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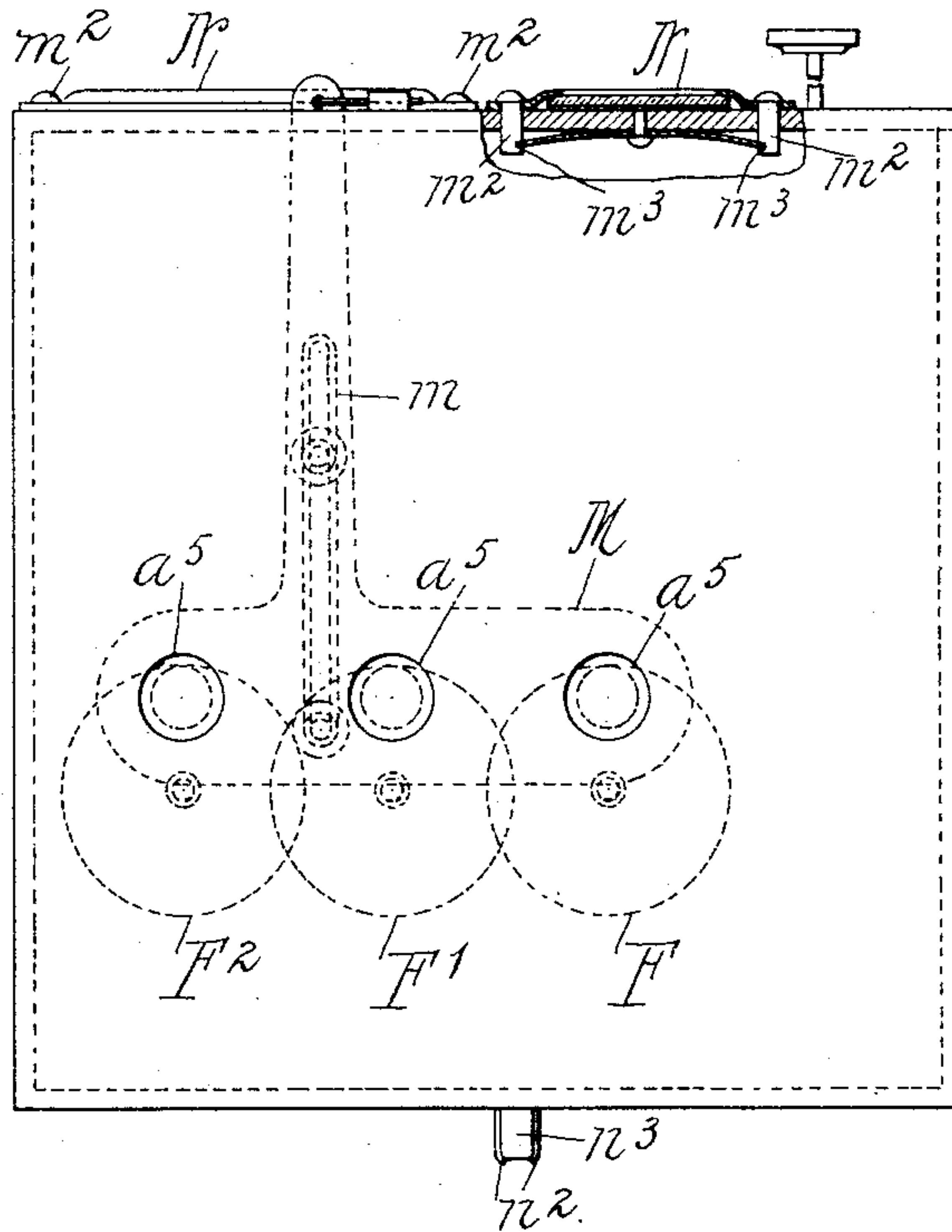
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C. A. STITZER.  
ELECTRICALLY CONTROLLED VOTING MACHINE.

No. 543,065.

Patented July 23, 1895.

*Fig. 1.*



Witnesses

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his Attorneys

(No Model.)

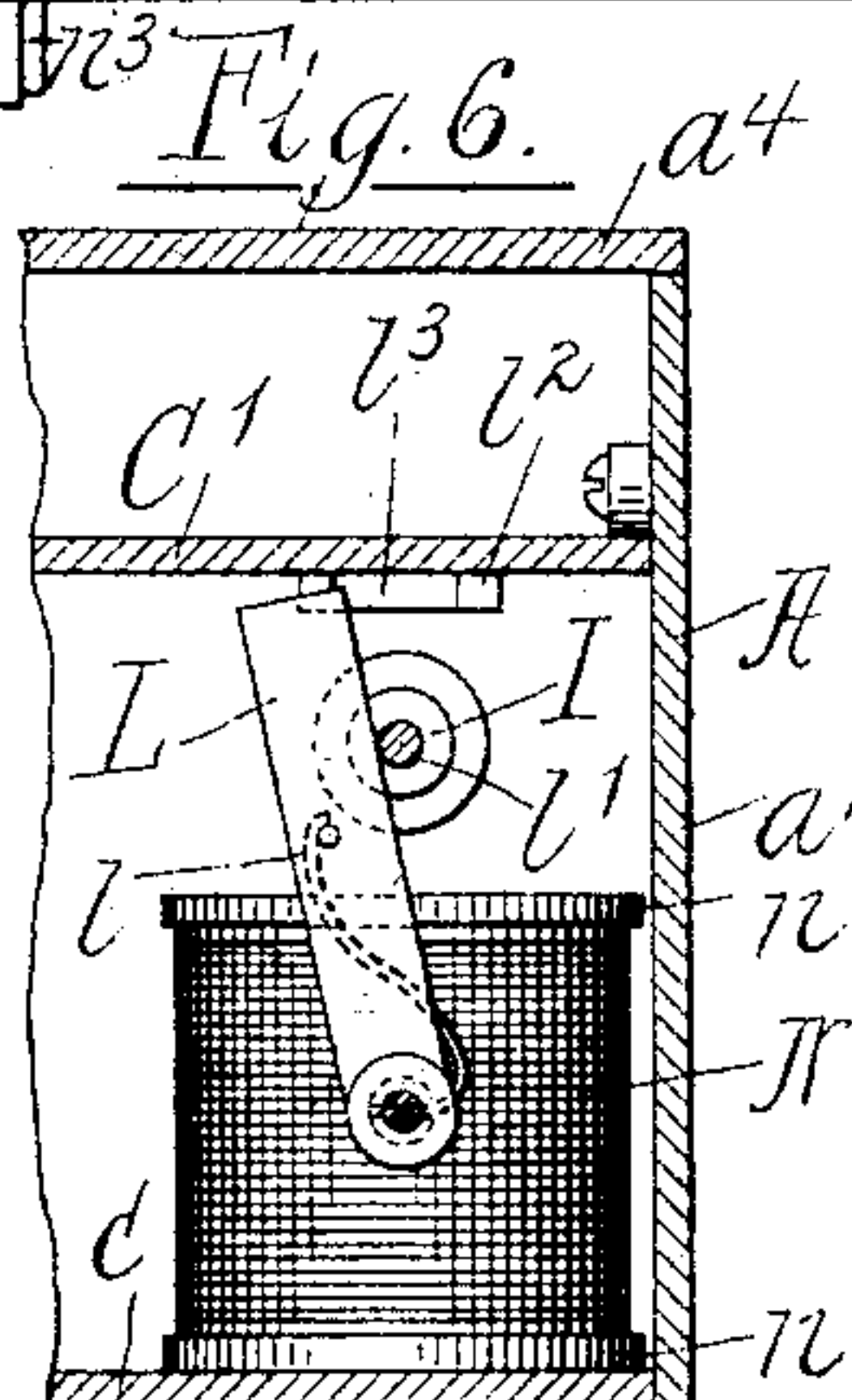
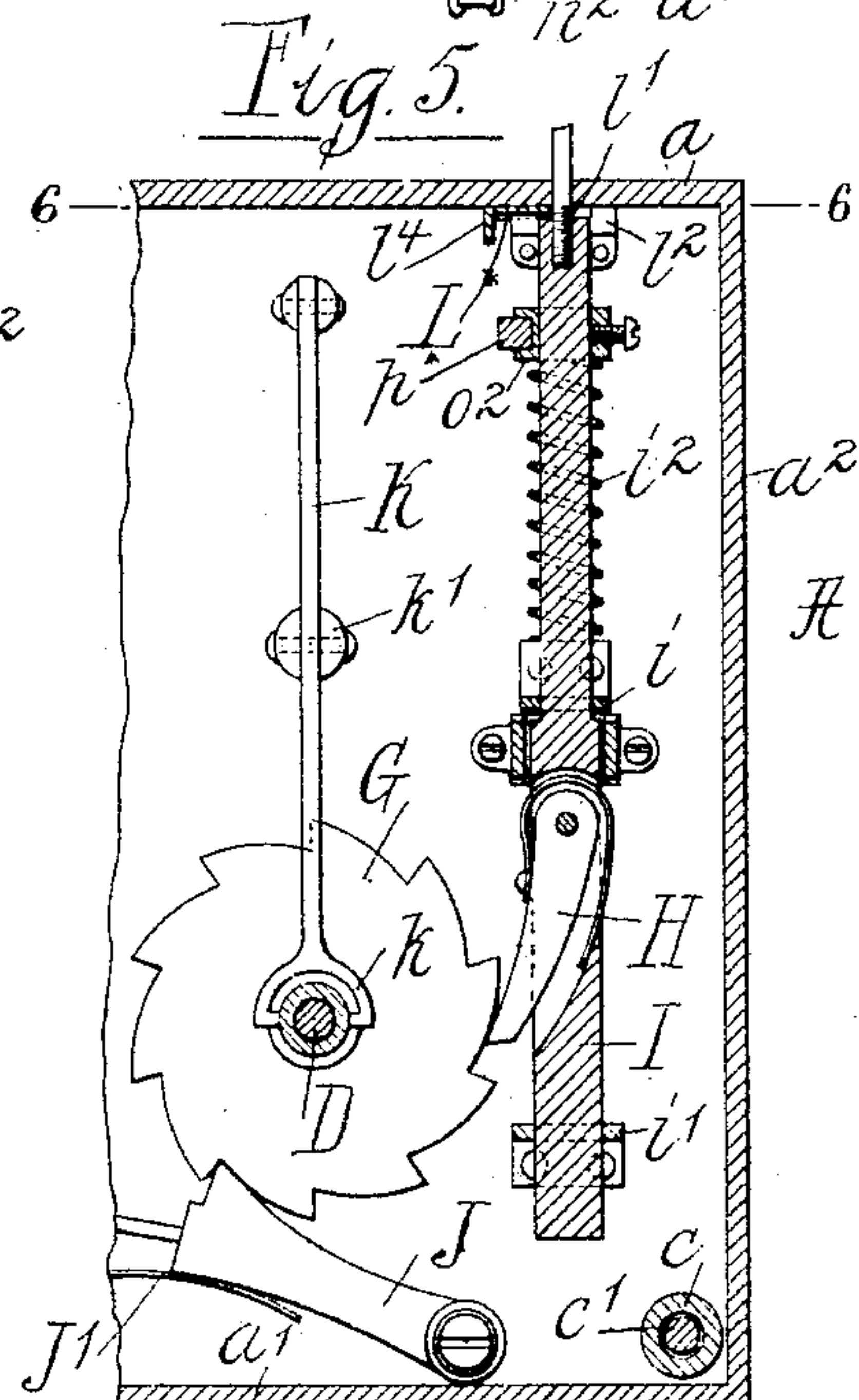
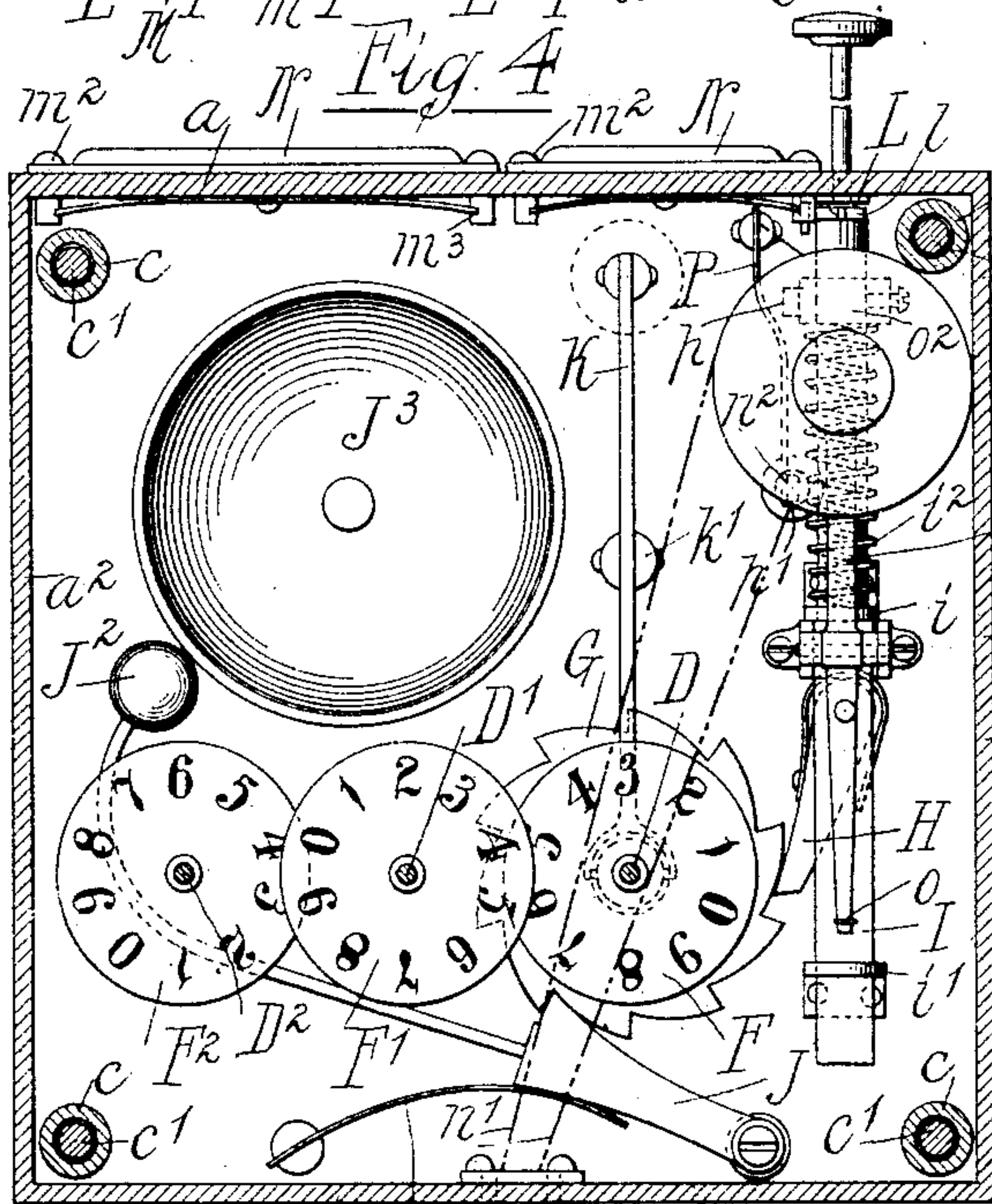
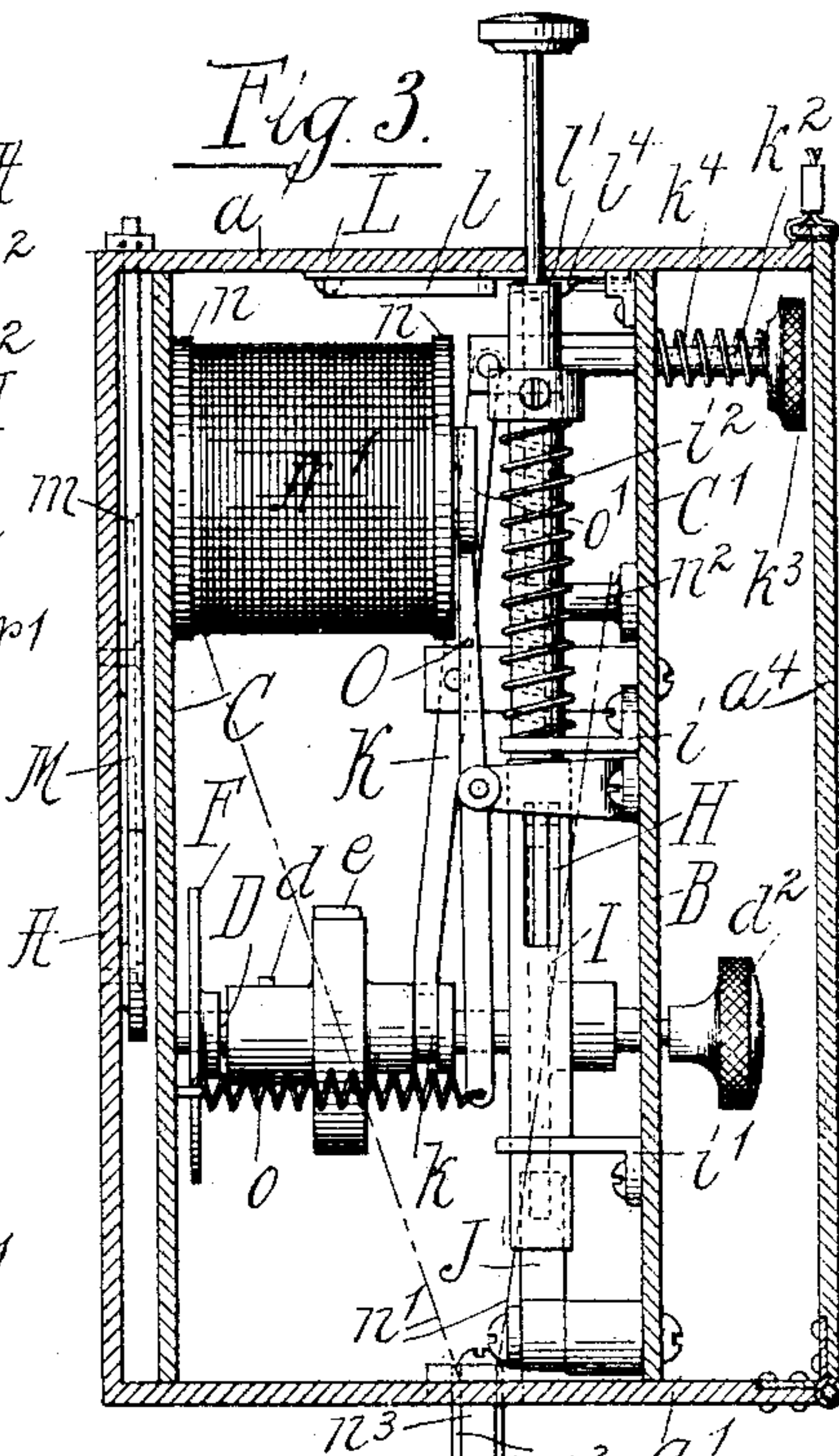
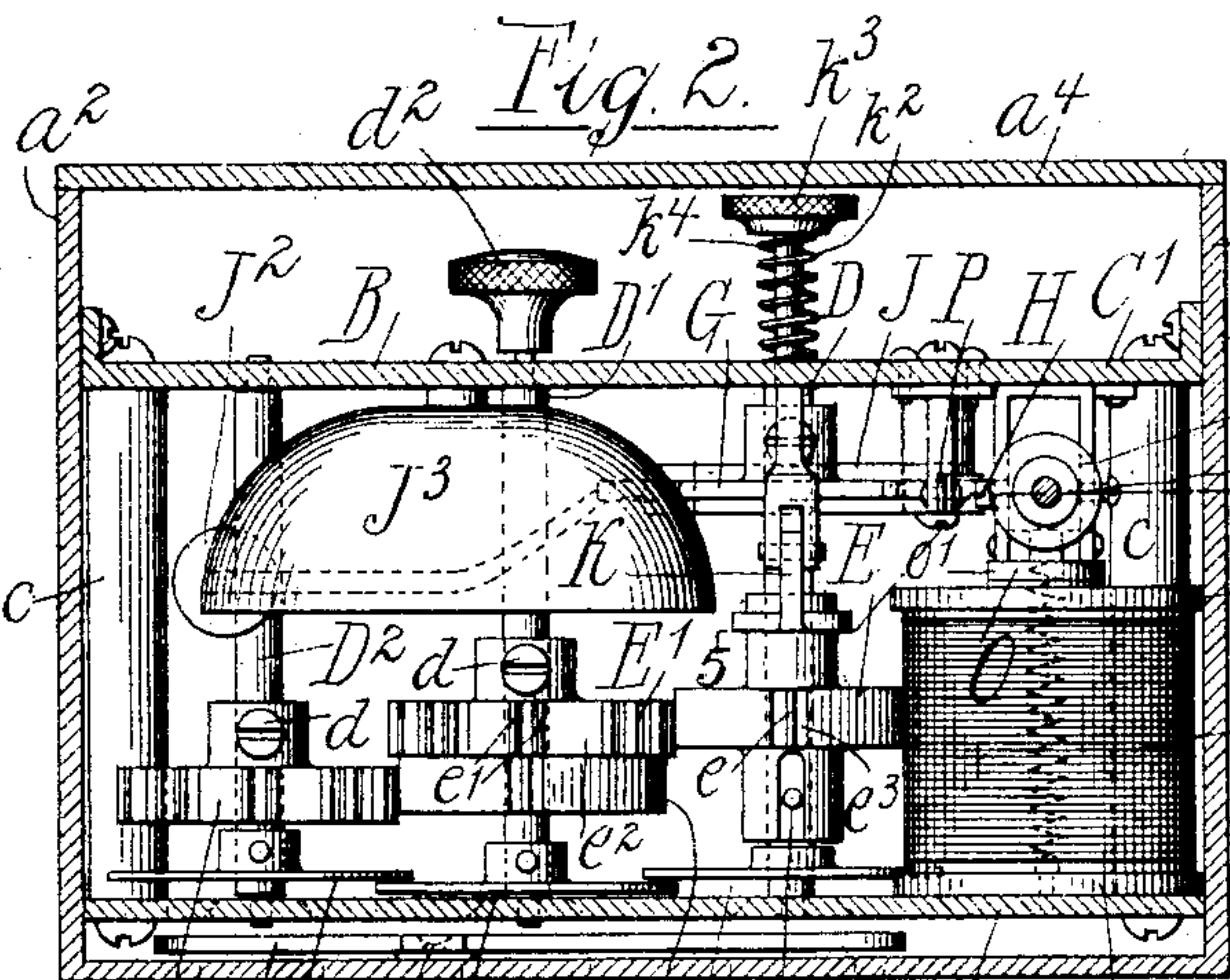
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C. A. STITZER.

ELECTRICALLY CONTROLLED VOTING MACHINE.

No. 543,065.

Patented July 23, 1895.



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(No Model.)

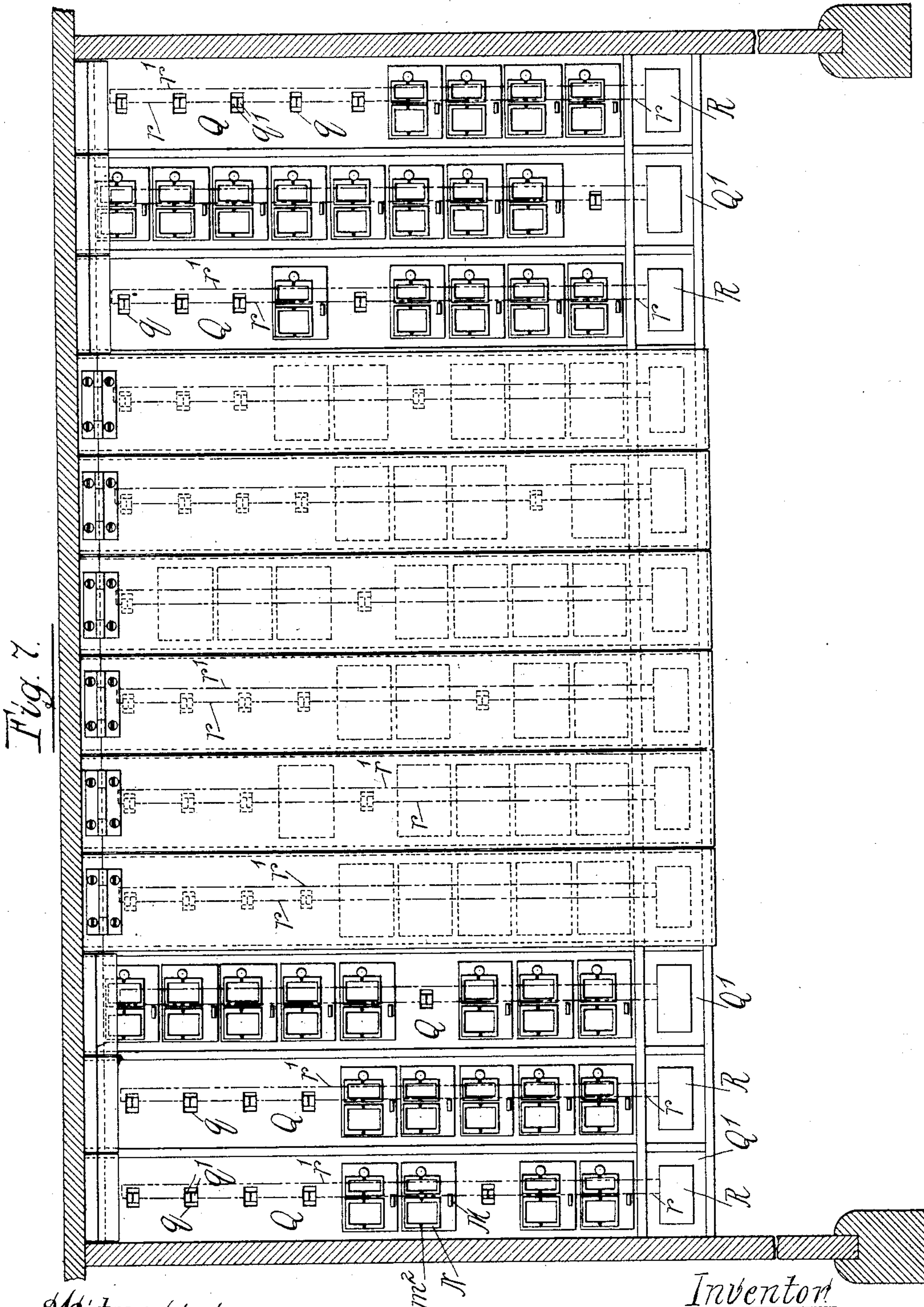
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C. A. STITZER.

ELECTRICALLY CONTROLLED VOTING MACHINE.

No. 543,065.

Patented July 23, 1895.



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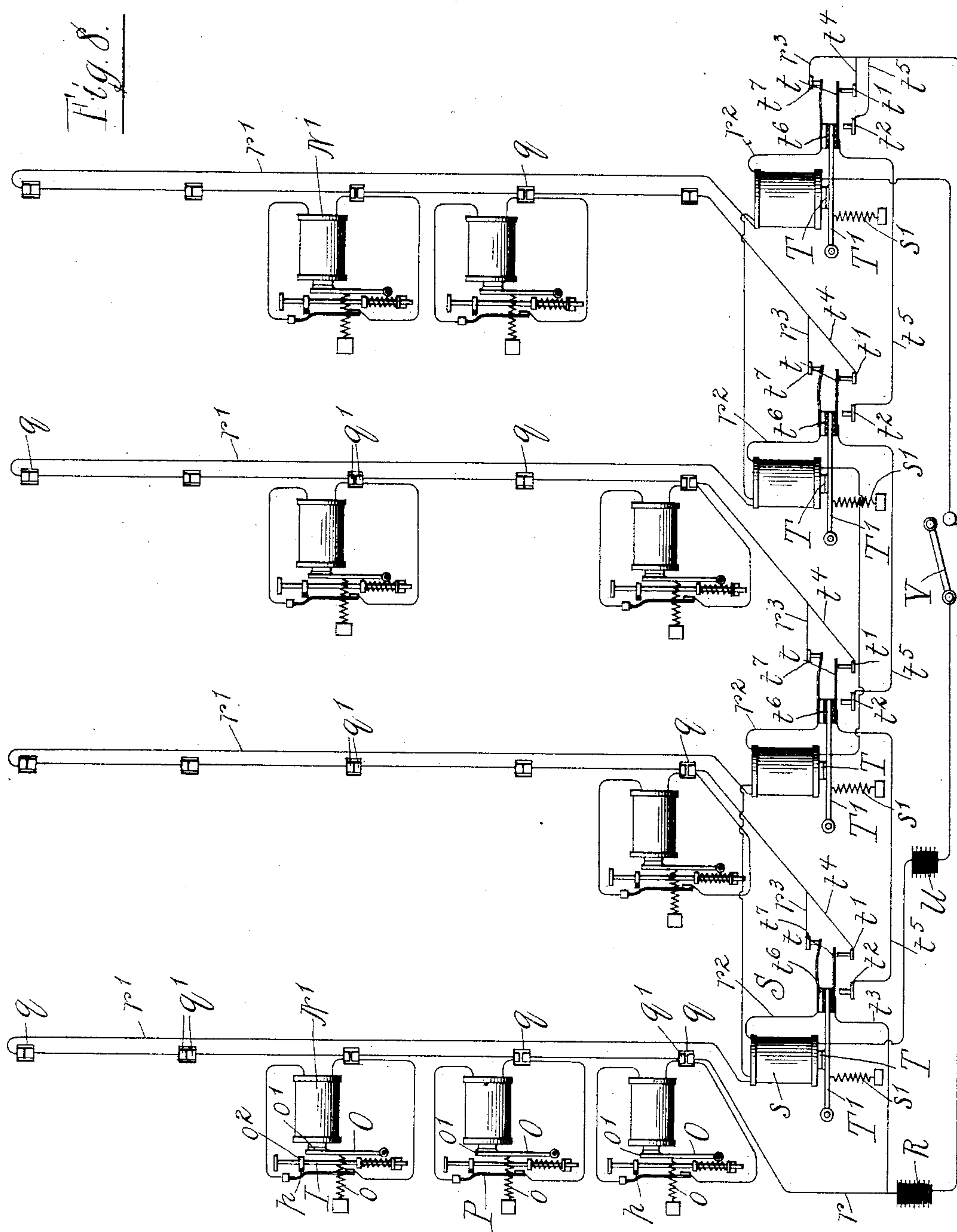
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C. A. STITZER.

ELECTRICALLY CONTROLLED VOTING MACHINE.

No. 543,065.

Patented July 23, 1895.



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(No Model.)

5 Sheets—Sheet 5.

C. A. STITZER.

ELECTRICALLY CONTROLLED VOTING MACHINE.

No. 543,065.

Patented July 23, 1895.

Fig. 9.

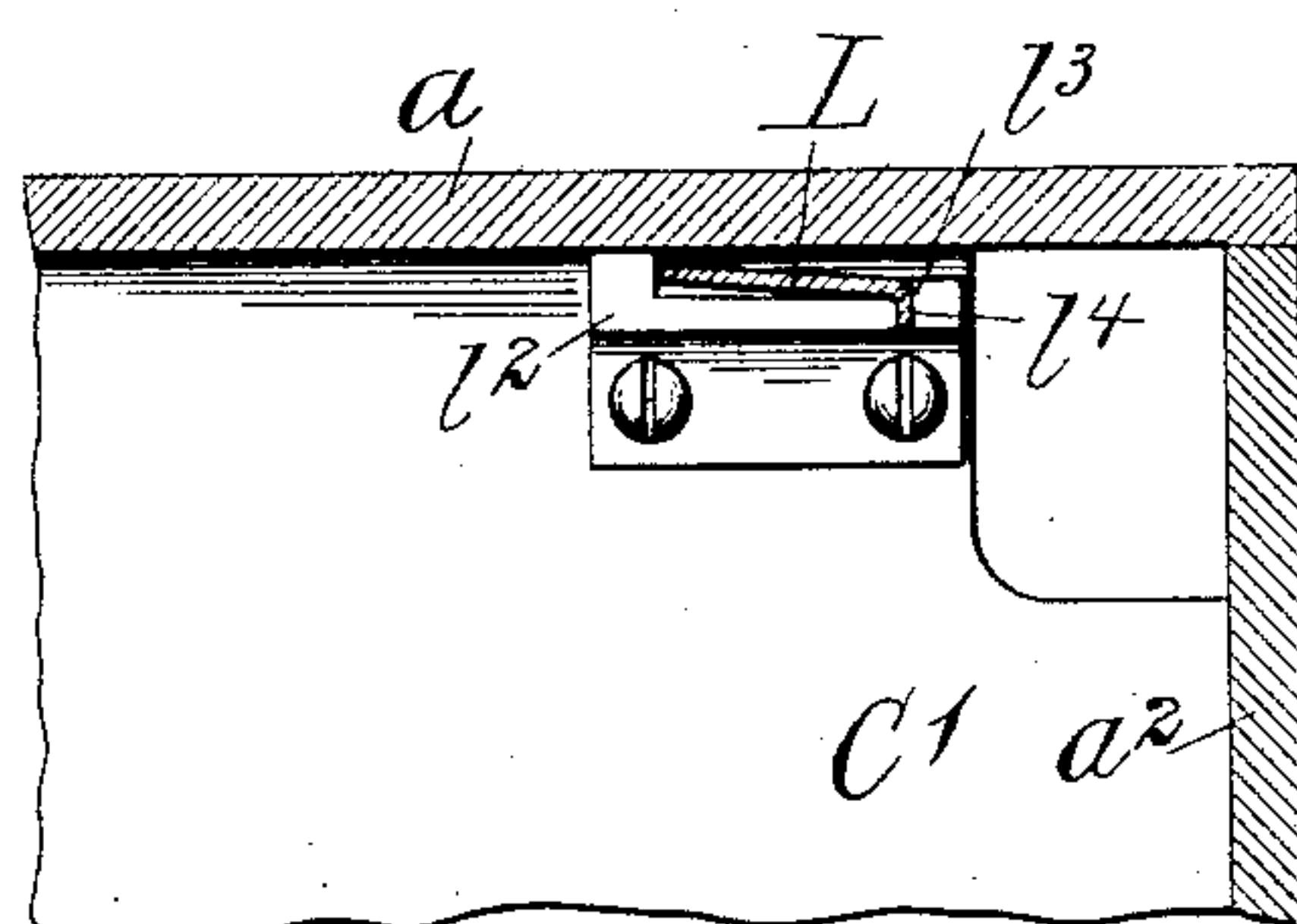
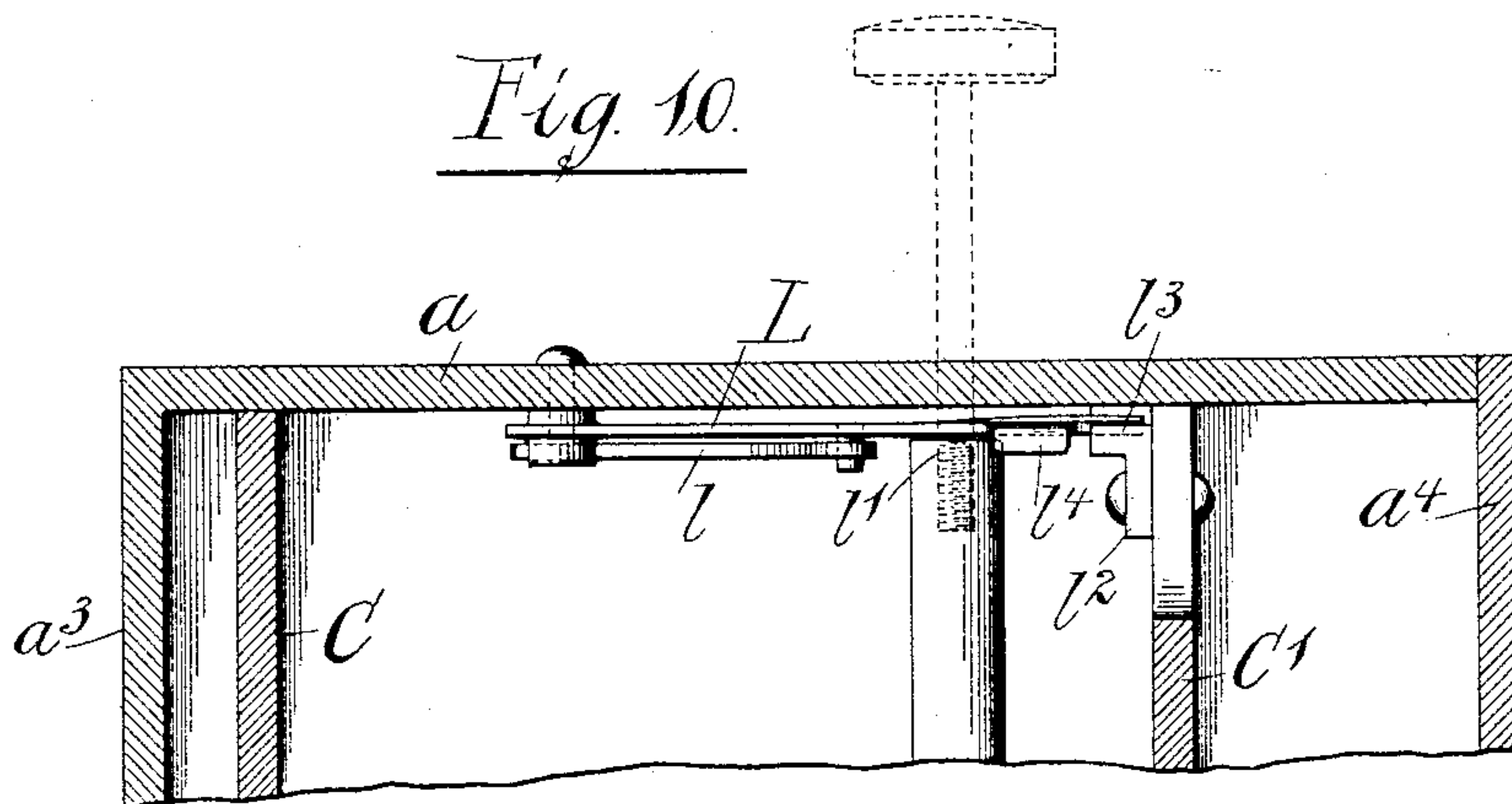


Fig. 10.



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# UNITED STATES PATENT OFFICE.

CHARLES A. STITZER, OF CENTRAL CITY, NEBRASKA.

## ELECTRICALLY-CONTROLLED VOTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,065, dated July 23, 1895.

Application filed November 27, 1893. Serial No. 492,122. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. STITZER, of Central City, in the county of Merrick and State of Nebraska, have invented certain new and useful Improvements in Electrically-Controlled Recording Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in registering apparatus adapted for use in balloting or voting, and also for other purposes, as hereinafter set forth.

The several features constituting the invention are herein shown as applied to a voting register or apparatus of that class in which the voter registers his choice of candidates by operating a registering or counting device representing that candidate, and wherein a separate register is employed for each candidate to be voted for.

The invention consists in the various novel features of construction, combination, and arrangement, as hereinafter set forth, and particularly pointed out in the appended claims, and will be readily understood by reference to accompanying drawings, in which—

Figure 1 is a front elevation of a register designed for use in carrying out the present invention, a part of the front casing being broken away to show the card-holder in section, and the registering-dials and guard-plate therefor being shown in dotted lines. Fig. 2 is a top plan view of the register with the top casing removed to show interior arrangement of parts. Fig. 3 is an end elevation with end casing removed. Fig. 4 is a front elevation with front casing removed. Fig. 5 is a vertical longitudinal section of parts of the register, taken on line 5 5 of Fig. 2. Fig. 6 is a horizontal section taken on line 6 6 of Fig. 5, showing the arrangement of the closing-plate for the operating-rod aperture. Fig. 7 is a plan view of a voting-booth, showing the arrangement of the compartments and registers therein. Fig. 8 is a diagrammatic view showing the arrangement and electrical connections of the locking mechanisms of the registers and switch devices controlling the same. Figs. 9 and 10 are enlarged details

showing the construction of the pivoted plate which automatically closes and locks the push-rod aperture.

To first refer to the registering or counting mechanism forming part of an apparatus embodying my invention, it will be understood that this may be of any suitable construction adapted to correctly register successive movements of a part operated by the voter in the act of balloting from one upward to as high a number as may be the greatest number of votes likely to be cast for one candidate in any single election; but, as herein shown, such counting mechanism is constructed as follows:

An outer casing or box A for the registering device is preferably made in the form of a metal box of rectangular form, the top  $a$ , bottom  $a'$ , ends  $a^2$   $a^2$ , and front  $a^3$  being, in this instance, shown as cast integral with each other and the back  $a^4$  being hinged at its lower margin to the bottom of the box and provided at its opposite margin with suitable apertures arranged to register with corresponding apertures formed in the top wall of the box when the latter is closed. Through these apertures a wire or metal strand may be passed and suitably sealed to prevent opening of the box by unauthorized persons. A series of apertures  $a^5$   $a^5$   $a^5$  is provided in the front wall of the box through which the registering-dials (hereinafter described) may be seen. The main operative parts of the register are shown as all mounted upon a suitable frame B, composed of front and back plates C and C', secured together by posts  $c$   $c$   $c$   $c$  and removably secured within the outer casing by means of bolts  $c'$   $c'$ , as shown. Revolvably mounted in this frame are three transversely-arranged parallel shafts or arbors D D' D<sup>2</sup>, each carrying a gear-wheel E, E', and E<sup>2</sup>, secured against rotation thereon by means of set-screws  $d$   $d$   $d$ , said gear-wheels being arranged to intermesh so as to form a train of gearing by which numbered disks or dials F F' F<sup>2</sup> mounted on the shafts D, D', and D<sup>2</sup>, respectively, are actuated. The construction of this train of gearing, by which the several dials are actuated so as to bring the proper figures carried thereon opposite the apertures  $a^5$   $a^5$   $a^5$ , is as follows: The gear E is provided with a single tooth  $e$ , which is adapted to en-



gage and intermesh with gear-teeth  $e' e'$ , arranged in pairs with intermediate spaces  $e^2$  around the perimeter of the gear  $E'$ , said gear  $E'$  being provided with ten pairs of teeth and  
 5 corresponding spaces. The gear  $E$  is cut away or recessed adjacent to the single tooth  $e$ , as shown at  $e^3$ , and is so adjusted with relation to the gear  $E'$  that after having carried said gear forward one step in its rotation its outer  
 10 perimeter will fit and travel within the space  $e^3$  between the last-engaged pair and the following pair, thus positively locking and preventing the further rotation of the gear  $E'$  until the gear-tooth  $e$  has reached the point  
 15 at which it will intermesh with the succeeding pair of teeth  $e$  of the gear  $E'$ , when the latter will be again carried forward a step as before. The shaft  $D'$  carrying the gear  $E'$  is also provided with a gear  $E^3$  having a single  
 20 tooth like the gear  $E$  and arranged to intermesh with and actuate the gear  $E^2$ , which is provided with alternate pairs of teeth and spaces like the gear  $E'$ . Thus arranged, it will be obvious that the several dials, each of  
 25 which bears on its face numerals from 0 to 9, will be carried forward in such a manner as to bring the proper numerals before the apertures  $a^5 a^5 a^5$ , so as to correctly indicate succeeding numbers from 0 to 999 in the same  
 30 manner other counting devices or registers.

As a means of actuating the train of gearing a ratchet-wheel  $G$  is rigidly secured upon the shaft  $D$ , and said ratchet-wheel is engaged by a spring-pressed pawl  $H$ , pivotally  
 35 mounted within an operating rod or lever  $I$ , in this instance arranged to reciprocate vertically within guides or brackets  $i i'$  secured upon the frame-plate  $C'$ , the pawl being so arranged as to carry the ratchet-wheel forward one notch at each time the rod is actuated. A detent  $J$ , pivotally mounted on the  
 40 frame-plate  $C'$  and held yieldingly against the ratchet-wheel by a spring  $J'$ , serves to prevent backward movement of said wheel  $G$  in the usual manner. A coiled expansion-spring  $i^3$  surrounds the operating-rod  $I$  and is interposed between the guide or bracket  $i$  and a collar secured on said rod  $I$ , said spring serving to automatically return the rod to its  
 45 normal upward position after it has been depressed.

As a means of announcing, both to the person who is voting and to the proper officials in charge of the election, that the operating-rod has been depressed sufficiently to actuate  
 55 the registering device and thereby register a vote, the detent  $J$  carries a hammer or clapper  $J^2$ , arranged to strike a gong or bell  $J^3$  mounted upon the frame-plate  $C'$ , when the  
 60 said detent drops into one of the ratchet-notches at the end of each downward stroke of the operating-rod  $I$ , the said spring  $J'$  being made of sufficient strength to insure proper action of the hammer  $J^2$ .

65 In order that the register-dials may be conveniently set at zero before the beginning of

the balloting, one of the gears, in this instance the one on the shaft  $D$ , is arranged to slide longitudinally of the said shaft, being for this purpose provided with a slotted hub within  
 70 which slot the set-screw  $d$  is inserted, so that it may be shifted out of gear with the adjoining gear  $E'$ , thus releasing the remaining gears of the train from the ratchet mechanism and allowing them to be rotated in  
 75 either direction. For the purpose of thus rotating said gears  $E'$  and  $E^2$  the shaft  $D'$  is extended through the plate  $C'$  and provided on its outer end with a milled thumb-nut  $d^2$ . As a convenient means of thus shifting the  
 80 gear  $E$ , I have provided a shipping-lever  $K$ , having at one end a fork or yoke  $k$  engaging an annular groove formed in the hub of the gear  $E$ , and pivoted upon the frame-plate  $C'$ , as shown at  $k'$ , together with an actuating-rod  $k^2$ , which is secured to the opposite end of  
 85 said lever and extends approximately at right angles therefrom through the plate  $C'$ , said rod being provided at its outer end with a thumb-piece or button  $k^3$ , and being surrounded by a coiled spring  $k^4$ , interposed between the plate  $C'$  and a shoulder on said rod in such manner as to normally hold the gear  
 90  $E$  in mesh with the adjoining members of the train.

95 In order that the register may be rendered positively inoperative after the voting at an election has been completed until after the returns of election have been finally made, the operating-rod  $I$  is made in two parts or  
 100 sections separable at a point within the casing, conveniently by having the outer section threaded into a socket formed in the other, so that said outer end may be unscrewed and removed. Means for preventing its reinsertion  
 105 after having been once removed are provided as follows: Pivoted against the inner face of the top wall of the box is a plate  $L$ , (shown in dotted lines in Fig. 5,) so arranged as to be automatically rotated by a spring  $l$ , secured  
 110 on said plate into a position to close said rod, aperture  $l'$  when the rod has been removed, the end of said plate  $L$  being in this position supported by a rib or cleat  $l^2$ , secured on the adjacent side wall of the casing beneath the  
 115 same. In order that this plate may be automatically locked in position to close the aperture it has its outer end or that end remote from its pivot twisted slightly out of a flat plane in such manner than its forward edge  
 120 (referring to its direction of rotation) shall press against the inner face of the top wall, while its rear edge will ride upon the cleat  $l^2$ . Said cleat is provided with a notch or recess  
 125  $l^3$ , within which the rear edge of the plate  $L$  is adapted to drop and rest when it has reached its most advanced position, in which latter position it is prevented from further movement by striking against a stop formed on the opposite end of said cleat. A suitable lip or  
 130 turned-down portion  $l^4$  is provided on the rear edge of the plate  $L$ , by means of which, when



access is had to the interior of the register, it may be lifted out of the notch  $l^3$  and drawn back to permit the reinsertion of the rod I.

Inasmuch as it is desirable, if not necessary, that the dials of the register should be concealed from inspection during the progress of the balloting, a plate M, having the general form of an inverted T, one of the arms thereof being slightly longer than the other, as shown, is interposed between said dials and the inner face of the casing, said plate being conveniently mounted so as to slide into and out of register with the dial-apertures by means of two screws or rivets inserted through a slot  $m$ , formed vertically in said plate and extending into the front wall of the casing, as shown in Fig. 1. That part of the plate M having the slot  $m$  is extended upward through a vertical aperture formed through the top of the box in the plane of the inner face of its front side and is transversely pierced by an aperture adapted to receive a seal wire or strand when said plate is in its upward position or in that position in which the dial-apertures are closed thereby. When it is desired to inspect the dials the seal is broken and the plate M moved or allowed to drop, so as to expose the faces of the dials.

As a means of identifying each register with the candidate whom it represents, one or more card-holders N, having glass-covered faces, are suitably secured to the top of the register, such holders being designed to contain the candidate's name, political party, office for which he is a candidate, and other desirable data. These card-holders are shown as made in the form of metal frames, so arranged as to be accessible for the insertion or removal of the card only by removal of the holder from the box, the glass face (which is larger than the inner opening of the frame) being inserted within the frame from the back, the card next placed with its face to the glass, and the frame then securely attached to the register.

As a convenient means of securing the holder to the box in such manner that it can be removed by access to the interior of the register only, a short lug or bolt  $m^2$  is provided at each of its ends, which lug or bolt is adapted to fit within a corresponding aperture formed through the top of the box. Said lugs are long enough to extend a short distance within the box and are transversely slotted on their proximate sides adjacent to the inner face of said top wall. Pivoted to the inner side of said top at a point midway between the lugs is a flat strip or bar, preferably of spring-steel, of proper length to fit within the slots  $m^3 m^3$  at each end when so turned as to rest on a line between them. Preferably this spring-strip will be slightly curved flatwise with its convex side against the inner face of the box, so that when its ends are forced back and turned within the slots  $m^3 m^3$  it will hold the card-receptacle closely against the top of the box.

As a means of positively preventing incorrect or illegal voting—such as repeating the

vote for the same candidate, voting for two candidates for any one office, or otherwise improperly operating the registers—said registers are arranged in groups, the registers for all of the candidates for any one office being arranged in a single group, and these groups are so controlled by electrically-operated apparatus that after any one candidate of a group has been voted for it will be impossible to either register another ballot for him or to vote for any other candidate in that group. This apparatus is arranged and constructed as follows: Mounted within each register in suitable supports  $n$  is an electromagnet  $N'$ , having its terminals  $n' n'$  leading to contact-pieces  $n^2 n^2$ , embedded in a somewhat-tapered button  $n^3$ , of insulating material, at opposite sides thereof, as seen in Fig. 4. Pivotally mounted so as to vibrate in the field of the electromagnet  $N'$  is an armature-lever O, held away from the coil when the latter is demagnetized by means of a spring  $o$ , the arrangement of the armature-lever being such that when in its position remote from the coil  $N'$  its vibrating end  $o'$  will rest beneath and in the path of a projection or collar  $o^2$  formed on the operating-rod I. This construction renders it impossible to operate said rod when the lever is in position to engage the collar  $o^2$ , but when said coil  $N'$  is energized and the armature attracted the lever will be carried out of the path of the projection on the rod I, and the latter will be free to move. As a means of breaking the circuit through the coil  $N'$ , and thereby breaking the circuit through all of the other registers comprised in a single group, (thereby locking them against operation immediately upon the operation of any single one of them,) a spring contact-strip P is interposed in the circuit between the coil  $N'$  and one of the contact-points  $n^2$ , this strip P being arranged to lie nearly parallel with the operating-rod I and so shaped that a slight downward movement of the said rod I will bring an insulated contact-point  $p$  thereon into engagement therewith and cause it to break contact with the point  $p'$ , thus breaking the circuit through the coil  $N'$ , and of course through the remainder of the registers in the same circuit, the conformation of the spring-strip P being such that it will be held out of contact with point  $p'$  until the operating-rod has returned to the point at which the contact was broken, as clearly seen in Fig. 4.

Connections with a suitable battery for energizing the coils in the several registers are provided as follows: The several registers of each group will preferably be arranged in separate compartments Q, conveniently arranged in sections, as shown in Fig. 7. In the bottom of each compartment is formed a recess  $q$ , adapted to receive the projection or button  $n^3$  of each one of as many registers as the compartment is designed to contain. Arranged within each of said recesses  $q$  is a pair of spring-metal strips  $q' q'$  so formed and secured as to normally rest in contact with each



other in the form of a V. A conductor  $r$  leads from a conveniently-located battery R to the first of these strips  $q'$ . From its companion strip a second conductor leads to the strip of the next aperture of the series, and so on throughout the whole series of apertures of this compartment. From the last strip  $q'$  of the series a conductor  $r'$  leads to the coils of an automatic switch device S, located in a compartment Q' at the end of the compartment Q. This automatic switch device is constructed and connected as follows: Supported in a suitable frame is an electromagnet T, provided with the usual armature-lever T', pivoted so as to vibrate toward and from the said magnet and carrying at its free end a spring contact-strip  $t$ . This strip  $t$  is so arranged that when the armature T' is attracted by the magnet T it will be out of contact with, but in relatively-close proximity to, a back contact-point  $t'$ . A second back contact-point  $t^2$  is arranged opposite the end of the armature T', but at some considerable distance therefrom, so that when the coil T is demagnetized and the said armature-lever drops back under the influence of the spring  $s'$  the spring-strip  $t$  will first make contact with the contact-point  $t'$ , while the armature, continuing its backward movement, will afterward strike and rest against the fixed point  $t^2$ . A conductor  $t^3$  leads from a point in the main circuit between the battery and the first compartment or group of registers to the contact-strip  $t$ , said contact-strip being properly insulated from the body of the armature-lever T', as shown. From the contact-point  $t'$  a conductor  $t^4$  leads to the main circuit at a point between its compartment and the following compartment Q, while a third conductor  $t^5$  leads from the fixed back contact  $t^2$  to the contact-strip  $t$  of the switch device of the next compartment Q. These connections are repeated throughout the whole series of compartments, with the exception that the conductors leading from the last pair of back contact-points  $t'$   $t^2$  of the series are both connected with the main circuit leading back to the other pole of the battery.

Means controlled by the armature-lever of each switch device for positively interrupting the circuit in that part thereof controlled by said switch are provided as follows: An insulated contact-piece  $t^6$  is mounted on said switch-lever and connected with the conductor  $r^2$ , leading from the coil s. A contact-point  $t^7$  is provided, against which the contact-piece  $t^6$  rests when the lever T' is in its forward position, and from the contact-point  $t^7$  a conductor  $r^3$  leads to the next compartment Q.

As a convenient means of returning the switch devices of the several compartments into such position as to again establish a closed circuit through the several compartments in readiness for the next person to vote, a separate circuit is provided, the conductor of which leads from one pole of the battery, is coiled about the cores of each of the elec-

tro-magnets T of the several switch devices S, and is then carried back to the battery U. A key V is conveniently arranged, by which the proper official in charge of the election can open or close said circuit, the intention being that this circuit shall be normally left open and only temporarily closed for a moment after each voter has completed his voting and passed out of the booth.

Thus constructed and arranged, the operation of the apparatus will be as follows: Registers for each of the candidates having been set at zero, identified, and sealed by the proper officials, they are placed in their proper compartments and the main circuit closed. The secondary or judges circuit is closed for a moment, thus causing the armature-levers of the several switch devices to close the main circuit through their respective compartments and thus through their own magnets. The secondary circuit is then opened, the main circuit meanwhile retaining the switch-levers in their forward position, and the registers are in readiness for voting. The voter on entering the booth opens the first compartment Q, selects his choice of the candidates for the office represented by that compartment, and operates that register by pressing the operating-rod. As soon as this rod has been depressed a short distance the contact-point  $p$  thereon will strike the strip P, causing it to break contact with the point  $p'$  and thus breaking the circuit throughout the whole system of registers and instantly locking all of them, except the one being operated, which latter, by reason of the projection or collar  $o^2$ , having passed below the end of the locking-lever therein before the circuit was broken, will be free to continue its movement. At the instant the circuit is broken the armature-levers of each of the switch devices S will simultaneously drop back, closing the contact between points  $t$  and  $t'$ , but by reason of the shape of the spring-strip  $t^6$  still holding contact between points  $t^6$  and  $t^7$  of the several switches, thereby establishing a circuit through the conductor  $t^4$  and all of the compartments following the one in which the register is being operated and through the magnets of the several switch devices therein. The armature-levers of the said several switch devices are thus held in contact with their magnets, thereby leaving the circuit closed through all of the registers excepting those of the group in which one has been operated, which latter will remain locked. The register which the voter has operated will automatically lock itself when the operating-rod returns to its upward position. The armature-lever T' of the switch device of this compartment will, after having closed the circuit through the yielding back contact-point  $t'$  and conductor  $t^4$ , continue its backward movement until it breaks contact between points  $t^6$  and  $t^7$  and rests in contact with the fixed stop  $t^2$ . When the operating-rod has been depressed a sufficient distance to cause the reg-



ister to record a vote, the detent J will drop into the next ratchet-notch, thus ringing the bell and announcing that a vote has been recorded. The voter will then close this compartment, proceed to the next, and repeat the operation of registering his ballot. Preferably each group will be supplied with one blank register—i. e., a register which can be operated in case the voter does not wish to vote for any candidate of a group, but at the same time does not wish to disclose the fact that he has passed a group without voting. After he has completed his voting and passed out of the booth, the official in charge of the secondary circuit closes it for an instant only, and the system is then ready for the next voter. If during the progress of the voting it is found desirable to rearrange or replace the registers in the compartments, this may be done by simply lifting them up and changing them around as desired, such operation having no effect whatever on the circuit, but merely serving to lock any register while it is out of its compartment.

After the voting has been completed, the operating-rods of the several registers are unscrewed and removed, the automatic locking-plates preventing their reinsertion, and thus preventing any possible tampering with the recording mechanism of the register. The proper officials will then break the seals which hold the plates over the dials, make out their report of the number of votes polled for each candidate, and then transmit the register, still sealed against access to the registering mechanism, to the proper returning-board.

While my invention may be applied with great advantage to an apparatus for balloting or voting, as above described, yet the main features thereof may also be advantageously used for other purposes, such as a watchman's time recorder or indicator. It is obvious, for instance, that if the registering devices forming part of the mechanism are arranged at distant points or stations a reliable watchman's indicator will be provided, because only one of the same can be operated during each round of the watchman, it being obvious that the registering device in such case need not necessarily include a counting mechanism such as is herein shown, but may embrace an indicating or registering device, either electrical or mechanical in its character, and one making a record or indicating either at the station where it is located, at a central station, or elsewhere.

It is to be understood, also, that the registers or recording apparatus may, if desired, be arranged to be governed or controlled by a normally-open circuit instead of a closed circuit, as herein described, such change being a mere reversal of arrangement and a common and well-understood expedient in electrical devices. Such change is, obviously, entirely within the scope of the present invention.

I claim as my invention—

1. The combination with a registering device and locking mechanism adapted to lock said registering device against operation, of an electric circuit controlling the locking mechanism, a contact device in the said circuit for opening and closing the same, and means actuated by the registering device for operating said contact device, substantially as described.

2. The combination with a plurality of registering devices and locking mechanism adapted to lock each of said registers against operation, of an electric circuit controlling said locking mechanism, and contact devices in the said circuit arranged to open and close the same, and means actuated by each of said registers for operating said contact device, substantially as set forth.

3. The combination with a registering device, of an electro-magnet provided with a vibratory armature lever, said armature lever being arranged to lock said registering device from operation when the circuit is open and to permit its free operation when closed, and contact devices actuated by the registering device and arranged to open said circuit when the register is operated, substantially as described.

4. The combination with a registering device and an electrically controlled locking device adapted to lock said registering device against operation, a contact device actuated by the registering device and arranged to open or close the circuit which controls said locking device, and an electrically controlled switch device operating to throw out of circuit that part thereof containing said contact device when the registering device is operated, so as to prevent the re-establishment of the circuit therethrough after it has been once broken, substantially as set forth.

5. The combination with a registering device and an electrically controlled locking device adapted to lock said register from operation when the circuit is broken, contact devices actuated by the registering device and arranged to open and close the circuit which controls said locking device, an electrically controlled switch device operating to throw out of circuit that part thereof containing said contact devices when the registering device is operated, so as to prevent the re-establishment of said circuit therethrough after it has been once broken, and an independent, normally broken circuit arranged to return the switch to a position to re-establish the circuit through the locking device of the register by the closing of said independent circuit, substantially as set forth.

6. The combination with a plurality of registering devices each provided with an electrically controlled locking device adapted to lock said register from operation, contact devices arranged to open and close the circuits which control said locking devices, means actuated by each of said registering devices for operating said contact devices, and electri-



cally controlled switches arranged to throw out that part of the circuit passing through any register which is operated while retaining the circuit through the locking devices of succeeding registers, substantially as described.

7. The combination with a plurality of registering devices arranged in groups, each of said registering devices being provided with an electrically controlled locking device adapted to lock said register from operation, contact devices arranged to open and close the circuits which actuate said locking devices, means actuated by each of said registering devices for operating said contact devices, and electrically controlled switch devices adapted for actuation by all of the registering devices of each group and arranged to throw out the actuating circuit of the locking devices embraced in any group without breaking the circuits which actuate the locking devices of a succeeding group or groups of registers, substantially as set forth.

8. The combination with a plurality of registering devices arranged in groups and each provided with an electrically controlled locking device, of an electric circuit controlling all of said locking devices, contact devices arranged to open and close the said circuit, means actuated by each of said registering devices for operating said contact devices, electrically controlled switch devices each adapted to throw out the parts of said circuit which operate the locking devices of one group of registering devices, said switch devices being each adapted for actuation by all of the registering devices of the group to which it belongs, substantially as described.

9. A plurality of electrically controlled switches for cutting out successive parts of an electrical circuit, each comprising an electro-magnet located in said circuit, an armature lever controlled by said magnet, and yielding and fixed contact points, said parts being so connected and arranged that upon the breaking of the circuit through any switch its armature lever will first close a circuit through the yielding contact point and through the succeeding switches, and thereafter through the fixed contact point, thereby retaining in circuit the coils of the succeeding switches of the circuit, substantially as set forth.

10. A plurality of electrically controlled switches for cutting out successive parts of an electrical circuit, each comprising an electro-magnet located in said circuit, an armature lever controlled by said magnet, and two back contact points arranged to come into contact with said armature lever in its backward movement consecutively, said parts being so connected that upon the breaking of the circuit in that part thereof controlled by any switch its armature lever will drop back and cut out or short circuit said controlled part, but will close the circuit through the proximate back contact point and through the coils of the succeeding switch or switches, thereby returning said succeeding switches to their former forward position, whereby the remainder of the circuit is retained in closed circuit, substantially as described.

11. A plurality of electrically controlled switches for cutting out successive parts of an electrical circuit, each comprising an electro-magnet located in said circuit, an armature lever controlled by said magnet, two back contact points arranged to come into contact with said armature lever in its backward movement consecutively, and circuit breaking devices located in that part of the circuit controlled by said switch, said devices being actuated by the backward movement of the armature lever and arranged to break contact after said armature lever has closed the circuit through the proximate back contact point, said parts being so connected that upon the breaking of the circuit in that part thereof controlled by any switch its armature lever will drop back and cut out or short circuit said controlled part, but will close the circuit through the proximate back contact point and through the coils of the succeeding switch or switches, thereby returning said succeeding switches to their former forward position, whereby the remainder of the circuit is retained in closed circuit, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

CHARLES A. STITZER.

Witnesses:

ALBERT H. GRAVES,  
HENRY H. CARTER.