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Patented Aug. 2, 1898.

HENRY GUY CARLETON.  
COMBINATION MECHANISM FOR ELECTRIC LOCKS.

(Application filed June 18, 1898.)

(No Model.)

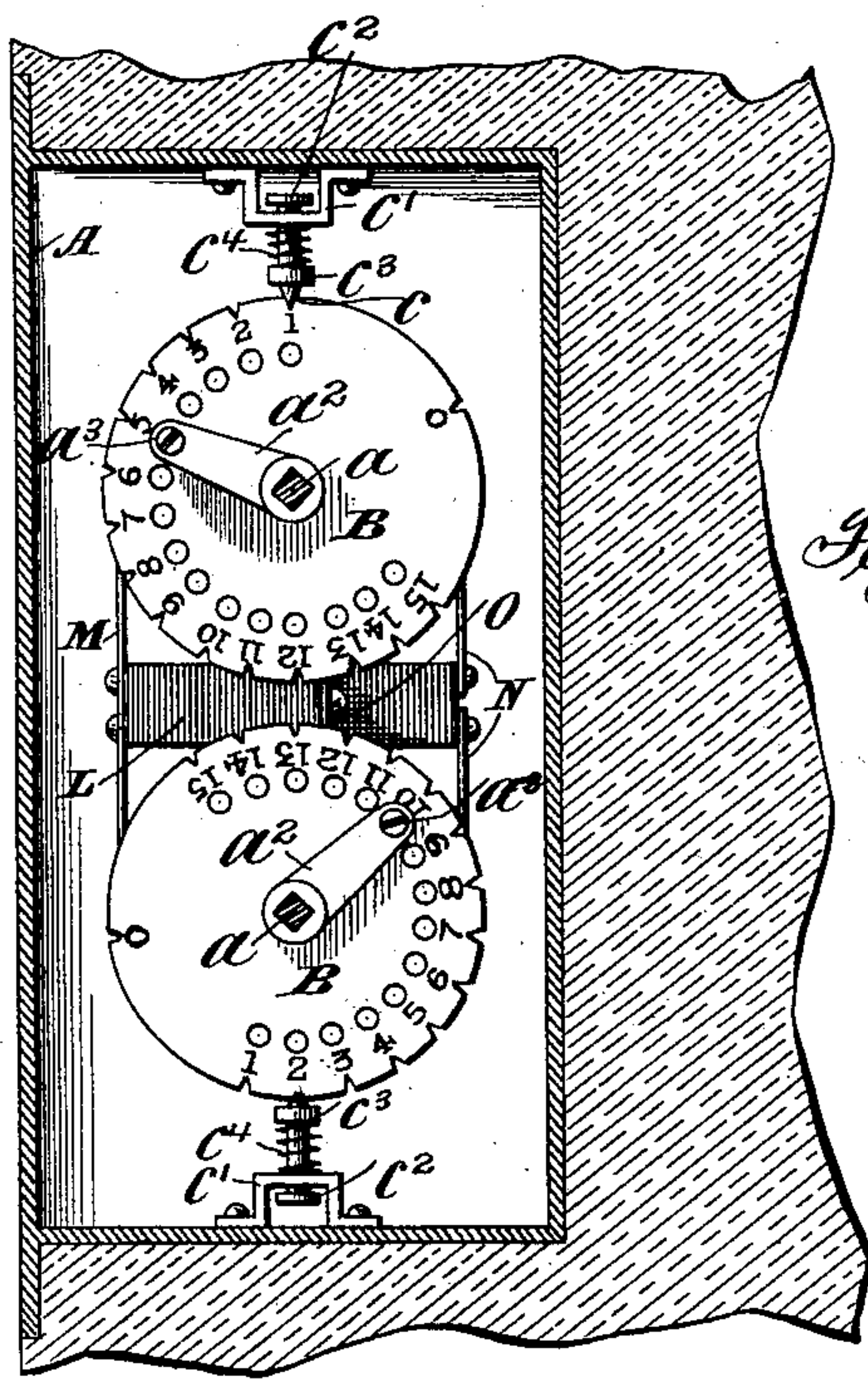


Fig. 1.

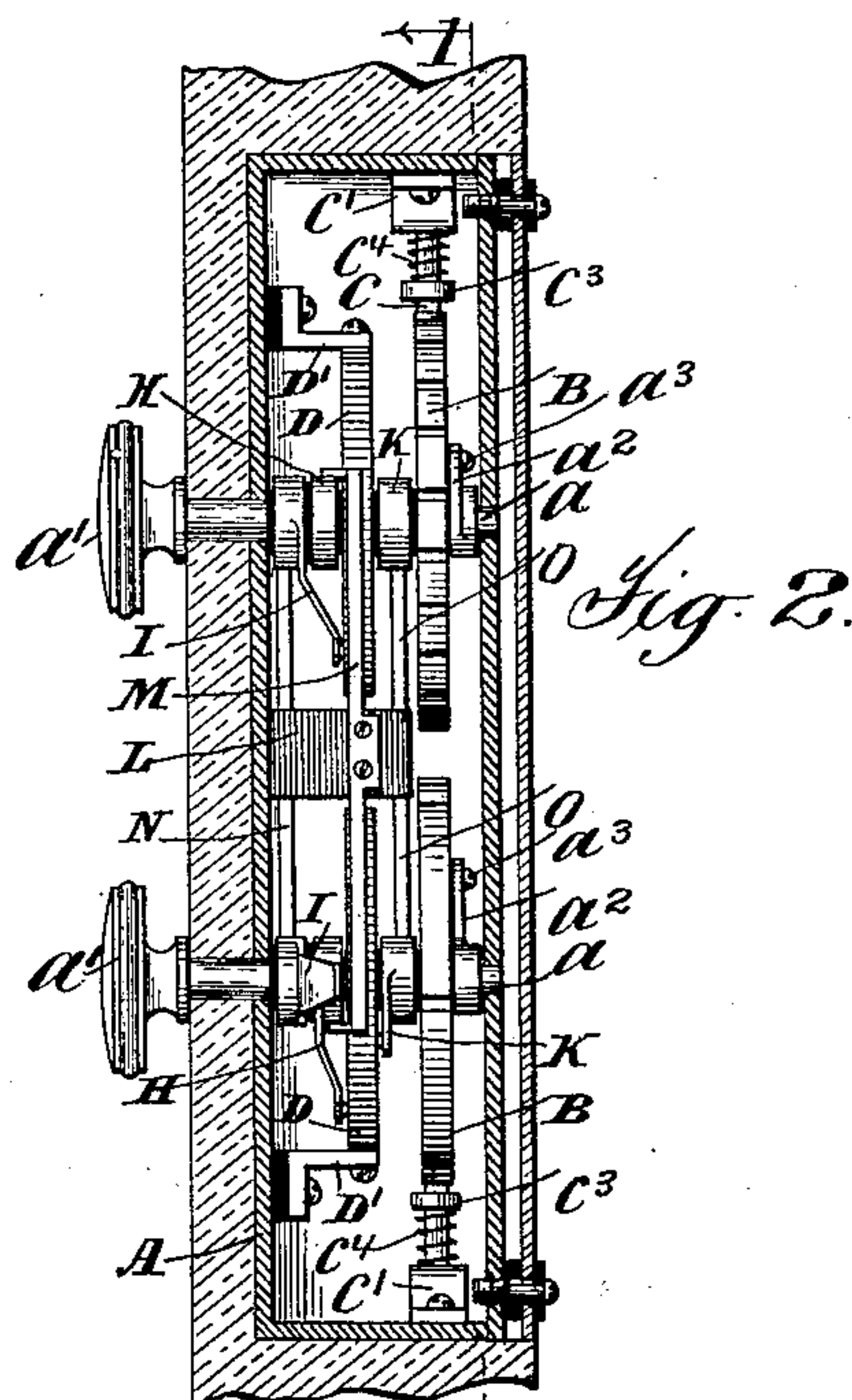


Fig. 2.

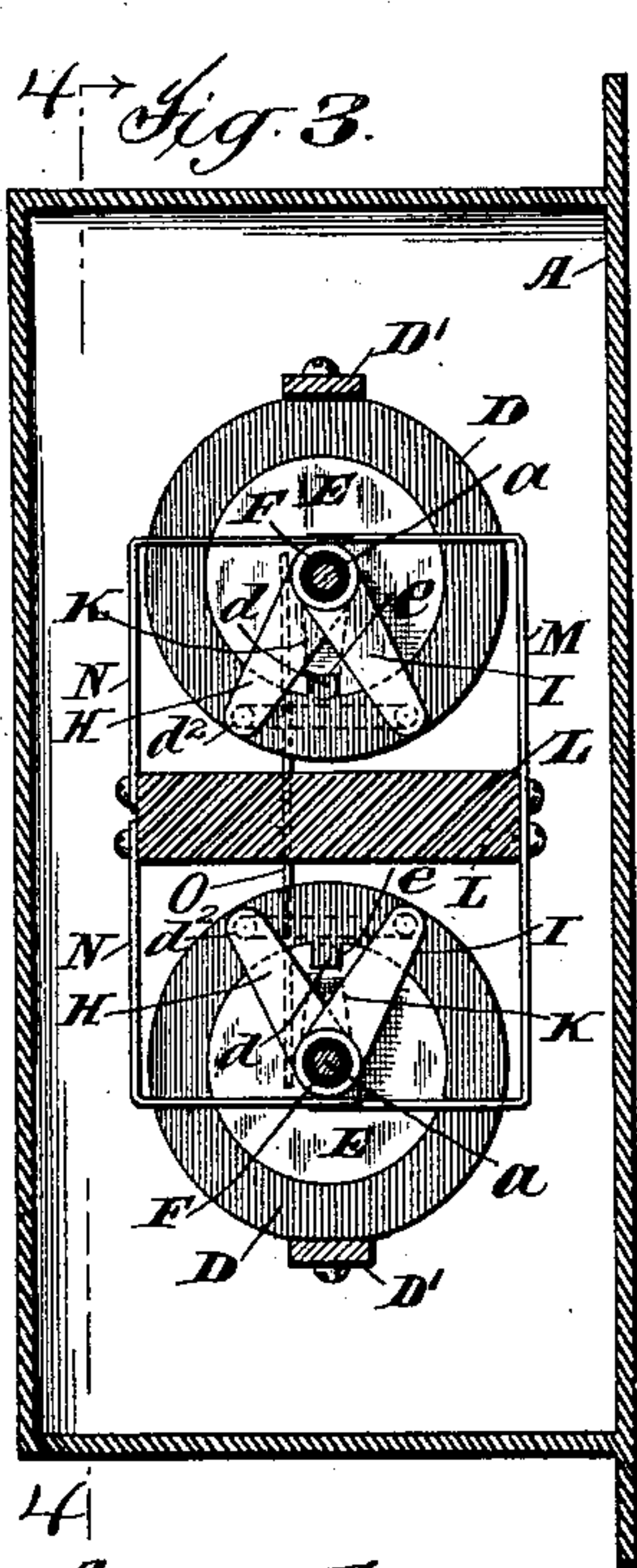


Fig. 3.

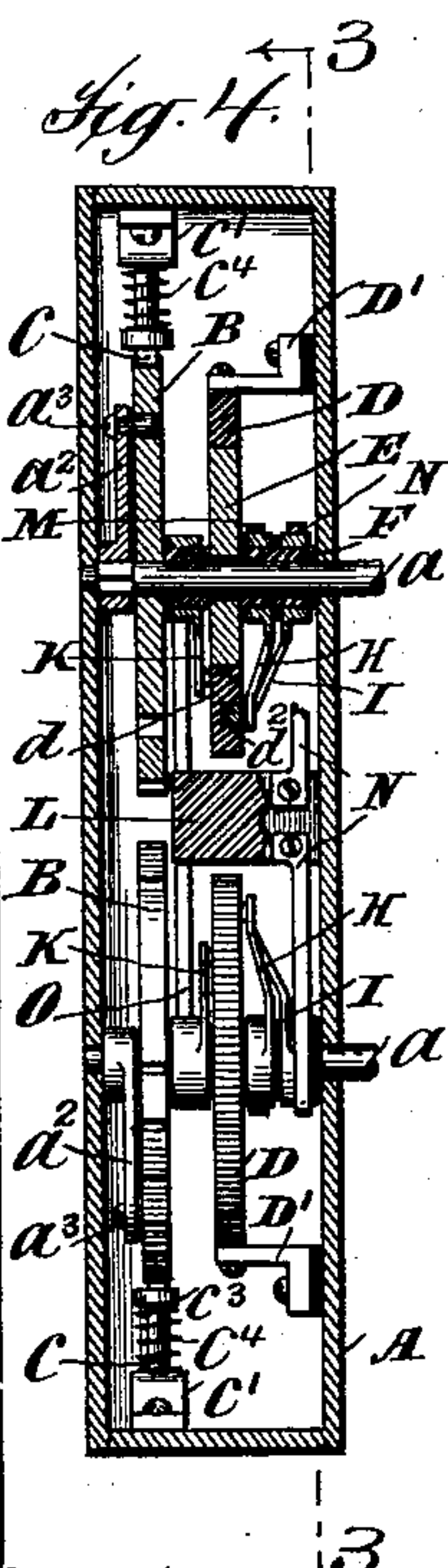


Fig. 4.

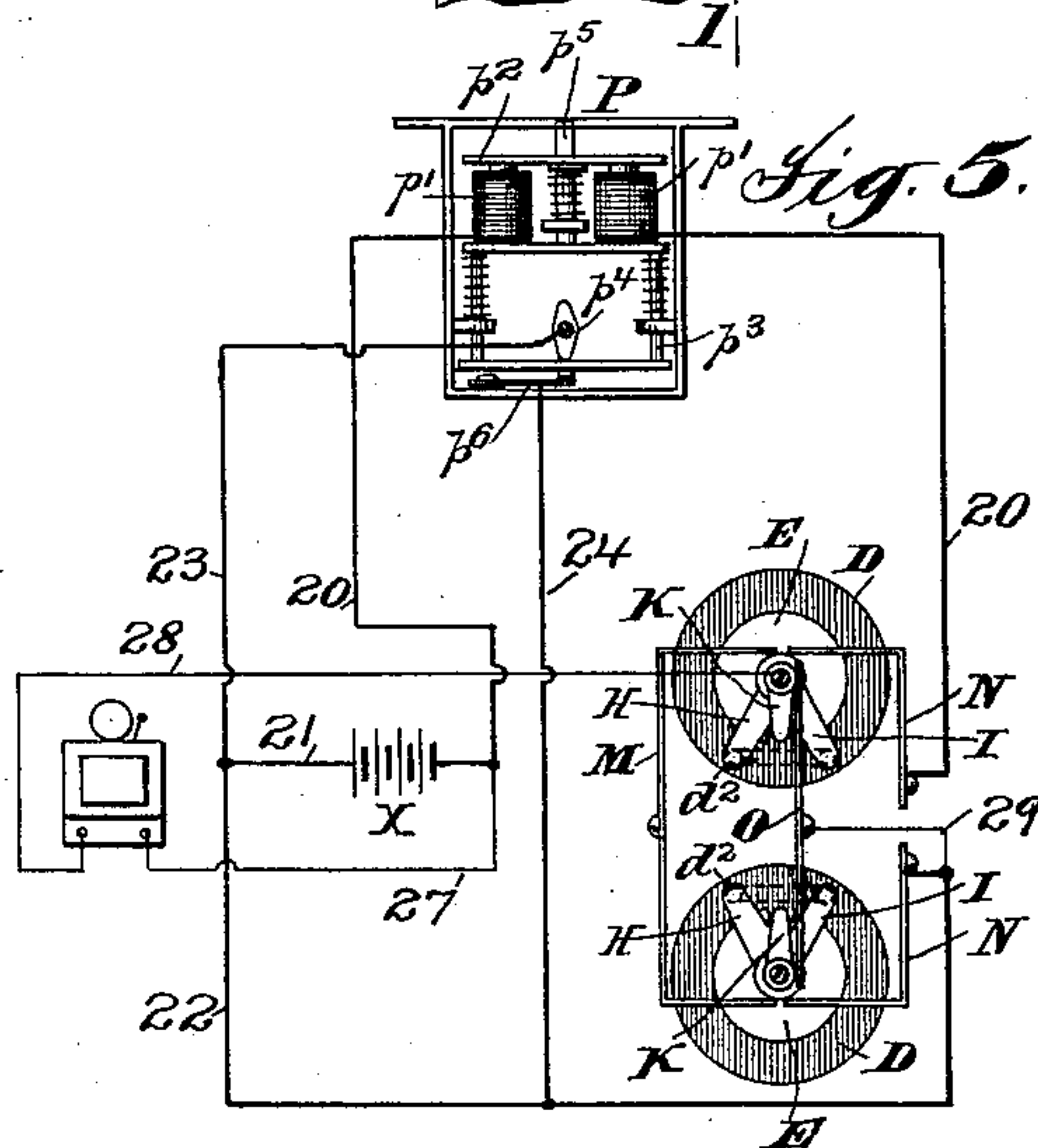


Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## COMBINATION MECHANISM FOR ELECTRIC LOCKS.

SPECIFICATION forming part of Letters Patent No. 608,322, dated August 2, 1898.

Application filed June 18, 1898. Serial No. 683,785. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY GUY CARLETON, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in a Combination Mechanism for Electric Locks, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improvement in controlling devices for electric locks, and is particularly concerned with certain modifications in construction of controlling devices of the character set forth in my application, Serial No. 676,303; filed April 4, 1898.

The invention consists in certain parts, improvements, and combinations hereinafter described, and more particularly pointed out in the claims hereunto appended.

In the accompanying drawings, which constitute a part of this specification, Figure 1 is a vertical section taken on the line 1 1 of Fig. 2. Fig. 2 is a vertical section taken in a plane which lies at right angles to the plane in which Fig. 1 is taken. Fig. 3 is a section taken on the line 3 3 of Fig. 4. Fig. 4 is a section taken on the line 4 4 of Fig. 3. Fig. 5 is a diagram illustrating the circuits employed.

In the construction shown in the accompanying drawings, A indicates a lock-casing which is to be set in the woodwork of the door or in any other suitable place.

*a a* indicates spindle, preferably two in number, which are suitably mounted in the casing before referred to and are operated by knobs *a'* or in any other suitable manner. Inasmuch as the spindles are similar in construction and operation the description of one of them and the parts connected therewith will serve for both.

On the inner end of each of the spindles *a* is an arm *a<sup>2</sup>*, which is connected by a suitable pin *a<sup>3</sup>* to a disk B, which is mounted on the spindle. The arm *a<sup>2</sup>* is connected to the spindle *a* through the medium of a squared section or in any other convenient or desired manner. It is obvious that as the spindle *a* turns in its bearings the disk B will be turned therewith through the medium of its connection with the arm *a<sup>2</sup>*.

The disk B is provided with a series of indicating devices, herein shown as nicks, though ridges, projections, or other similar constructions might be used, located on the periphery of the disk and marked "1" to "15" inclusive, and with an additional nick marked "0." The nicks from "1" to "15" are spaced at regular and corresponding distances apart, but the nick marked "0" is arranged in the open space between the nick marked "1" and the nick marked "15," and is spaced at a greater distance from these than they are from the adjoining nicks, so as to leave the periphery of the disk unbroken for some distance each side of it.

Suitably located in the interior of the casing, so as to cooperate with the nicked disk hereinbefore described, is a detent, spring-pawl, feeling-pin, or other similar device C. This pin is shown as located in an angular loop *c'*, being retained therein by an enlargement *c<sup>2</sup>* on its end. The pin is provided with a shoulder *c<sup>3</sup>*, and between this shoulder and the angular loop before referred to is a spring *c<sup>4</sup>*, by which the pin is thrown forward, so as to bear upon the periphery of the disk referred to. The spring is sufficiently strong, so that as the spindle *a* and the disk B are turned by the knob *a'* the click which occurs as the detent drops into the successive nicks will be distinctly felt by the person operating the knob. The disk and spring-pin thus form an indicating mechanism by which the position of the circuit-controlling mechanism to be hereinafter described is ascertained and the combination operated so as to place the lock in proper condition to be opened.

The disk B is also provided with a series of perforations, there being one for each of the nicks "1" to "15" before described, and the pin *a<sup>3</sup>* may be made to engage any desired one of these perforations. By this means, therefore, the position of the spindle *a* and the devices carried thereon with reference to the disk may be varied and the combination changed.

Suitably located in the casing is a stationary plate, preferably, though not necessarily, in the form of a ring D. This ring is formed of any suitable insulating material, such as hard rubber or vulcanite. It is herein shown as supported from the lock-casing by means



of a suitable bracket D', but it may be supported in any other suitable or convenient manner and has embedded in it a conducting-section  $d^2$ . The body of this conducting-section lies entirely within the surface of the ring, but its ends are exposed. In the space within the ring D is located a circular plate E, which is formed of any suitable conducting material—such, for instance, as brass. This circular brass plate is perforated at its center, and through this perforation the spindle  $a$ , before described, passes. The plate E has a notch  $e$  therein, and this notch is preferably entered by a projection  $d$  of the ring D, before referred to. By means of this projection and notch the plate E and the ring D are or may be securely fastened together with their surfaces lying in the same plane. While this construction and arrangement of the disk D and the plate E is a preferable and desirable one, it is to be understood that it is not a necessary one. The ring D and the disk E need not be secured together, nor need they be arranged with their surfaces in the same plane. It is sufficient if they are arranged in proximity to each other.

Mounted on each spindle  $a$ , so as to turn therewith, and insulated therefrom by collars F or in any other suitable manner are a series of circuit-controllers, preferably in the form of brushes II, I, and K. The brushes II and I are arranged to bear upon and travel on the surface of the ring D, before referred to. They are spaced apart a distance equal to the distance between the ends of the conducting-section  $d^2$ , heretofore described as embedded in the ring D. It is obvious, therefore, that when the ends of the brushes II and I are bearing upon the respective ends of the section  $d^2$  these brushes will be in electrical connection through the section  $d^2$ , and that when they are not resting on the ends of this section they are not in electrical connection, because they are insulated from each other and the spindle by the collar F. The brush K is arranged to bear upon the conducting-plate E at all times except when it is opposite the notch  $e$ , heretofore described, at which time, when the parts are arranged as shown, it bears upon the projection  $b$  of the insulating-disk D. It is therefore in electrical connection with this plate E at all times except when it is opposite the said notch. The arrangement of the brushes II, I, and K is such that when the brush K is opposite the notch  $e$  in the plate E the brushes II and I will bear upon the ends of the conducting bar or section  $d^2$ , before described.

Suitably located in the casing between the spindles  $a$ , before referred to, is a block L of any suitable insulating material. Mounted on this block is a thin conducting strip or bar M, preferably of metal, the ends of which bear on the hubs of the brushes II. This conductor is herein shown as angular in form; but it may be arranged in any suitable manner, so as to connect to form an electrical connection

between the brushes II II. Another strip or bar O acts to electrically connect the two brushes K, before described. The block further carries a pair of contacts N, each of which forms a terminal for a circuit hereinafter to be described, and each of which is in electrical connection with the brushes I, before referred to.

At P (see Fig. 5) is indicated an electrical bolt-operating mechanism. This bolt-operating mechanism is similar to that set forth in my application, Serial No. 681,586, filed May 24, 1898, and need not herein be specifically described further than to say that when a current is passing through magnet-coils  $p^1$  they are caused to attract their armature  $p^2$  and through it to operate the lock-bolt. The magnet-coils are mounted on a spring-controlled frame  $p^3$ , which is actuated by a tumbler-cam  $p^4$ , operated by a suitable handle. (Not shown.) When the tumbler-cam  $p^4$  is operated, the frame  $p^3$  will be retracted against the tension of its springs, will draw back the magnet-coils and the armature  $p^2$ , and will retract the plate  $p^5$ , against the shoulder of which the armature  $p^2$  bears.

The circuits employed are as follows: Wire 20 leads from one of the contacts N, through the magnet-coils  $p^1$ , before referred to, to the battery or other source of electrical energy, (herein marked X.) From the other pole of the battery is led a wire 21. This wire 21 has two branches 22 23. The branch 22 leads to the other contact N, before described. The wire 23 leads to the tumbler-cam  $p^4$ , before referred to. In the lock-casing is located a spring-contact  $p^6$ . This spring-contact is so arranged that when the magnet and its armature and the bolt are in their forward position—i. e., when the tumbler-cam  $p^4$  stands at right angles to the position shown in Fig. 5—the contact will be very close to, but not of course touching, the magnet-carrying frame. When the magnet-carrying frame and connected parts are drawn back, as shown in Fig. 5, the contact is forced back with it. From this contact is led a wire 24, which connects at any suitable point with the wire 22, leading to the contact N. Branching from the wire 20 at any suitable point is wire 27, which leads to one terminal of a bell, buzzer, or other suitable alarm. The other terminal of the alarm is connected by a wire 28 to one of the spindles  $a$ , herein shown as the upper one. The wire 29 connects the wire 22 with the contact-strip O, which connects the brushes K, before described.

With the circuits arranged as described it will be obvious that when each pair of brushes II and I is bearing upon the ends of the conducting bar or section  $d^2$  of the ring D a circuit will be established from the battery, through the wires 21 23, to the tumbler-cam  $p^4$ , and from the contact  $p^6$ , through the wires 24 22, contact N, brush I, conducting-section  $d^2$ , brush II, metal conductor M, brush II of the upper controller, connecting-section  $d^2$ ,



brush I, the contact N, and the wire 20, including the magnet-coils  $p'$ , to the battery.

As soon as the tumbler-cam is operated to open the door the metallic magnet-carrying frame of the lock mechanism will be brought into contact with the spring-contact  $p^6$ , which, as before said, lies close to it. This will close the circuit heretofore described and set up a current through the magnet-coils, causing the magnet to attract its armature. The further movement of the tumbler-cam will cause the magnet-armature and locking-bolt to be drawn back together, and the door may be opened. If, however, any attempt is made to open the door at a time when either of the circuit-controllers is set so that the brushes H and I are not on the ends of the conducting-section  $d^2$ , the circuit will be established through the alarm. In this case one or both of the brushes K will be resting on the metallic plate E, according as one or both of the controllers are improperly set. Supposing the upper controller to be improperly set, the circuit will be established from the battery, through the wires 20 27, the alarm, and the wire 28, to the spindle  $a$ . From this spindle the circuit passes to the upper disk E, the upper brush K, the contact O, the wires 29 22 24, to the spring-contact  $p^6$ . If now the tumbler-cam be operated in an attempt to open the door, the circuit will be closed by means of the metallic frame of the lock, before described, through the wires 23 and 21, to the battery, thereby sounding the alarm. In case the upper disk is properly set and the lower disk improperly set a similar circuit will be established, also sounding the alarm.

The operation is as follows: The operator first brings each of the combination-disks to the starting-point of the combination—namely, to the nick marked "0." Inasmuch as this nick is spaced at a considerable distance from the adjoining nicks the operator can readily tell when the spring-detent or feeling-pin drops into this notch. He now turns the spindle and each nicked disk until the detent engages the nick which indicates the point at which the circuit-controlling brushes H I are in contact with the conducting-section  $d^2$  of the disk D. If, for instance, the combination for the upper disk be "5," the operator after bringing the disk to the nick marked "0" turns it to the right until the feeling-pin drops into the fifth notch. In the same way if the combination for the lower disk be "7" this disk is turned from the starting-nick until the feeling-pin drops into the seventh notch. Each nicked disk having been properly set, the door can now be opened by turning the knob, the circuits being established through the magnets of the lock, as above described. If, however, any unauthorized person attempts to open the lock, unless he is in possession of the combination and succeeds on the first attempt to set each disk on the proper number an attempt to open the lock by turning the handle will establish a circuit, as before described,

and cause the alarm to sound. It is obvious, therefore, that the lock cannot be opened until the circuit-controllers or brushes are properly set and also that any attempt to open the latter resulting in improperly setting the brushes will cause the alarm to sound and give a notification that the lock is being tampered with.

While the mechanism above described as an entirety is an effective means for carrying the invention into effect, it is to be understood that the invention is not limited to the specific details thereof and that parts thereof may be used without employing the whole. For instance, under certain circumstances, as in a very simple lock, one set of circuit-controllers might be used. On the other hand, in case it be desired to increase the security of the combination more than two sets of controllers may be used. So, too, while it is convenient to arrange the circuit-closer so that it will be operated by the tumbler-cam of the lock, such arrangement is not necessary. Again, while the lock mechanism shown and described is the most effective one known to me, other lock mechanisms may be substituted therefor, and in general many changes may be made without departing from the spirit of the invention, which within its scope is generic in its nature.

What I claim is—

1. The combination with a circuit-controlling mechanism, of a disk carrying a series of indicating devices suitably spaced apart for indicating successive positions of the circuit-controlling mechanism, that one of the series which indicates the initial position of the circuit-controlling mechanism being farther from the adjacent indicating devices than the other devices of the series are from each other, and suitable means coöperating with said devices to indicate the position of the circuit-controlling mechanism, substantially as described.

2. The combination with a circuit-controlling mechanism, of a disk provided with a series of nicks to indicate successive positions of the controlling mechanism, the nick which indicates the starting-point of the combination being arranged with a wider space between it and the adjacent nicks than the spaces between the other nicks of the series, and a suitable device operating in connection with said nicks to indicate the position of the combination, substantially as described.

3. In a combination electric lock, the combination with a revoluble circuit-controller, of a disk provided with a series of indicating devices suitably spaced apart for indicating successive positions of the controller, that one of the series which indicates the initial position of the circuit-controlling mechanism being farther from the adjacent indicating devices than the other devices of the series are from each other, suitable means coöperating with said devices to indicate the position of the circuit-controller, a lock mechanism,



and a circuit between the controller and the lock, substantially as described.

4. In a combination electric lock, the combination with a revoluble circuit-controller, of a disk provided with a series of indicating devices suitably spaced apart for indicating successive positions of the controller, that one of the series which indicates the initial position of the circuit-controlling mechanism being farther from the adjacent indicating devices than the other devices of the series are from each other, suitable means cooperating with said devices to indicate the position of the circuit-controller, a lock mechanism, a circuit between the controller and the lock mechanism, and a circuit-closing device operated by a movement of the lock mechanism, substantially as described.

5. In a combination electric lock, the combination with a revoluble circuit-controller, of a disk provided with a series of indicating devices suitably spaced apart for indicating successive positions of the controller that one of the series which indicates the initial position of the circuit-controlling mechanism being farther from the adjacent indicating devices than the other devices of the series are from each other, suitable means cooperating with said devices to indicate the position of the circuit-controller, a lock mechanism, a circuit between the controller and the lock mechanism, a circuit-closing device, and an alarm, substantially as described.

6. In a combination electric lock, the combination with a revoluble circuit-controller, of a disk provided with a series of indicating devices suitably spaced apart for indicating successive positions of the controller that one of the series which indicates the initial position of the circuit-controlling mechanism being farther from the adjacent indicating devices than the other devices of the series are from each other, suitable means cooperating with said devices to indicate the position of the circuit-controller, a lock mechanism, a circuit between the lock mechanism and the circuit-controller, a branch circuit including an alarm, and a circuit-closing device operated by a movement of the lock mechanism to close either the lock-operating circuit or the alarm-circuit, substantially as described.

7. The combination with a spindle, of a circuit-controller mounted on the spindle and turning therewith, a disk carried on the spindle, devices carried by the disk to indicate the position of the circuit-controller, that one of the devices which indicates the initial position of the circuit-controller being farther from the adjacent devices than the other devices of the series are from each other, and means cooperating with said devices to determine the position of the controller, substantially as described.

8. The combination with a rotary spindle, of a pair of brushes mounted thereon and insulated from each other and the spindle, a stationary device which at a given position of

the brushes operates to electrically connect them, an indicating device, part of which is carried by the spindle to indicate the position of the brushes, a circuit of which the brushes and their electrical connections form a part, a lock mechanism in said circuit, and means for closing the circuit, substantially as described.

9. The combination with a spindle, of a pair of brushes mounted thereon and insulated from each other and the spindle, a stationary device which at a given position of the brushes operates to electrically connect them, an indicating device, part of which is carried by the spindle to indicate the position of the brushes, a suitable circuit of which the brushes and their electrical connections form a part, a lock mechanism in said circuit, and means for closing the circuit operated by a movement of the lock mechanism, substantially as described.

10. The combination with a pair of spindles, of a pair of brushes carried by each spindle, stationary means for electrically connecting each pair of brushes when the spindles are in a given position, means for indicating the position of each spindle, an electric circuit of which the brushes form a part and which is established when each pair of brushes is electrically connected, a lock mechanism in said circuit, an additional brush on each spindle, a conductor with which said brush is in contact at all times except when the pair of brushes before referred to are electrically connected, a circuit which is established when either single brush is in contact with its conductor, an alarm mechanism in said circuit, and means operated by movement of the lock mechanism for closing either of said circuits, substantially as described.

11. The combination with a pair of spindles, of a pair of brushes carried by each spindle, stationary means for electrically connecting each pair of brushes when the spindles are in a given position, means for indicating the position of each spindle, said means including a disk bearing a series of indicating devices, the one which indicates the initial position of the brushes being farther from the adjacent devices than said devices are from each other, an electric circuit of which the brushes form a part and which is established when each pair of brushes is electrically connected, a lock mechanism in said circuit, an additional brush on each spindle, a conductor with which said brush is in contact at all times except when the pair of brushes before referred to are electrically connected, a circuit which is established when either single brush is touching its conductor, an alarm mechanism in said circuit, and means operated by movement of the lock mechanism for closing either of said circuits, substantially as described.

12. The combination with a pair of spindles, of a nicked disk carried by each spindle, one of the nicks being farther from the adjacent



nicks than the remainder of the nicks are  
from each other, a spring-detent coöperating  
with said nicks, a pair of brushes mounted  
on each spindle and insulated from it and  
5 each other, a disk mounted on each spindle  
and carrying a conducting-section and which  
serves when the brushes are in proper posi-  
tion to electrically connect them, an electric  
circuit including the brushes, a lock mechan-  
10 ism in said circuit, a single brush carried by  
each spindle and insulated therefrom, a con-  
ducting-disk with which each brush is in con-  
tact at all times except when the pairs of  
brushes before referred to are electrically con-

nected, a circuit of which said single brush 15  
and conductor form a part, an alarm mechan-  
ism in said circuit, and a circuit-closing de-  
vice operated by movement of the lock for  
closing either the alarm-circuit or the lock-  
circuit according to the position of the sev- 20  
eral brushes, substantially as described.

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

HENRY GUY CARLETON.

Witnesses:

JAMES O. RICE,  
T. F. KEHOE.