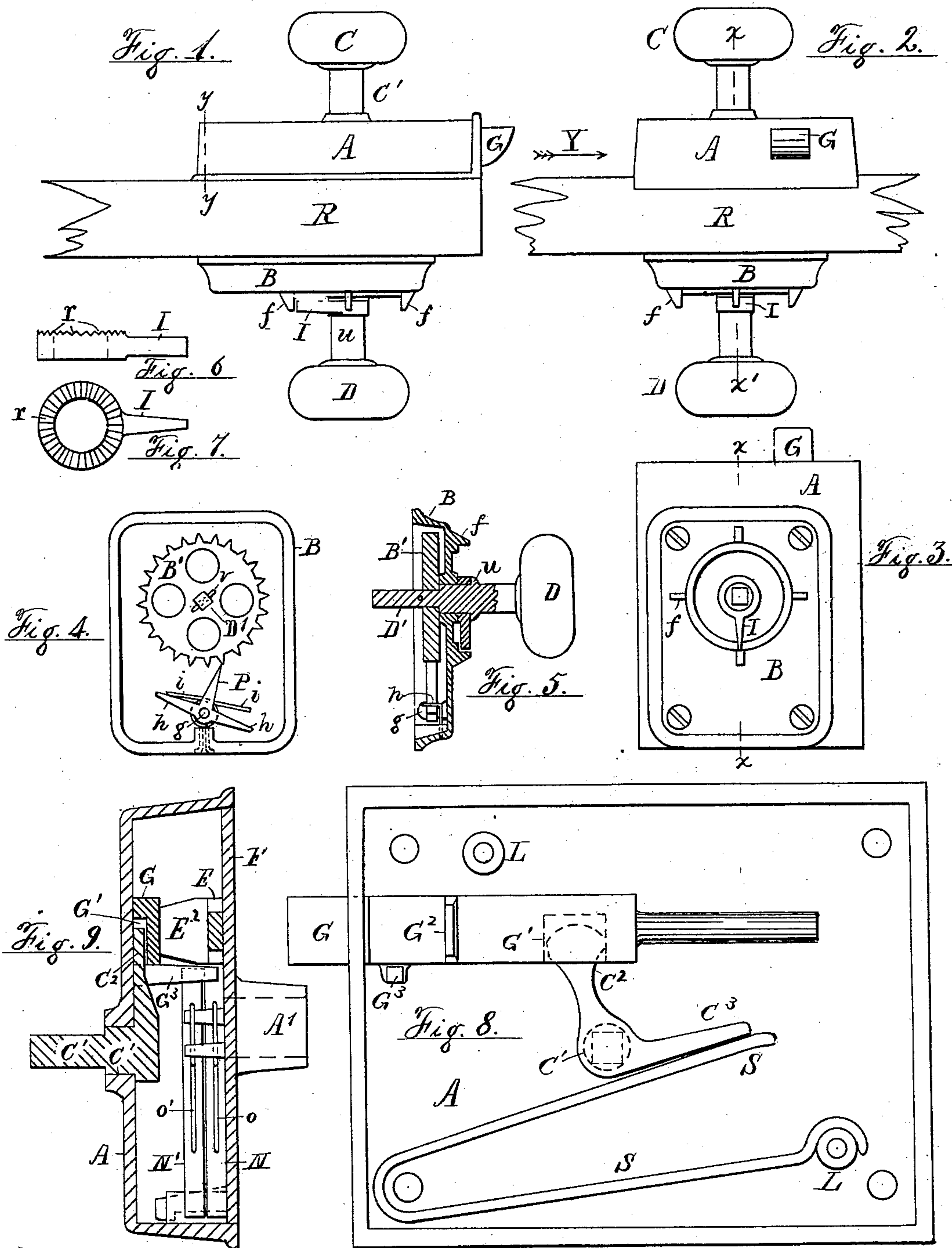
2 Sheets—Sheet 1.

W. S. CHEDISTER.

PERMUTATION LOCK.

No. 273,466.

Patented Mar. 6, 1883.



Attest:

Wm. D. Crane
Chas. C. Merrick

Inventor.

W. S. Chedister per
Thos. S. Crane, Atty.

(Model.)

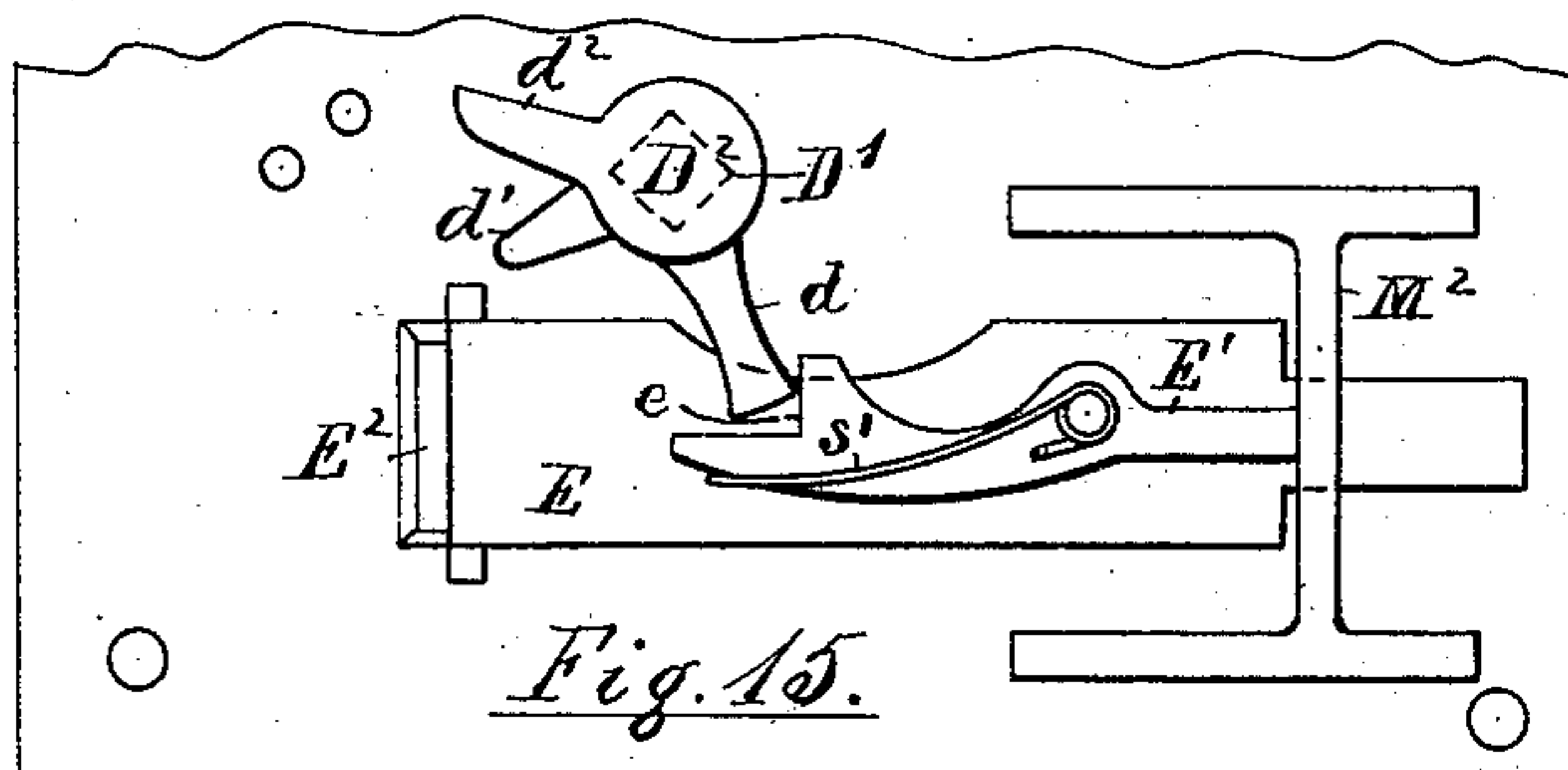
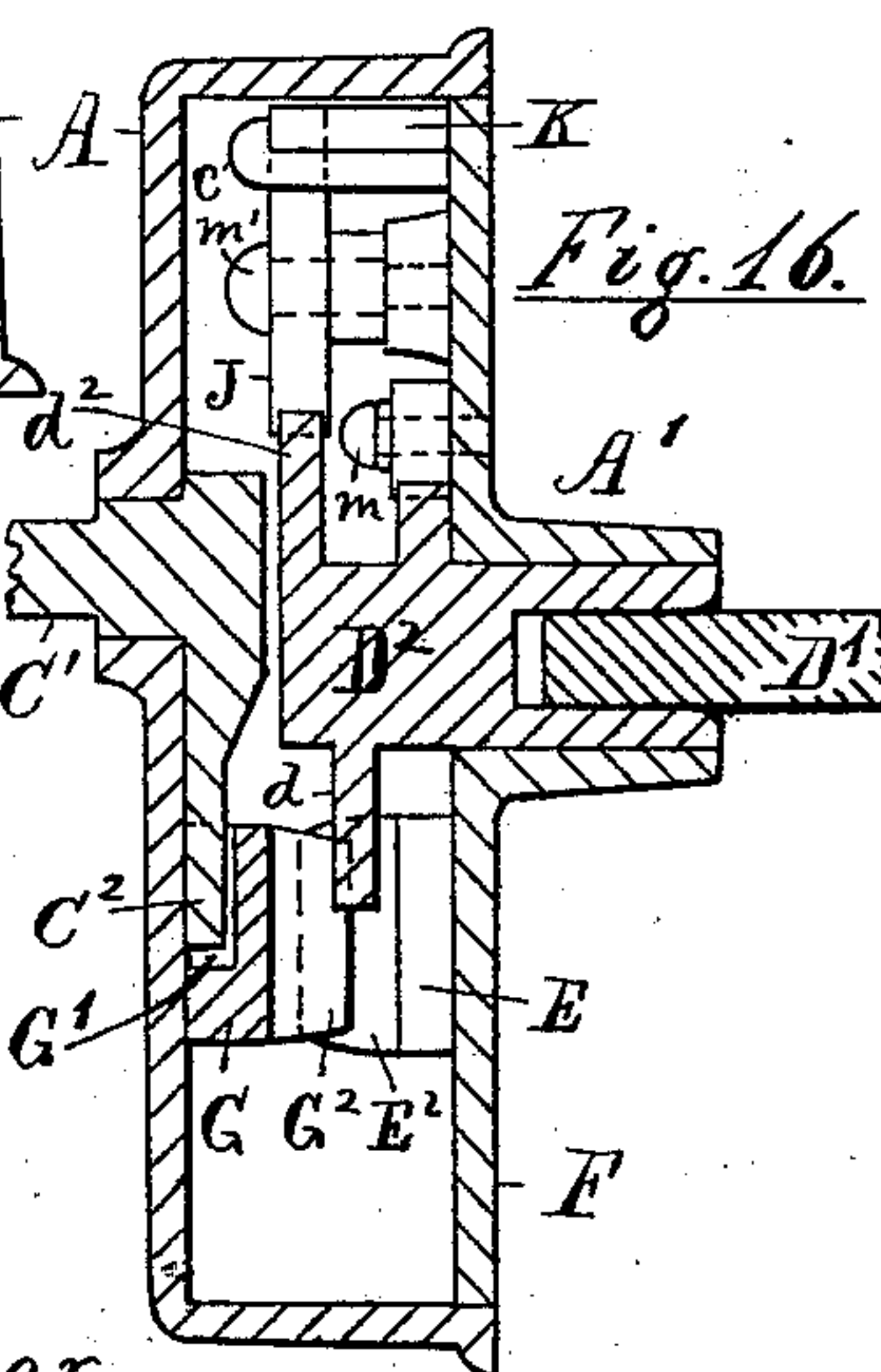
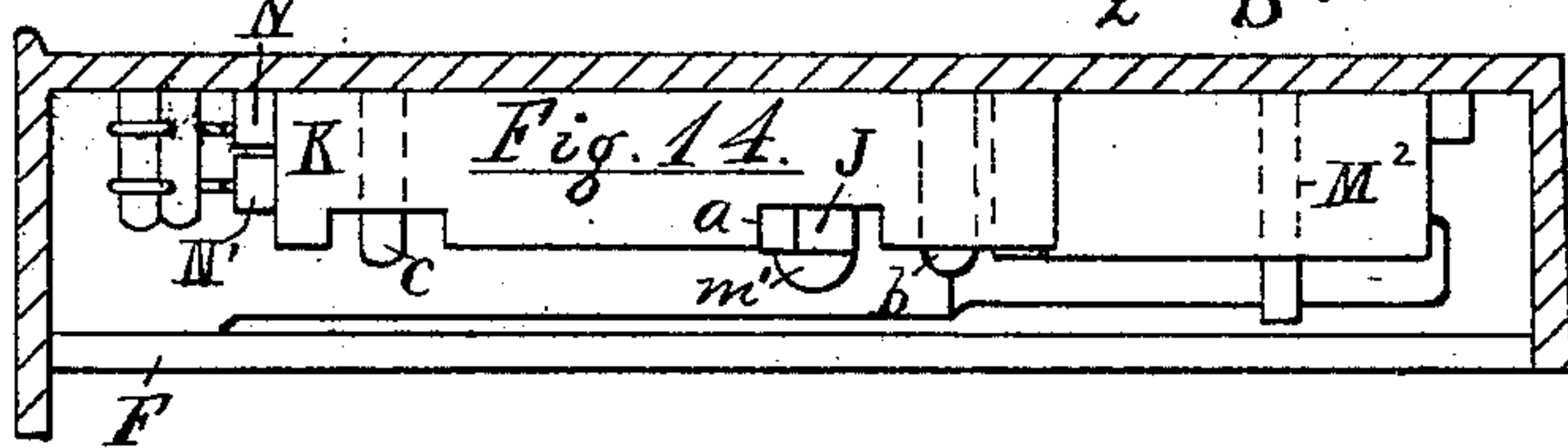
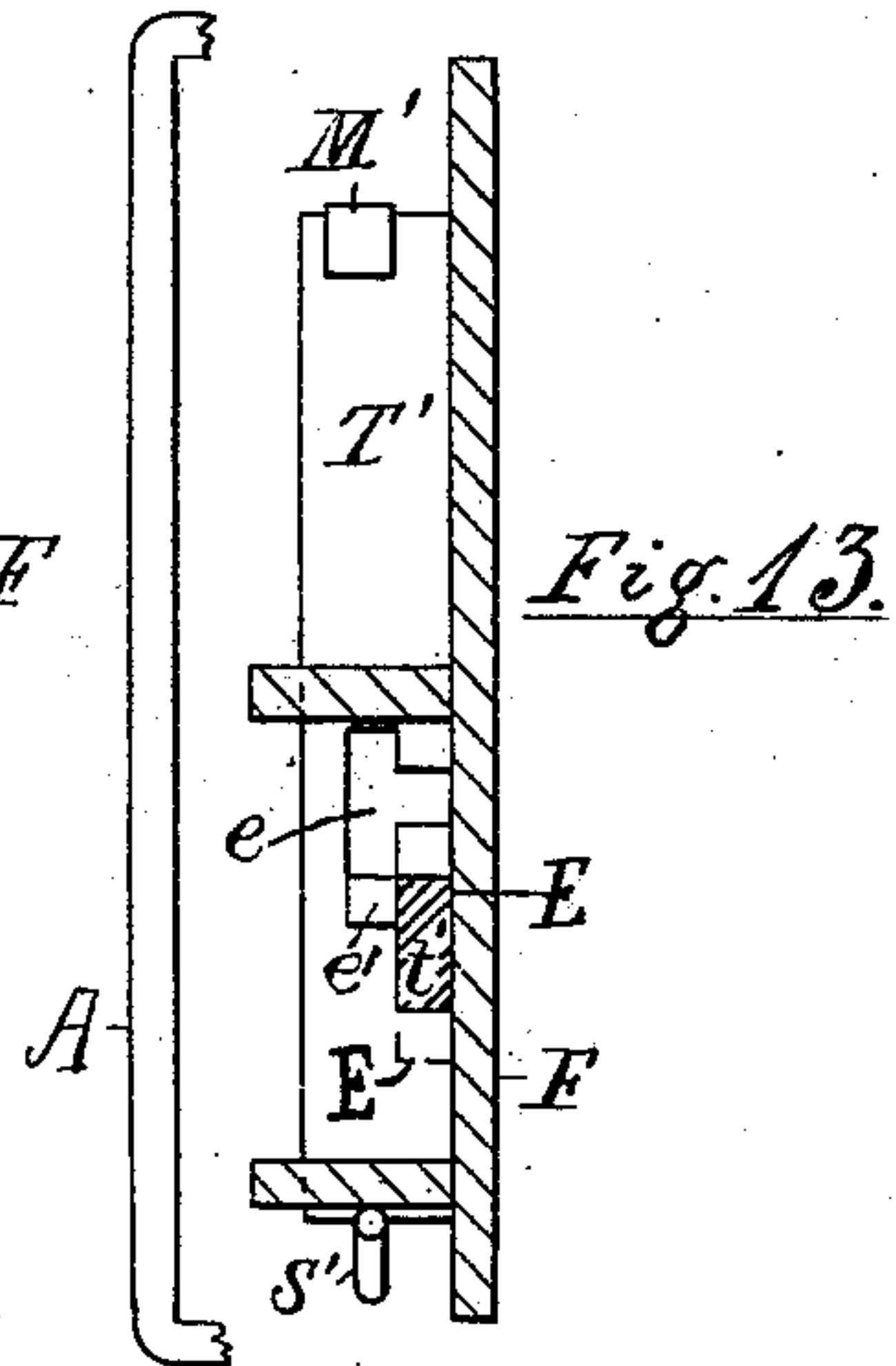
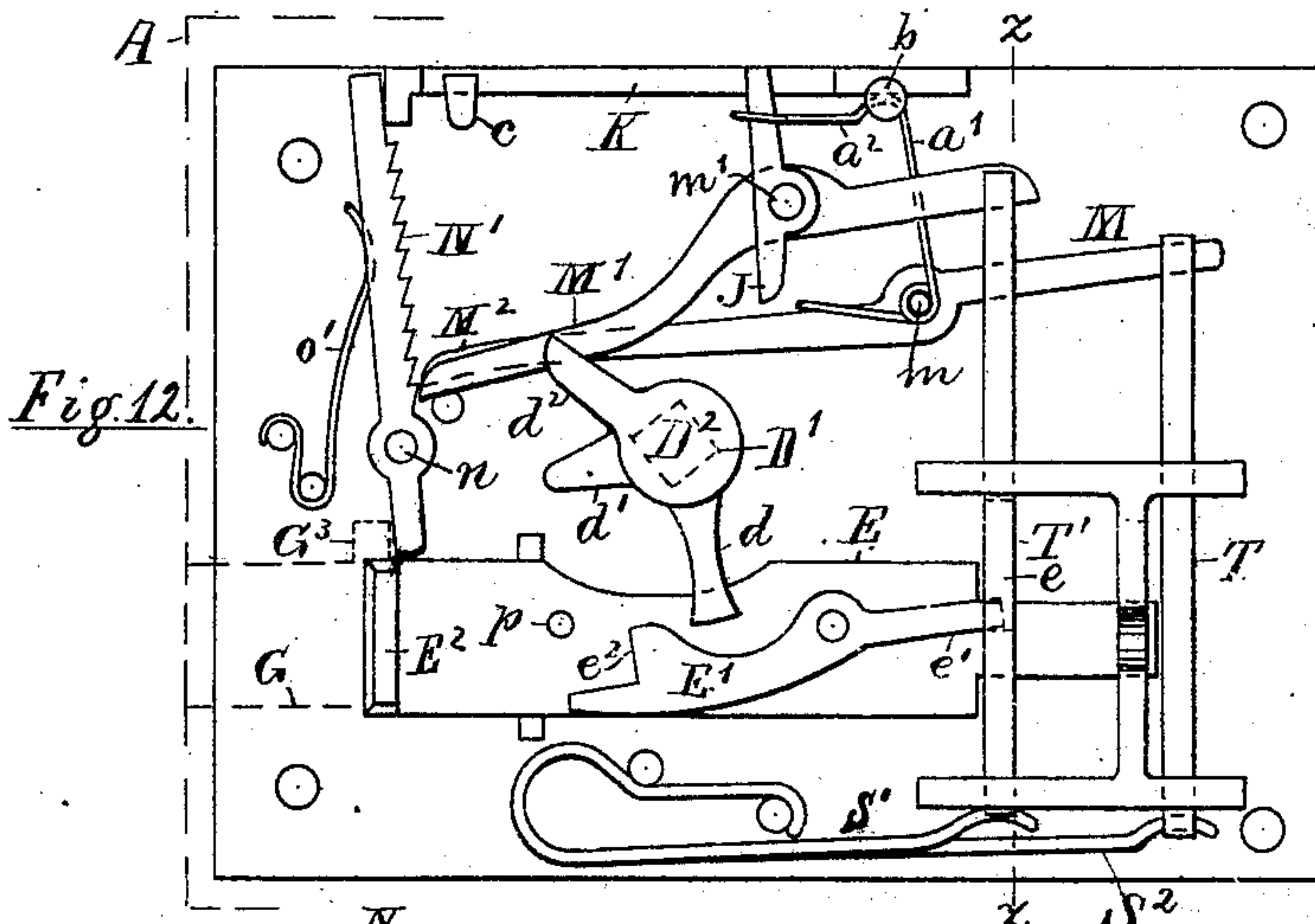
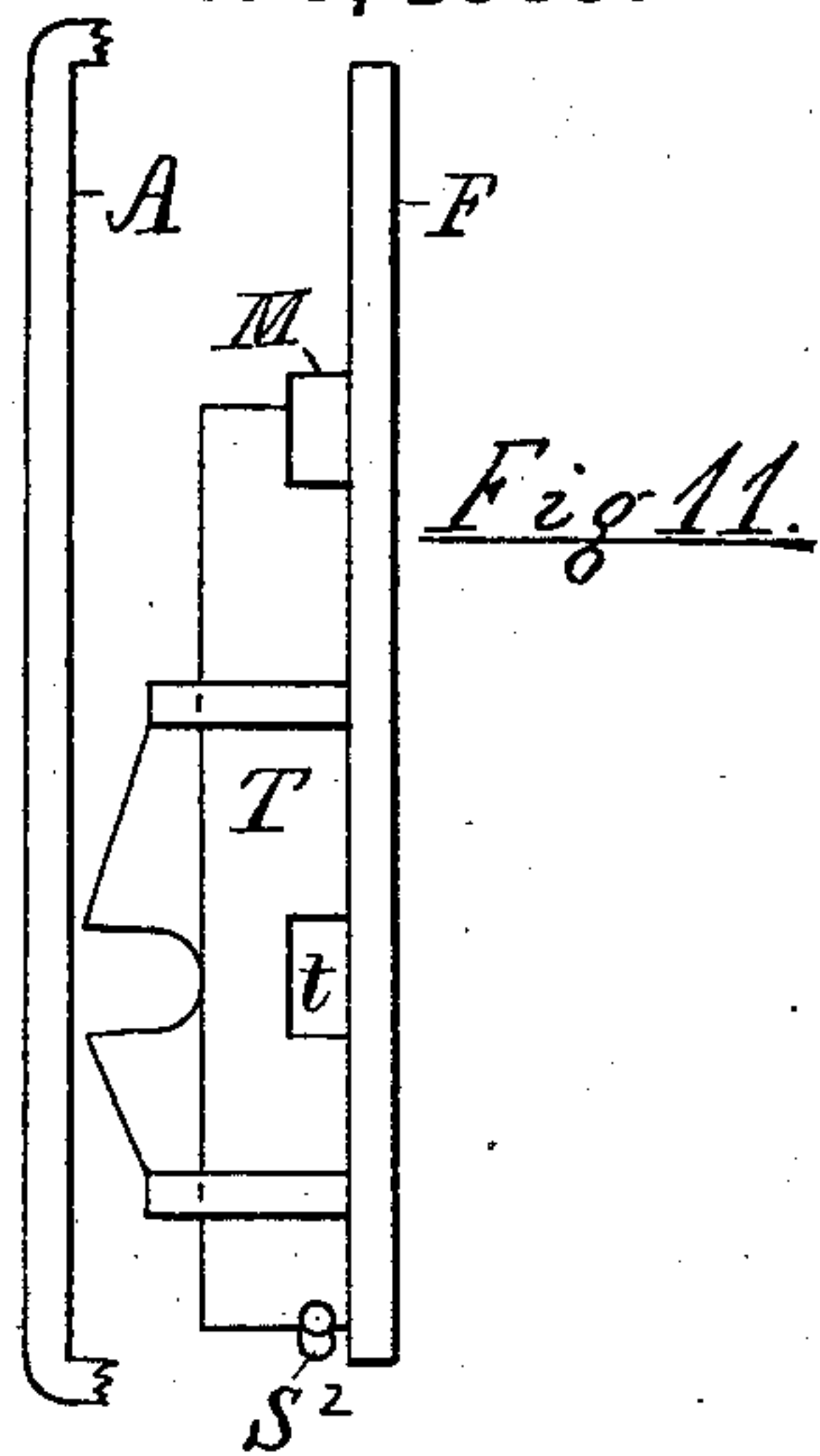
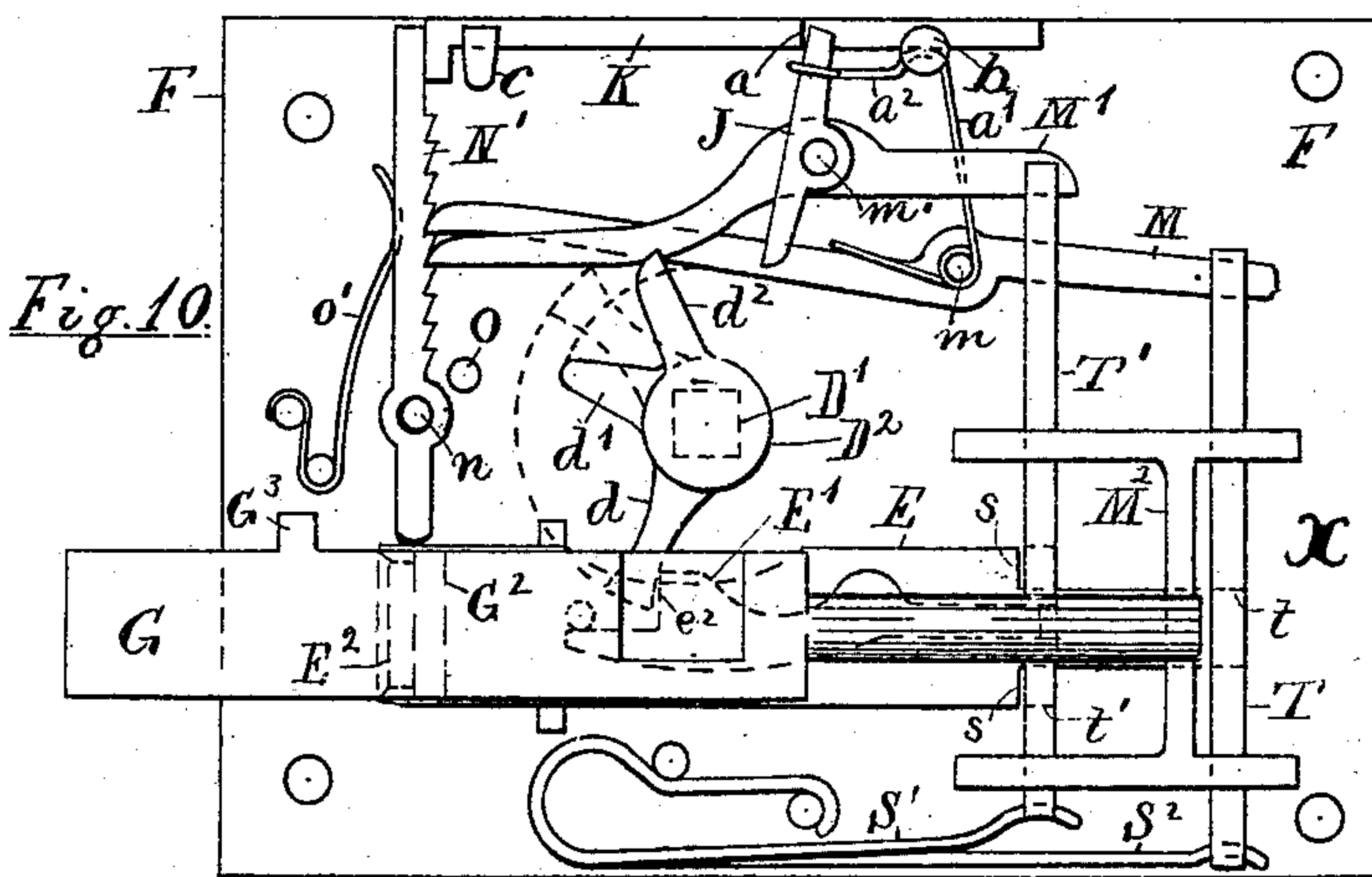
2 Sheets—Sheet 2.

W. S. CHEDISTER.

PERMUTATION LOCK.

No. 273,466.

Patented Mar. 6, 1883.



Attest:

William F. Crane
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Thos. S. Crane Atty.

UNITED STATES PATENT OFFICE.

WINFIELD S. CHEDISTER, OF NEWARK, NEW JERSEY, ASSIGNOR OF ONE-HALF TO JOSHUA S. COOLEY, OF NEW YORK, N. Y.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 273,466, dated March 6, 1883.

Application filed May 10, 1882. (Model.)

To all whom it may concern :

Be it known that I, WINFIELD S. CHEDISTER, a citizen of the United States, residing in the city of Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Combination-Locks, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

My invention relates to an improvement in combination-locks, and in the addition thereto of certain devices for adapting the same to the doors of houses, and for distinguishing the movements of the spindle by sound in arranging the tumblers to permit the movement of the bolt.

The improvement in the lock consists in the combination, with the tumblers, of spring-moved levers, by which the tumblers automatically obstruct the bolt; and in the combination, with the levers, of racks adapted to hold the levers and tumblers in definite positions separately, and in a spindle provided with a separate bit to move each lever and the bolt.

The device for adapting the lock to the door of a house consists in the combination, with the bolt, of two knobs and spindles, one of which is in constant connection with the bolt for opening the door independently of the lock from one side, and the other being connected with the combination-lock, and operating the bolt only through the intervention of a slide controlled by the tumblers.

The construction will be understood from the annexed drawings, in which Figure 1 shows a plan of a door, R, having the lock fixed to the inside at A, and the knob with the sounding device upon the outside at B. The knob C upon the lock is in direct connection with the bolt at all times, the latter being shown herein as beveled, to use as a latch in opening the door from the inside. The knob D upon the outside is connected with the combination-tumblers, and with a slide, E, (shown in Fig. 10,) for drawing the bolt back when the tumblers permit. Fig. 2 is an edge view of the door and parts A, B, C, and D. Fig. 3 is an external view of the sounding-box B; Fig. 4, an interior view of the same, and Fig. 5 a central section of the same on line $x x$ in Fig. 3. Fig. 6 is an edge view, and Fig. 7 a plan, of the index I. Fig. 8 is an interior view of the case of the

lock A, the plate F carrying the combination mechanism being removed to show the bolt G in place and the connection of the latch-spindle C' therewith. Fig. 9 is an end view in section of the lock on line $y y$ in Fig. 1, the end of the lock-case being removed to show the interior. Fig. 10 is an interior view of the plate F, showing all the combination mechanism. Fig. 11 is an end view of the same at x in Fig. 10, with the top of the case A indicated to show its relation thereto. In these figures the bolt G is shown as removed from its case A and placed in its natural relation to the tumbler-slide E, and all the parts of the lock are shown in a suitable position for the retraction of the bolt by the spindle D' of the knob D. Fig. 12 is a similar view without the bolt of the inside of plate F; the parts being shown as locked, and a prong, G³, upon the bolt being shown in dotted lines in contact with the lower ends of the pivoted racks N N' to indicate the action of the bolt in tripping the tumbler-levers every time the bolt is retracted. The action of the tripping-lever J, when operated by one of the bits upon the spindle D', is also indicated by the position of the tripping-bar K, and by a dotted arc extending from the bit d' to the lower end of the lever J in Fig. 10. Fig. 13 is a section on line $z z$ in Fig. 12, showing the shape of the slots in the tumbler T' and the relation of the slide E and dog E' to the slots, the tail e' only of the dog being shown. Fig. 14 is a top view of the lock seen from the arrow Y in Fig. 2, with the casing removed to display the works. Fig. 15 is a partial view of plate F, showing the slide E and dog E' pushed back, as in retracting the bolt, by bit d ; and Fig. 16 is a transverse section of the lock through the centers of the spindles C' D', on line $x' x'$ in Fig. 2.

The casing of the lock is shown of oblong rectangular form, and its back plate, F, is secured in the usual manner to posts L. (Shown in Fig. 8.) The bolt G and slide E are arranged near one side of the casing, and the spindles C' D' enter the lock nearly opposite to one another about the middle of the casing. The spindle C' is formed with a thin bit or arm, C², fitted to a notch or recess, G', in the edge of the bolt G, and with an arm, C³, for receiving the pressure of the latch-spring S, which keeps the bolt out, as seen in Fig. 8.

The bolt is provided with a lug, G^2 , for contact with a lug, E^2 , formed upon the slide E, to move the bolt by the outer knob, D, and with a prong, G^3 , for tripping the combination mechanism every time the bolt is retracted. The rear of the slide E is narrowed to enter a guide, M^2 , and a tumbler, T, is arranged behind the guide transversely to the slide, and formed with a hole, t , Fig. 11, to permit its passage when retracted. Shoulders s are formed upon the slide E by the narrowing referred to, and a tumbler, T' , is arranged before the guide M^2 , and provided with a hole, t' , at its lower edge to admit the shoulders s . The two tumblers must therefore coincide with the guide and the slide before the latter can be moved to retract the bolt, which it does by the contact of the lug E^2 with the lug G^2 upon the bolt, Fig. 10.

In Fig. 12 the means for moving the slide is shown, and consists of a dog, E' , formed as a lever pivoted by its middle to the face of the slide, and provided at the rear end with a narrow tail, e' , to enter a hole, e , in the tumbler T' , and at its forward end with a shoulder, e^2 , to intercept the bit d when the latter is turned by a spindle-hub, D^2 , to move the slide and bolt G. The dog is pressed toward the bit or spindle-hub by a spring, s' , and is checked when in the position to intercept the bit by a stop-pin, p . The spindle-hub D^2 is provided with three bits, d , d' , and d^2 , at different distances from the casing, and is formed with a tubular socket extended through the shell of the casing and supported in a boss or bearing, A' . The socket is formed with a square aperture externally, to receive the end of the spindle D' , as shown in Figs. 1 and 16.

When, by reason of the tripping of the tumbler-levers, the tumbler T is thrown out of its proper position to unlock the bolt, the tail of the lever E' is carried upward, as shown in Fig. 12, and the bit d may then be turned all the way around without engaging the dog or moving any part of it. The tumblers T and T' are normally pressed upward by two springs, S' and S'' , and thus tend to elevate the ends of two levers, M and M' , pivoted to the casing at points above the spindle-hub at m and m' .

Two racks, N N' , are pivoted upon a pin, n , at the opposite end (of the plate F) from the tumblers, and stand transversely to the levers M M' , the ends of which are beveled to engage the teeth of the racks, the latter being pressed toward them by springs o o' .

When unsustained by the teeth of the racks, the left-hand ends of the levers are forced downward by the pressure of the tumblers against their opposite ends, and are checked by a stop-pin, O, and when lifted by the bits d and d' are retained at such position by the teeth of their respective racks. The holes t and t' are formed in the tumblers to coincide with the slide E when the levers M M' are in some arbitrarily-selected position and resting upon the teeth of the racks N N' , and the bits must be turned only so far in contact with

their respective levers as to move them to such teeth in the racks and permit the movement of the slide E and the bolt G. Such movement of the bits is secured by turning the knob D in one direction to the desired extent, and then in the opposite direction to bring the other bit in contact with the other lever, and turning that bit also a certain amount as determined by a suitable index or dial. When both levers are thus moved the tumblers necessarily stand as indicated in Fig. 10, and the slide E may be retracted. The dog E' is also, by the operation of the spring s' , thrown into the proper position to intercept the bit d , as shown in the same figure, the hole e and tail e' being lowered with the tumbler T' , as shown. The hole e is shown in Fig. 13 as elongated above the top side of the tail e' , that the latter may have a freespace to move in should the bit d be moved over the other end of the lever E' at any time to reach the position required to withdraw the slide and bolt. Such a movement of the bit from right to left would simply press the outer end of the lever downward and raise the tail up in the hole or slot e , after which the spring s' would operate to restore the lever to its normal position and a contrary movement of the bit, effected by reversing the spindle, would then unlock the bolt.

Having thus fully described the construction and operation of the combination devices, it is obvious that the same are operated by movement of the knob D independently of the latch-spindle C' , and that the tumbler-levers are tripped by each movement of the slide E in unlocking the bolt through the agency of the prong or stud G^3 upon the bolt.

A tripping device is also seen at J in Figs. 10 and 12, the same operating to trip the levers and derange the lock if the spindle is improperly turned in a certain direction.

A sliding bar, K, is arranged above the levers M M' and supported in guides b and c in a line with the upper ends of the racks H H' . It is formed with a notch at a , in which the upper end of the tripping-lever J fits, the lever being pivoted upon the pin m' , and having an arm extending downward in the path of the bit d^2 .

A spring, a' , is secured to the guide b , and operates to press the upper end of the lever into contact with that side of the notch toward the racks N N' , the other side of the notch being cut out sufficiently to permit the bit d^2 to move and pass the lever at pleasure from the right-hand side, while a movement in the opposite direction causes the bar K to move toward the racks and push them away from the levers M M' , thus allowing them to fall upon the pin O, as before described in connection with the tripping of the levers by the stud G^3 .

To determine the proper position of the spindle D' in setting the levers to open the lock, use may be made of any ordinary dial when light is available for seeing the same; but as my device is designed especially for use upon street-doors and in the night-time, when

the dial cannot be seen, I have devised means for using the senses of touch and hearing to distinguish the movements of the spindle, the same being fully shown in Figs. 1 to 7, inclusive.

The shank of the knob D is provided with an index-finger, I, and the sounding-box B is provided with several projections, as the four lettered *ffff* in Fig. 3, by which certain cardinal positions of the index can be readily determined through the sense of touch, the point of the index coinciding with the four points *f* in four equidistant positions of the spindle. Inside the box I arrange a ratchet-wheel, B', secured to the spindle D', and provide a pawl, P, to press against the teeth of the wheel if moved in either direction. The pawl is pivoted to the box at *g*, and is formed with lever-arms *h h*, against which two equal springs, *i*, press, thus sustaining the pawl in a central position, but resisting any movement thereof in either direction. The length of the pawl is so proportioned to the length of the teeth upon the ratchet-wheel that an angular movement equal to the space between two teeth will release the pawl and permit it to fall upon the next tooth. The blow thus made upon the tooth is distinctly audible if the parts are properly constructed, and affords an indication when the spindle has been turned a specific amount.

By the combined use of the projections *f* and the sounds from the wheel any combination may be followed out which has been arranged in conformity with the teeth upon the wheel. In the drawings the wheel is shown formed with twenty-four teeth, and the points *f* are numbered from 1 to 4, the pawl thus making six clicks when the index is turned from 1 to 2 or 2 to 3. The spindle may therefore be turned in the dark until the index coincides with one of the points *f*, and the movements thereafter be determined by the sounds of the pawl passing over the teeth.

The construction shown in the drawings requires the index to be first turned to the projection 1, thence two clicks to the left, seventeen to the right, and then twelve to the left, when the parts would be in the position shown in Fig. 10, and any movement of the knob to the right would draw back the slide and bolt, as desired.

As constructed herein, the lock is formed with a socketed spindle-hub, D², into which the spindle D' is inserted through the door R. This arrangement permits the spindle to be inserted in the socket in four different positions and a different reading upon the dial secured in each position.

The wheel B' may also be changed in its position upon the hub D², or the index I rotated and fastened in a different relation to the wheel, to secure a different reading of the dial for many locks having the same internal construction. The means for thus changing the index is shown in Figs. 6 and 7, where the hub of the index is shown formed with notches *r*, adapted to fit depressions of a similar char-

acter in the shank *u* of the knob D. The wheel B' is shown secured to the shank by a pin, *v*, which serves to hold the wheel and the index both upon the spindle in the desired positions.

I am aware that it is not new to use a clicking device to indicate various positions of the spindle by sound, and that the same have been used before in other locks of construction different from mine, and I do not therefore claim such a device as new, except as herein combined with other elements to secure new and useful results; but,

Having fully set forth the nature and objects of my invention, I claim the same as follows:

1. The combination, in a permutation-lock, of a bolt provided with suitable tumblers for obstructing its movement when locked, spring-moved levers adapted to move the tumblers for obstructing the bolt, and racks adapted to automatically hold the levers and tumblers in specific positions when moved by suitable means, substantially as shown and described.

2. The combination of the bolt provided with sliding tumblers operated by spring-moved levers to automatically obstruct the bolt, the racks adapted to automatically hold the levers when moved by suitable means, and the bits *d*, *d'*, and *d''*; connected with a spindle or equivalent turning device, substantially as shown and described.

3. The combination of the slide E, provided with lug E², for moving the bolt G, and operated by a moving device having combination mechanism, as described, with the bolt G, provided with lug G², and with a knob and spindle or other moving device independent of the slide E, substantially as and for the purpose set forth.

4. The combination, with the racks N N' for holding the spring-moved tumbler-levers M M' in specific positions, as described, of the tripping-slide K, the tripping-lever J, and the bit *d''*, operating to trip the racks and displace the levers in the manner herein set forth.

5. The combination, with the slide E and bolt G, provided with the combination mechanism described, of the stud G³, for tripping the racks and displacing the levers M M' every time the bolt is withdrawn, substantially as herein described.

6. The combination and arrangement of the sounding-box B, provided with the knob D', index I, and projections *f f*, and containing the click-wheel and click, as described, with the door R, having the combination lock A, secured upon the opposite side thereof, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

W. S. CHEDISTER.

Witnesses:

HENRY F. GOKEN,
WM. F. D. CRANE.