

No. 608,320.

Patented Aug. 2, 1898.

HENRY GUY CARLETON.
ELECTRIC COMBINATION LOCK.

(Application filed Apr. 4, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1

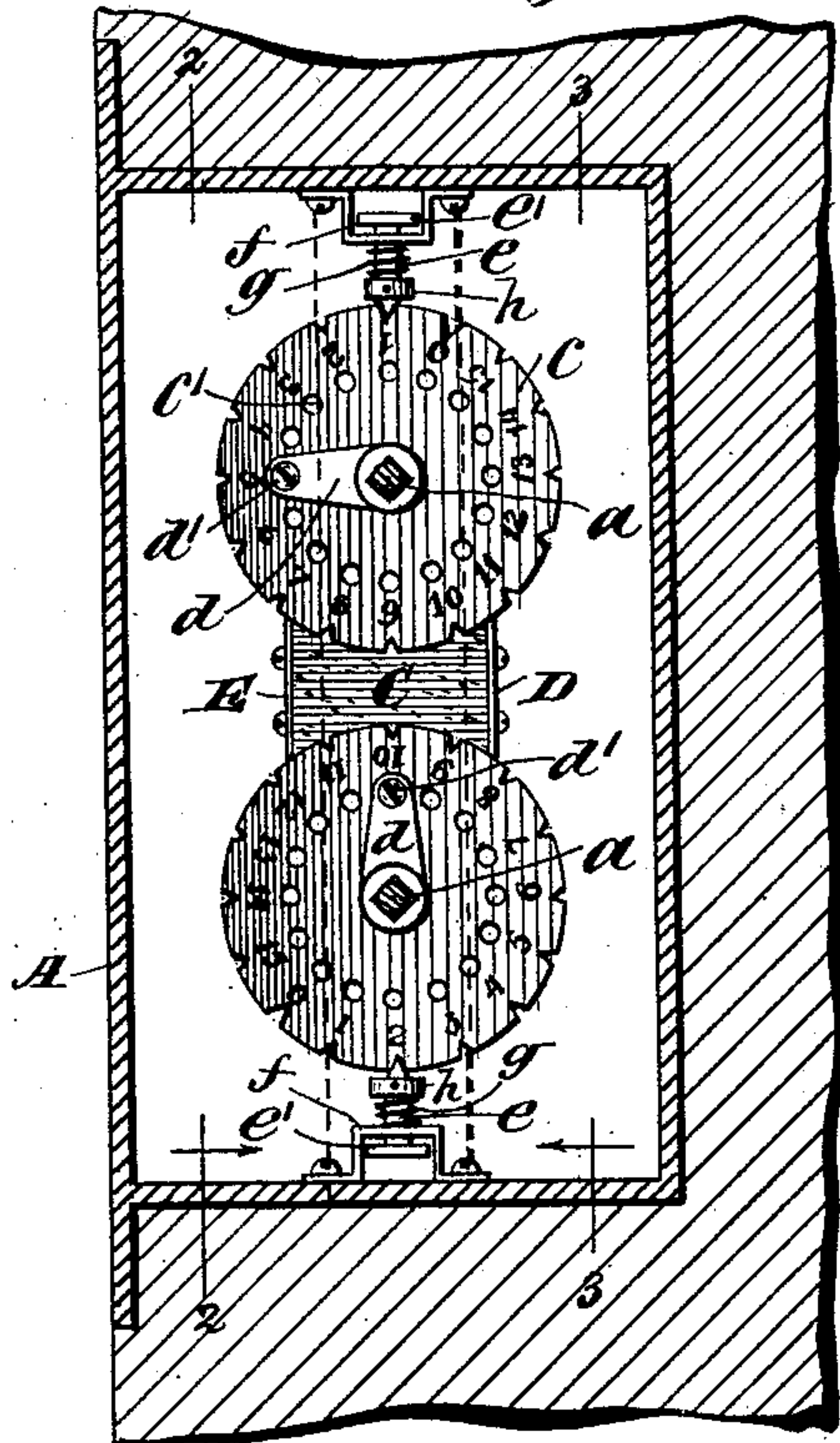


Fig. 2

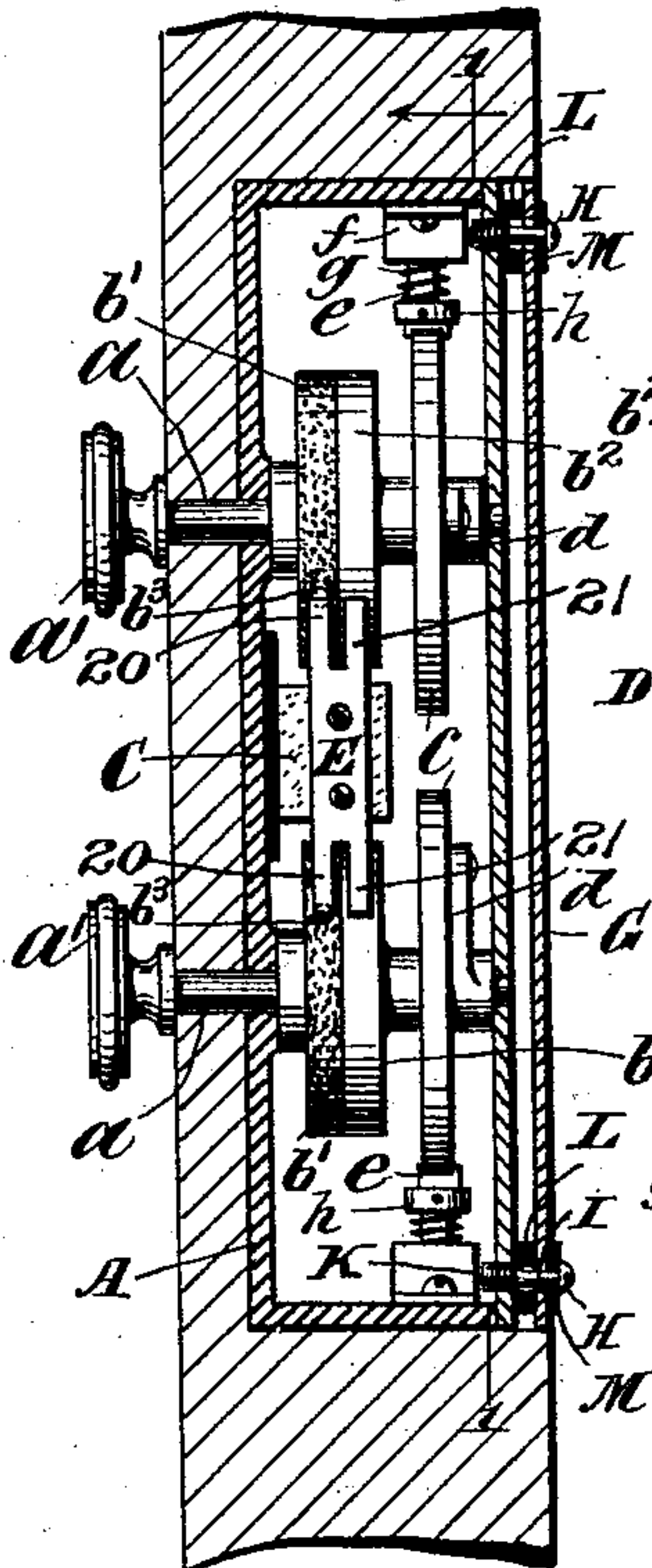


Fig. 3

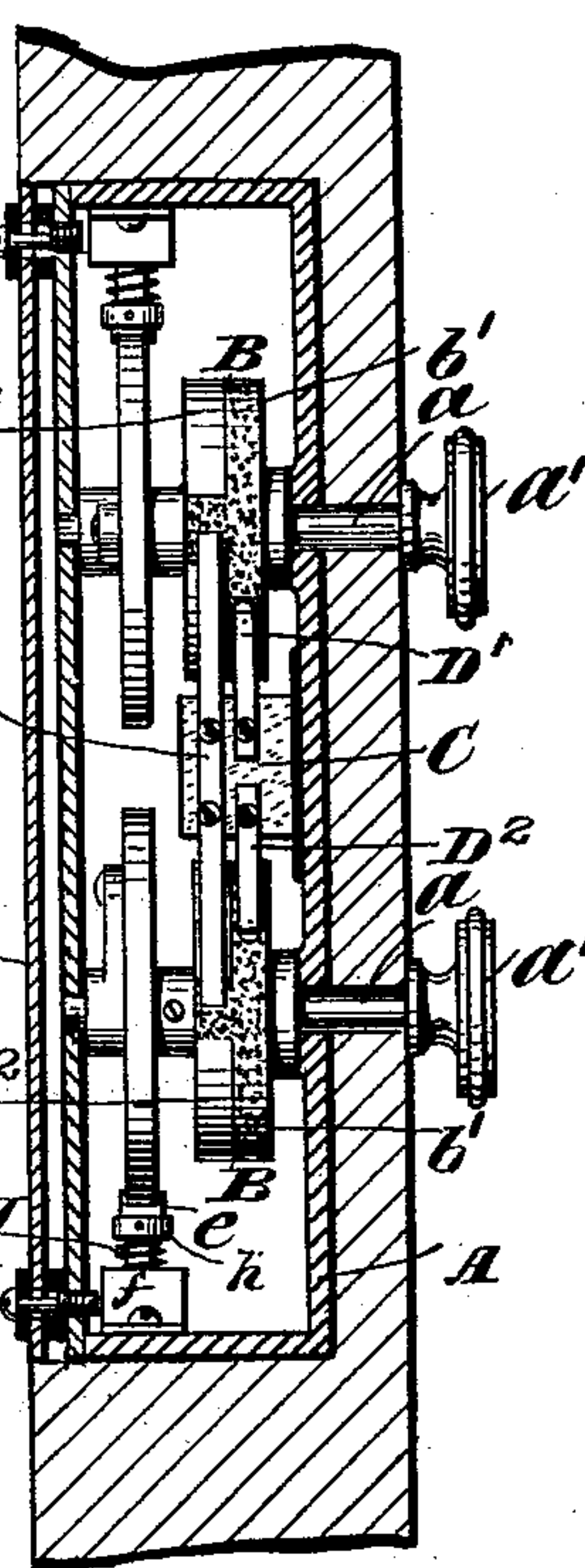


Fig. 4

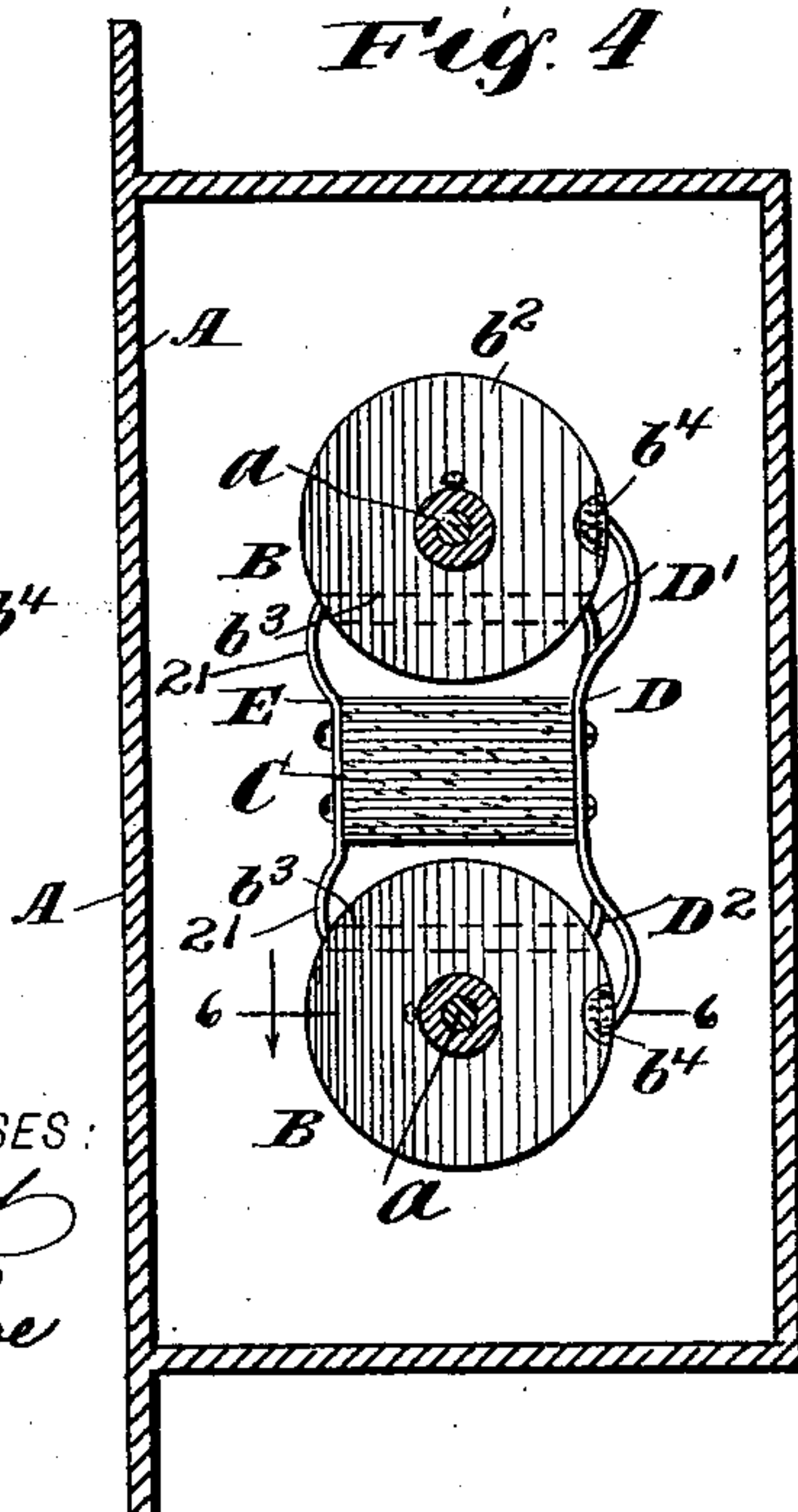


Fig. 5

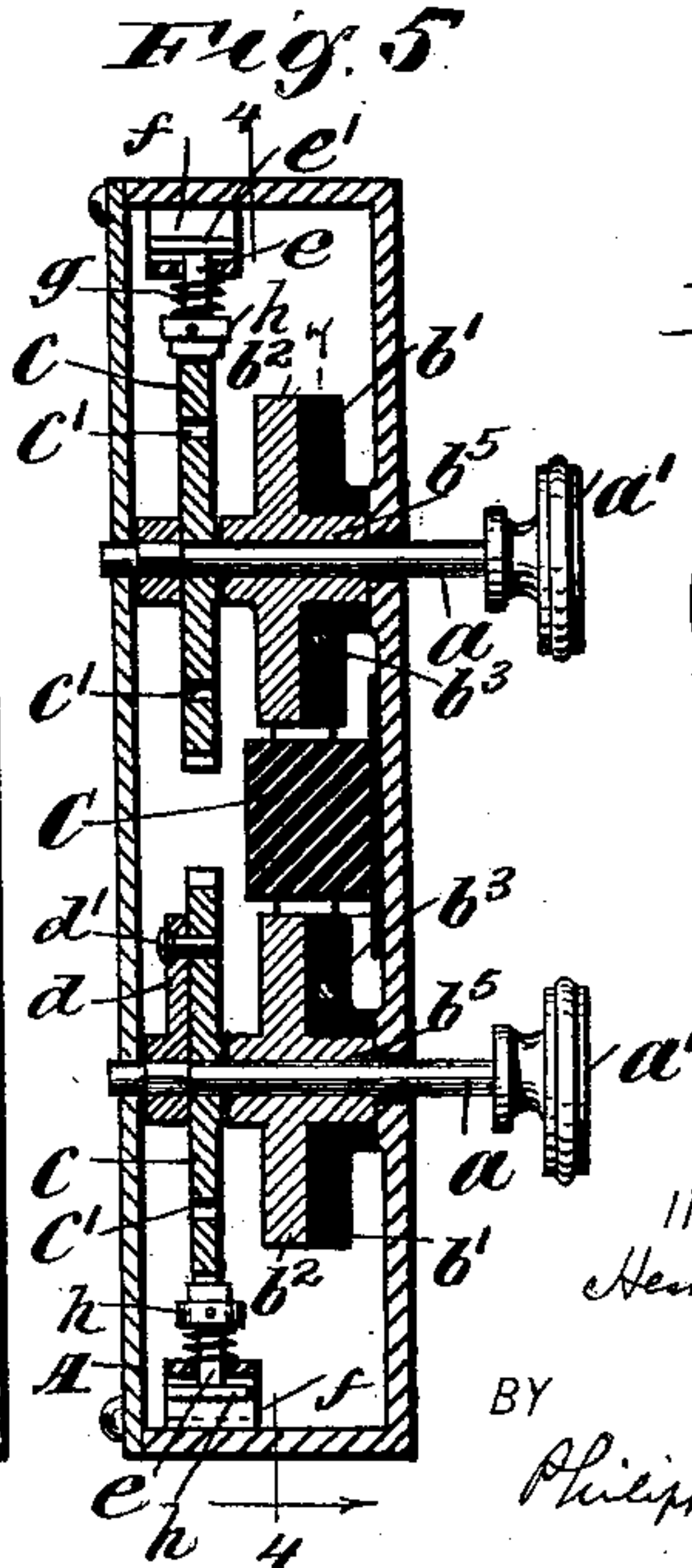
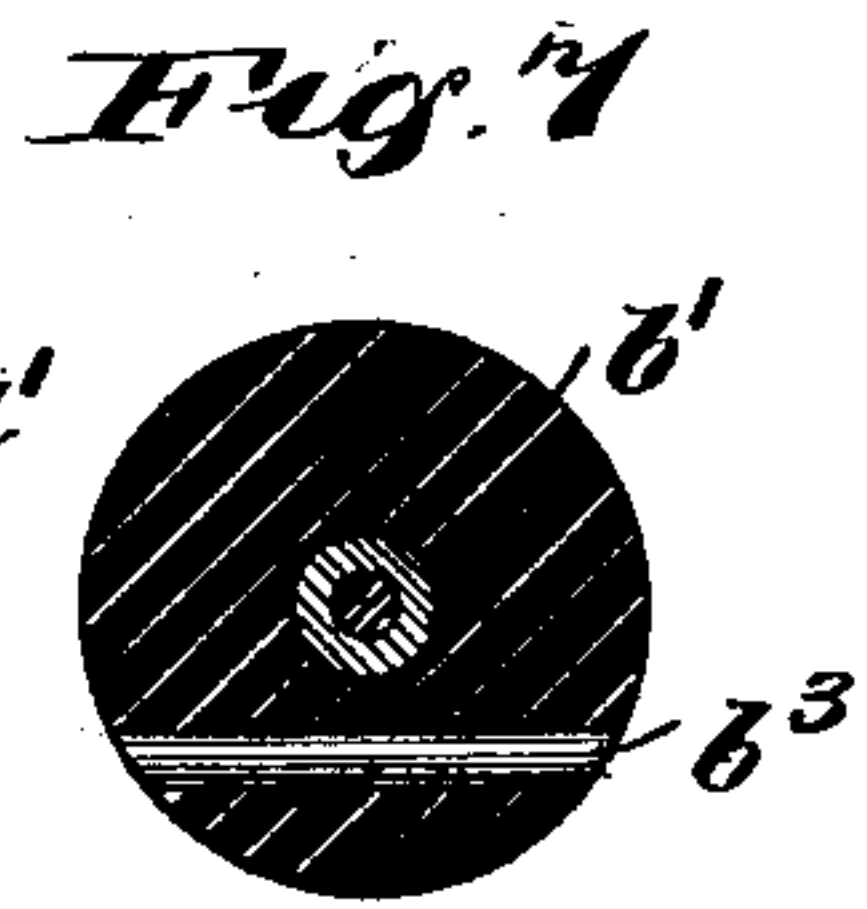
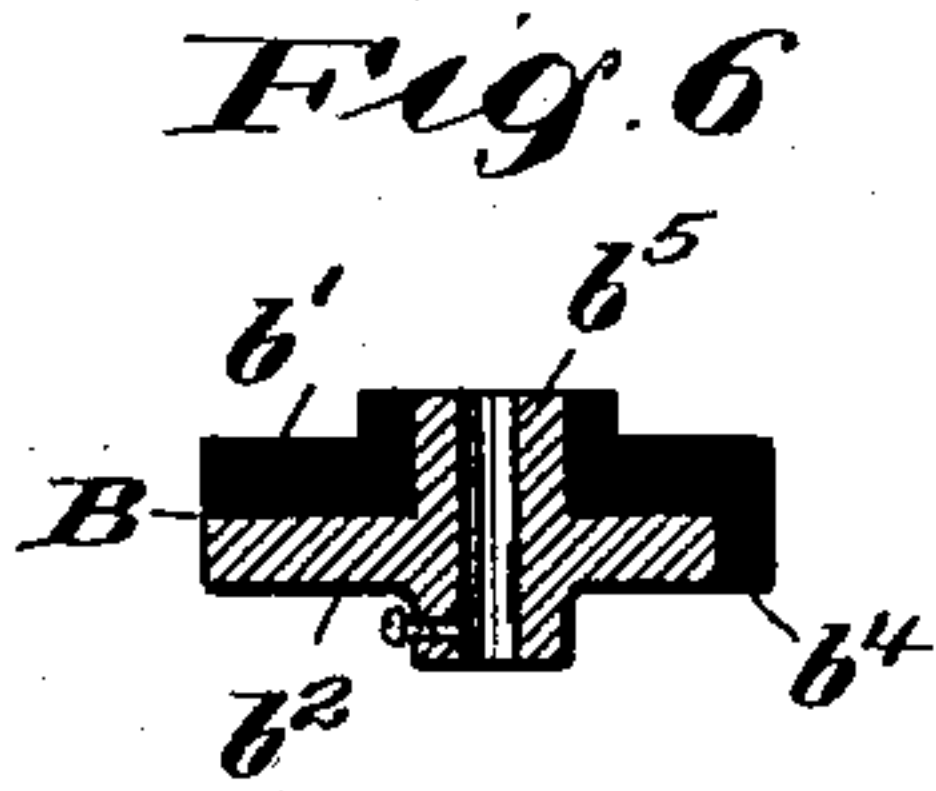


Fig. 6



WITNESSES:

G. B. Beret
J. H. Kefoe

INVENTOR

Henry Guy Carleton

BY

Philip Phelps Sawyer
ATTORNEYS.

No. 608,320.

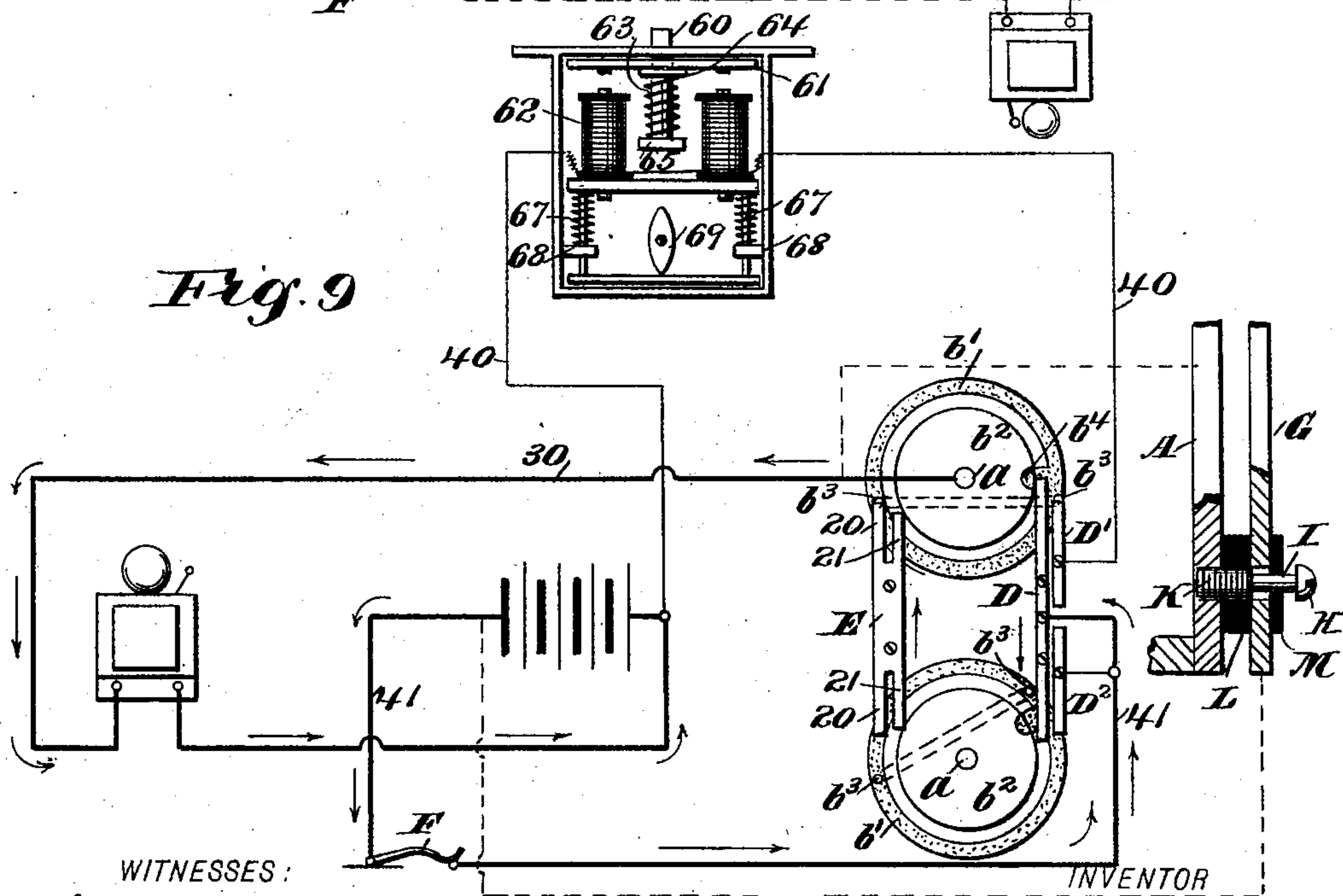
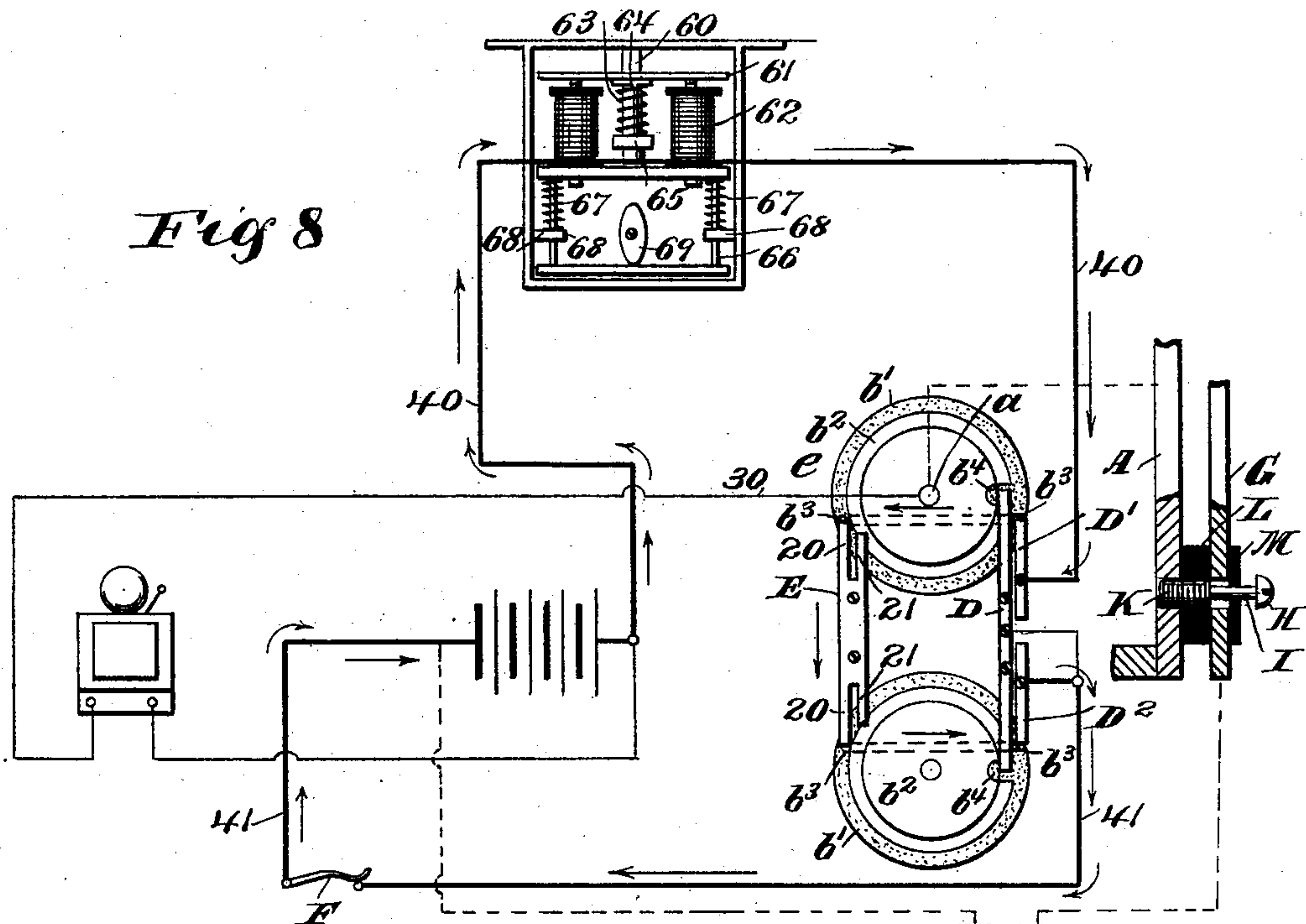
Patented Aug. 2, 1898.

HENRY GUY CARLETON.
ELECTRIC COMBINATION LOCK.

(Application filed Apr. 4, 1898.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

G. M. Burt
J. A. Shaw

INVENTOR

Henry Guy Carleton

BY

Philip Phelps Sawyer
ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY GUY CARLETON, OF NEW YORK, N. Y.

ELECTRIC COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 608,320, dated August 2, 1898.

Application filed April 4, 1898. Serial No. 676,303. (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 Electric Combination-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 an improvement upon the invention shown, described, and claimed in the application, Serial No. 651,016, filed September 9, 1897.

The object of this invention is to reduce the number of operating parts in the apparatus referred to, whereby the apparatus is not only rendered much cheaper in construction, but it is simplified, rendered more certain in operation; and the liability of the parts to get out of order is reduced to a minimum.

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

In the accompanying drawings, which constitute a part of this specification, Figure 1 is a vertical section of the circuit-controlling portion of the apparatus, the same being shown as located in the woodwork of a door or elsewhere. Fig. 2 is a vertical transverse section taken on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section taken on the line 3 3 of Fig. 1. Fig. 4 is a sectional view showing the circuit-controlling disks and the contacts cooperating therewith, the section being taken on the plane indicated by the line 4 4 in Fig. 5. Fig. 5 is a vertical central section. Figs. 6 and 7 are details of the circuit-controlling disk. Fig. 8 is a diagram of the circuits employed, the lock mechanism being also shown therein and the various parts being arranged so that the bolt is retracted. Fig. 9 is a diagram similar to Fig. 8, but showing the parts arranged so that the bolt cannot be retracted and the circuit being sent through the alarm.

A indicates a casing, which may be set in a door or located at any convenient point so as to be electrically connected with the lock mechanism hereinafter referred to. Mounted in the casing A are two spindles *a a*. In-

asmuch as these spindles are similar and inasmuch as the parts carried by them are similar in construction and operation a description of one of them will suffice for both.

The spindles *a* are operated by finger-knobs *a'* or in any other suitable manner. Loosely mounted on each of the spindles *a* is a notched disk *c*, this disk being secured to the spindle so as to turn therewith through the medium of the arm and pin hereinafter described. This disk *c* serves to set the combination, as hereinafter described. It has a deep notch (indicated herein by the numeral 0) and a series of shallow notches, in the apparatus illustrated in the drawings fifteen in number and indicated by the numerals 1 to 15. Each of the disks is also provided with a series of holes *c'*, one for each of the notches referred to. Each of the spindles is provided with an arm *d*, and the disks *c*, before referred to, are connected to the arm by means of a suitable pin or screw *d'*, entering one of the series of holes *c'* in the disks before referred to. By causing the pin to enter various ones of the holes referred to the position of the several notches in the disk may be varied with respect to the spindle and also with respect to the parts fixed on the spindle, as will be readily understood.

Suitably mounted, preferably in the casing A, in position to engage the notches in the disks *c* are two spring-detents *e*. In the apparatus described these detents are mounted in a right-angled loop *f*, and a spring *g*, located between the loop and a collar *h* on the detent, serves to hold it in engagement with the notched wheel, the detent being held in the loop by an enlargement *e'*. The spring *g* is of sufficient strength so that as the wheel *c* is turned by the finger-knob *d* through the medium of the spindle *a* the click which occurs as the detent snaps into each of the notches will be distinctly felt by the person operating the spindle.

Mounted upon each of the spindles *a* so as to turn therewith are two circuit-controllers B. Each of these circuit-controllers is composed of a section of insulating material *b'* and a section of conducting material *b''*, these sections being preferably, though not necessarily, circular in outline or of disk-like form. The insulating-section *b'* has located therein

a conducting wire or bar b^3 , which extends through the body of the disk from side to side thereof. The entire circumferential surface of the section b' , with the exception of the conducting wire or bar b^3 , before referred to, is therefore composed of non-conducting or insulating material. The section b^2 is also preferably, though not necessarily, circular in outline, and it has an insulating-section b^4 in one portion of its perimeter. The two sections are preferably constructed as indicated in Fig. 6, wherein the conducting-section b^2 is shown as provided with a hub b^5 , upon which the insulating or non-conducting section b' is mounted, and the non-conducting section b^4 of the perimeter of the disk b^2 is formed by a projecting portion of the disk b' . This construction, however, while a simple and desirable one, is not a necessary one, as these parts may be of any suitable form and may be entirely independent of each other and assembled in any suitable manner.

Located within the casing A is a block of insulating material C. Mounted upon this block are a series of contacts D, D', D², and E. The contact E is provided at each of its ends with a pair of prongs 20 21. These contacts are so arranged that the contact D bears upon the perimeters of the conducting-wheels b^2 , before referred to, and the contacts D' D² bear upon the non-conducting or insulating wheels b' , before referred to. The contact E is so arranged that its prongs 20 bear upon the non-conducting wheels b' and its prongs 21 bear upon the conducting-wheels b^2 .

The circuits controlled by the circuit-controllers before referred to are indicated, diagrammatically, in Figs. 8 and 9. The contacts D' D² are the terminals of a circuit 40 41, which includes the lock mechanism, hereinafter described, and also any suitable source of electrical energy, herein indicated as a battery. This circuit also includes a circuit-closer of any suitable construction, the same being conventionally indicated at F. A second or branch circuit 30 has one of its terminals connected to the spindle of the upper circuit-controller and is connected at any suitable point to the circuit 40 41. This branch circuit includes a bell or other suitable alarm.

It will be understood that the contact D forms one terminal of the branch circuit including the bell, the other terminal of that circuit being in one of the conducting-disks of one of the circuit-controllers, herein shown as the upper one. The contacts D D' D² and the insulating-sections b^4 of the conducting-disks b^2 are so constructed and arranged with reference to the ends of the wires or bars b^3 that when the contacts D' D² are brought into contact with and rest against the ends of the bars b^3 the ends of the contact D rest on the insulating-sections, and the alarm-circuit is therefore broken. If, however, one or the other of the circuit-controllers is so positioned that its bar b^3 is not in electrical connection with either of the contacts D' D², that end of

the contact D which extends to the circuit-controllers so positioned will rest upon the conducting-section of the disk b^2 of the said controller. The circuit through the alarm will consequently be made so far as the combination mechanism is concerned, and when the circuit-closer is operated the alarm will be sounded.

The construction of the latch-controlling devices herein shown is the same as that illustrated in my application, Serial No. 653,957, filed October 4, 1897, and need not be here specifically described further than to state that the bolt or latch 60 carries an armature 61, which lies in the magnetic field of a suitable magnet 62. A spring 63, working between a shoulder 64 and a suitable guide 65, in which the bolt slides, holds the bolt in engagement with its keeper. (Not shown.) The magnet 62 is mounted in a suitable frame 66, which is held in its forward position by means of springs 67, working between guides 68, attached to the lock-casing, and the upper or inner part of the magnet-frame.

The frame 66 is retracted by means of a tumbler-cam 69, operated by a suitable handle. (Not shown.) It is obvious that when the magnet 62 is energized it will attract its armature, and if the tumbler-cam be then operated to retract the frame in which the magnet is mounted and the magnet the armature 61 will be drawn back with the magnet and by its contact with the shoulder 64 will retract the bolt from its keeper.

The operation of the construction so far described is as follows: The operator first brings each of the circuit-controllers to the starting-point of the combination—that is, to the point where the detent e engages the deep notch 0. He then turns each of the circuit-controllers through the finger-piece b to that point where the prongs 20 of the contact E each engage one end of the conducting wire or bar b^3 , before referred to, at which time the terminals D' D² of the circuit 40 41 will engage the other ends of these conducting-bars. The distance through which each of the controllers has to be turned in order to bring the contacts to this position is of course known to the operator if he is in possession of the combination and will be indicated by the successive clicks of the detent as it drops into the successive notches in the circuit-controllers. For instance, if the combination be "5" for the upper wheel and "8" for the lower wheel the operator, having brought the upper wheel to that point where the detent engages the deep notch, will proceed to turn the notched disk to the right until the detent engages the notch numbered 5. At this time the upper wheel will be in such position that the contact D' and the upper one of the prongs 20 of the contact E will engage the bar b^3 . The lower wheel having been brought to the starting-point of the combination is then turned in the same manner until the detent enters the notch numbered 8. The lower wheel will be then properly set, and

upon operating the circuit-closer F the circuit will be made from the battery through the magnet 62 of the bolt-drawing mechanism, wire 40, contact D', the bar b^3 in the upper wheel, the contact-plate E through prongs 20, the bar b^3 in the lower wheel, the contact D², and the wire 41 back to the battery. The circuit being so made the magnets 62 will be energized, and on turning the tumbler 69, which is operated by a suitable knob, (not shown,) the frame carrying the magnets, the magnets, and the armature 61, carrying with it the bolt 64, will all be moved back and the door can be opened. If, however, any unauthorized person attempts to open the lock, unless he is in possession of the precise combination he will cause the circuits to be closed, as indicated in Fig. 9. In this figure the circuit is made from the battery through the bell or other alarm and to the spindle of the upper circuit-controller. This spindle is in electrical connection with the controller itself, because the section b^2 thereof is made of conducting material. For any position of the upper wheel, therefore, except the one in which the combination is rightly set the upper end of the contact D will be in electrical connection with the conducting portion of the controller. If, therefore, the circuit-closer be operated with the upper wheel in any but the correct position, the alarm-circuit will be made directly through the conducting portion of the controller and through the contact D and the connections before described and the alarm will be sounded. If, however, the upper controller be correctly set and the lower controller be incorrectly set, the lock-circuit will be broken, because the contact D² and the lower prong 20 of the contact E will be off the ends of the bar b^3 . If now the circuit-closer be operated, the alarm-circuit will be made through the wire 30, the conducting portion b^2 of the upper controller, contact E through prongs 21, the conducting portion b^2 of the lower controller, the contact D to and through the alarm and back to the battery. Any attempt to operate the lock, therefore, by setting anything except the exact combination will result in the making of a circuit from the battery through the alarm, thus sounding the alarm and giving a notification that the lock is being tampered with.

In order that the lock may not be removed by any person and the combination being tampered with in any way, the back part of the casing containing the combination is covered with a metallic plate G, which is in electrical connection through a suitable wire or wires with the battery before referred to or with some other suitable source of electrical energy. The casing of the combination is also suitably connected to the same source of electrical energy, a suitable alarm being included in the circuit. The plate is secured to the casing by means of suitable screws H, having a cut-away portion I and a threaded portion K, which enters a suitably-tapped

hole in the rear portion of the casing. The plate G and the rear plate of the casing are suitably insulated from each other by means of washers L or in any other suitable manner. An insulating-washer M is also located between the head of the screw and the plate G.

It is obvious that when the screws H, which connect the plate G to the rear plate of the casing, are driven home the tapped or large portion of the screw will be in electrical connection with the rear plate of the casing. The recessed portion of the screw, as shown in Figs. 8 and 9, will not touch the plate G, and the head thereof is prevented from coming in contact with the plate by the insulating-washer M. If any attempt is made, however, to remove the protecting-plate G, it is obvious that as soon as the tapped portion of the screw, which is longer than the distance between the two plates, reaches the plate G the circuit will be made through both the plates and the connecting-wire to the battery and will sound the alarm which is included in this circuit, giving notice of the fact that the lock is being tampered with.

In order to change the combination, the disks c are first brought to the point where the detents e will engage the deep notches O. The pin d' is then removed, disconnecting one of the arms d from its disk; and the arm is then swung around to the hole opposite the number which it is desired shall be one of the numbers of the combination. It is obvious that this movement of the arm will carry with it the spindle a and the disks b' b^2 , forming the circuit-controller B, hereinbefore referred to. The pin d' is now inserted, thus locking the arm and disk together. The same operation is then performed with the other disk. It is obvious that when the notches which are opposite the holes in which the pins d' now are are swung under the detents the circuit-controllers will be in such a position that the circuit through the lock mechanism will be made upon operating the circuit-closing device. The combination can readily be changed at any time with great rapidity, it being necessary only to remove the protective plate G, before referred to, and the back plate of the combination-casing. Various modifications of this construction may be made. For instance, it is obvious that by the introduction of one or more additional notched disks, circuit-controllers, and contacts the number of possible combinations will be greatly increased, and the addition of such additional notched disks, circuit-controllers, and contacts is contemplated whenever particular security is desired. Furthermore, while I have shown only one lock in connection with the combination mechanism it is obvious that by the use of the proper circuits a large number of locks can, if desired, be controlled from one combination mechanism.

It is also to be understood that this invention is not limited to the particular form of detent mechanism shown and described as co-

operating with the notched wheel. This form is simple and efficient; but any suitable form of detent mechanism may be used. Furthermore, while a notched or nicked disk or wheel
 5 is a very effective form of device for indicating the position of the circuit-controlling devices it is to be understood that the invention is not necessarily restricted thereto. The disk might bear forms of indicating devices
 10 other than notches.

Various other modifications may be made without departing from the spirit and scope of this invention, which is not to be limited to the particular details shown and described.

15 What I claim is—

1. In a combination electric lock, the combination with a lock mechanism and a suitable circuit through which it is operated, of a combination mechanism for controlling the
 20 circuit including a disk carrying indicating devices, a suitable member cooperating with the indicating devices of the disk to indicate to the touch both the starting-point of the combination mechanism and each successive
 25 position thereof, substantially as described.

2. In a combination electric lock the combination with a lock mechanism and with a suitable circuit through which it is operated, of a combination mechanism for controlling
 30 the circuit, the said combination mechanism including a nicked disk and a suitable cooperating device for indicating to the touch both the starting-point of the combination mechanism and each successive position thereof,
 35 substantially as described.

3. In a combination electric lock the combination with a lock mechanism and with a suitable circuit through which it is operated, of an alarm-circuit, an alarm in said circuit,
 40 a combination mechanism for controlling said circuits including a nicked disk and a suitable device cooperating therewith to indicate to the touch both the starting-point of the combination mechanism and each successive
 45 position thereof, and a circuit-closing device, all substantially as described.

4. In a combination electric lock, the combination with a lock mechanism and with a suitable circuit through which it is operated, of a combination mechanism for controlling
 50 the circuit, said mechanism including a circuit-controller, suitable contacts cooperating therewith, means for producing a movement of one of these devices with respect to the
 55 other, a nicked disk, and a suitable device cooperating with the disk to indicate to the touch both the starting-point of the combination mechanism and each successive position thereof, substantially as described.

5. In a combination electric lock the combination with a lock mechanism and with a suitable circuit through which it is operated, of a combination mechanism for controlling
 60 the circuit, the said mechanism including a revoluble circuit-controller and nicked disk, and a suitable device cooperating with the disk to indicate to the touch both the start-

ing-point of the combination mechanism and each successive position thereof, all substantially as described. 70

6. In a combination electric lock, the combination with a lock mechanism and with a suitable circuit through which it is operated, of a combination mechanism for controlling
 75 the circuit, the said combination mechanism including a revoluble circuit-controller and nicked disk, one of the nicks being deeper than the others to determine the starting-point of the combination, and a suitably-mounted detent engaging with the nicked
 80 disk to determine the position of the combination, all substantially as described.

7. In a combination electric lock the combination with a lock mechanism and alarm mechanism, of suitable circuits through which
 85 these mechanisms are operated, a combination mechanism for controlling the circuits, the said combination mechanism including a revoluble circuit-controller and nicked disk, one of the nicks thereof being deeper than
 90 the others to determine the starting-point of the combination, a suitably-mounted detent for engaging the nicked disk, and a circuit-closing device, all substantially as described.

8. In a combination electric lock and in combination with the lock mechanism and the circuit for controlling it, a plurality of revoluble circuit-controllers, a plurality of disks
 95 having nicked edges and a suitable device cooperating with each disk to indicate to the touch both the starting-point of the combination mechanism and each successive position thereof and means for giving the disks a movement corresponding to that of the controllers,
 100 all substantially as described.

9. In a combination electric lock and in combination with the lock mechanism, a plurality of revoluble circuit-controllers, a plurality of disks having nicked edges and a suitable device cooperating with each disk to indicate
 110 to the touch both the starting-point of the combination mechanism and each successive position thereof, means for giving the disks a movement corresponding to that of the controllers, an alarm mechanism, suitably-arranged circuits including the bolt-drawing mechanism and the alarm mechanism,
 115 and a circuit-closing device, all substantially as described.

10. In a combination electric lock and in combination with the lock mechanism, a plurality of revoluble circuit-controllers, a plurality of disks having nicked edges, one of the nicks being made deeper than the others
 120 to indicate the starting-point of the combination, means for giving the disks a movement corresponding to that of the controllers, means cooperating with the nicks to indicate to the operator the amount each controller has been moved and a circuit including the bolt-drawing
 125 mechanism, all substantially as described.

11. In a combination electric lock and in combination with the lock mechanism, a plurality of revoluble circuit-controllers, a plu- 130

5 reality of disks having nicked edges one of the nicks being deeper than the others to indicate the starting-point of the combination, means for giving the disks a movement correspond-
 10 ing to that of the controllers, detents engaging the nicks, an alarm mechanism, suitably-arranged circuits including the alarm mechanism and the locking mechanism, and a circuit-closing device, all substantially as de-
 15 scribed.

12. In a combination electric lock the combination with a movable magnet, connections between it and one of the operative parts of the lock, the connections being so constructed
 20 that when the magnet is energized the lock will be operated and when it is deenergized the magnet will move without operating the lock, devices for moving the magnet, a circuit in which the magnet is included and a combination mechanism for controlling the
 25 circuit, substantially as described.

13. In a combination electric lock the combination with a movable magnet, connections between it and one of the operative parts of the lock, the connections being so constructed
 30 when the magnet is energized that the lock will be operated and when it is deenergized the magnet will move without operating the lock, devices for moving the magnet, a circuit including the magnet, an alarm mechanism, a suitable circuit therefor, a combination
 35 mechanism controlling the said circuits, and a circuit-closing device, all substantially as described.

14. In a combination electric lock the combination with a movable bolt, of a movable magnet, the bolt and magnet being so constructed and arranged that when the magnet
 40 is energized the bolt will move therewith and when it is deenergized the magnet will move without operating the bolt, devices for moving the magnet, and a combination mechanism for making the circuit through the magnet, all substantially as described.

15. In a combination electric lock the combination with a movable bolt, of a movable magnet, the bolt and magnet being so constructed and arranged that when the magnet
 45 is energized the bolt will move with the magnet and when it is deenergized the magnet may move without operating the bolt, suitable devices for moving the magnet, an alarm mechanism, suitable circuits including the magnet and the alarm mechanism, a combination
 50 mechanism controlling said circuits, and a suitable circuit-closing device, all substantially as described.

16. In a circuit-controlling mechanism for electric combination-locks the combination of
 55 a spindle, a nicked disk mounted on the spindle, a device cooperating with the disk to indicate to the touch the starting-point of the combination and the amount of movement therein, and suitable circuit-controlling disks,
 60 all substantially as described.

17. In a circuit-controlling mechanism for electric combination-locks the combination of

a spindle, a nicked disk adjustably connected to said spindle, a device cooperating with the disk to indicate to the touch the starting-point
 70 of the combination mechanism and each successive position thereof, and a suitable circuit-controller also mounted on the spindle, all substantially as described.

18. In a circuit-controlling mechanism for electric combination-locks the combination of
 75 a spindle, an arm mounted on the spindle, a nicked disk also mounted on the spindle and provided with a device for indicating the starting-point of the combination, a series of holes
 80 in the disk, a pin for adjustably connecting the arm and the disk through the medium of one of the holes referred to and a suitable circuit-controller also mounted on the spindle,
 85 all substantially as described.

19. A circuit-controller consisting of a conducting-disk having a hub or boss thereon and a part of its circumference cut away, an insulating-disk mounted on said boss and
 90 having a portion which extends into the cut-away portion of the conducting-disk, all substantially as described.

20. A circuit-controlling mechanism for electric combination-locks consisting of a spindle, a nicked disk mounted on the spindle,
 95 one of the nicks being deeper than the others to indicate the starting-point of the combination and the said disk being provided with a series of holes one corresponding to each nick, an arm also mounted on the spindle
 100 and a pin by which the disk is adjustably connected to the arm through the medium of one of the holes referred to, and a circuit-controller also mounted on the spindle, the said controller consisting of a disk of con-
 105 ducting material having part of its circumference cut away and a disk of insulating material a portion of which lies in the cut-away portion of the conducting-disk, the said insulating-disk having a connecting bar or
 110 wire therein, all substantially as described.

21. In an electric combination-lock, the combination with the lock mechanism, of a plurality of circuit-controlling devices, each
 115 circuit-controlling device consisting of a spindle carrying a nicked disk adjustably mounted thereon and having a suitable device for indicating the starting-point of the combination, a device engaging with each disk to indicate the amount each disk has been turned,
 120 a circuit-controller also carried on the spindle, contacts engaging the controllers, an alarm mechanism, suitable circuits including the alarm mechanism and the lock mechanism, and a suitable circuit-closing device, all
 125 substantially as described.

22. In a protective device for combination-locks the combination with one of the plates of the casing of the lock, of a protective plate, insulating material between the plates, a hold-
 130 ing device for securing the plates together, the said holding device passing through perforations in each and having a reduced portion, the said reduced portion lying in the per-

foration in one of the plates, and the main portion being long enough to span the distance between the plates, insulating material between the holding device and that plate
5 which surrounds the reduced portion, the two plates being connected to a suitable source of electrical energy, and an alarm in said connections, substantially as described.

23. In a protective device for combination-
10 locks the combination with one of the plates of the lock-casing, of a protective plate, insulation between the plates, a screw holding the plates together, said screw having a tapped portion and a reduced portion, the tapped
15 portion engaging one of the plates and being

long enough to span the distance between the plates and a recessed portion lying in the perforation of the other plate when the screw is home, an insulating-washer between the head of the screw and the plate, the plate and the casing being connected to a suitable source of electrical energy, and an alarm in said connections, all substantially as described.

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

HENRY GUY CARLETON.

Witnesses:

T. F. KEHOE,

G. M. BORST.