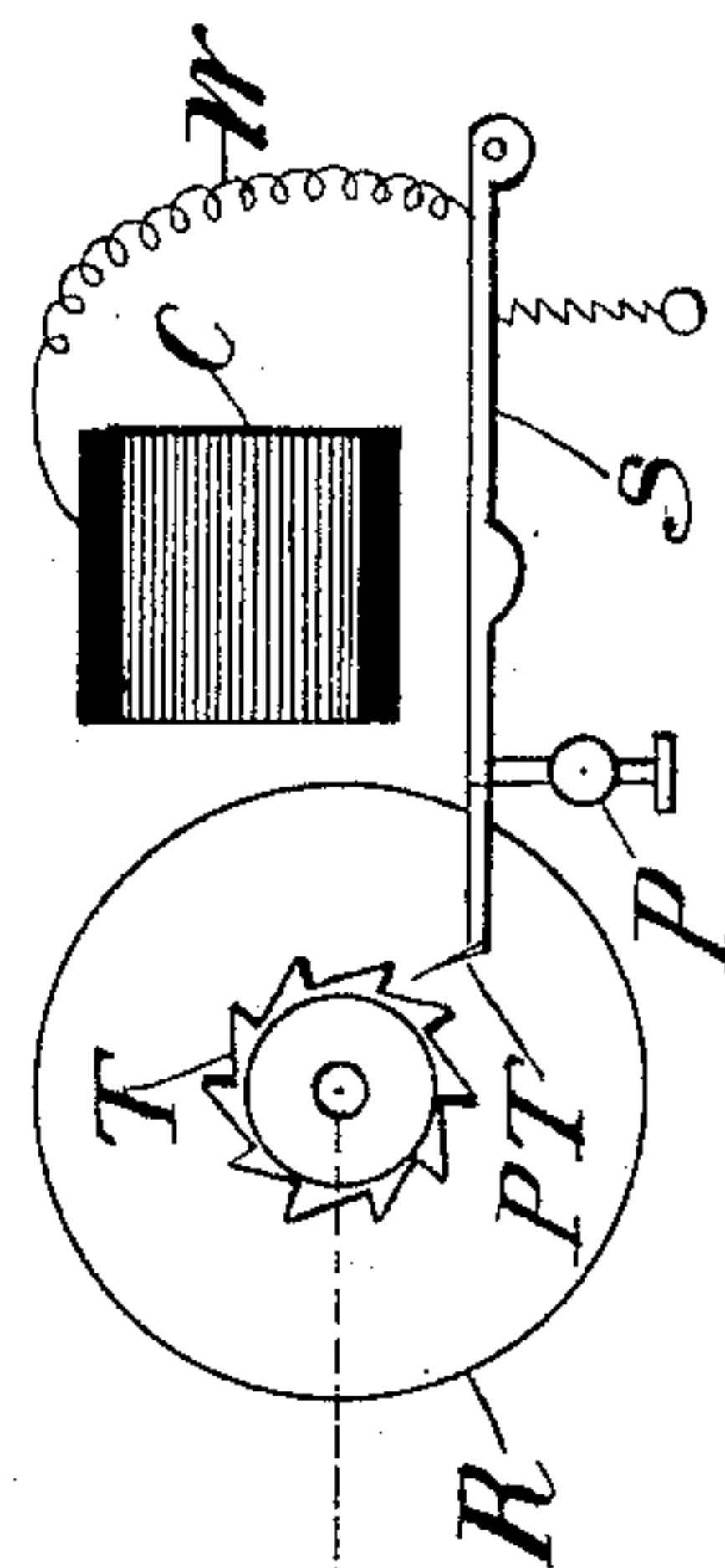
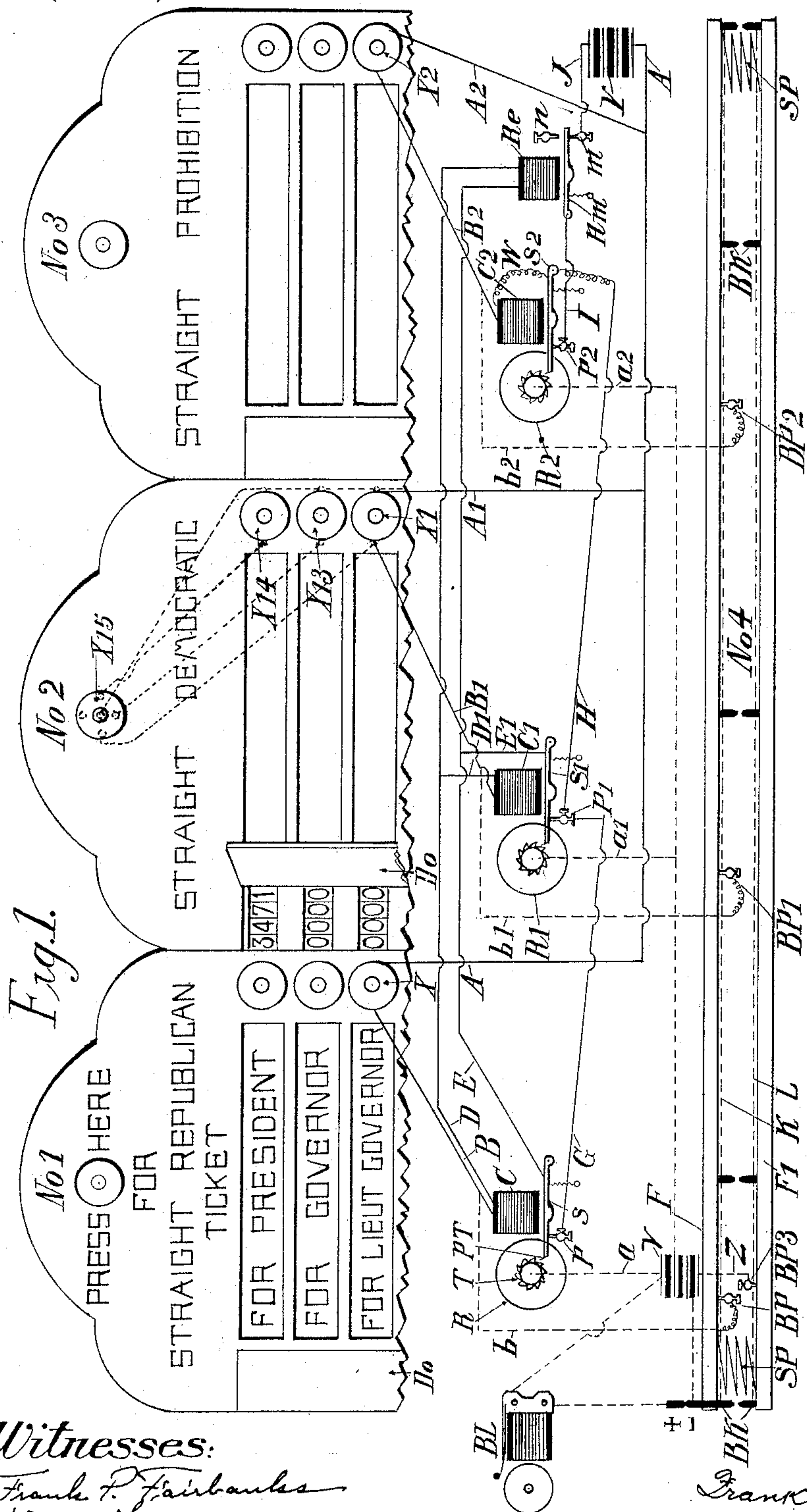


F. S. WOOD.
ELECTRIC VOTING MACHINE.

(Application filed Jan. 16, 1897.)

(No Model.)



Witnesses:

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ELECTRIC VOTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 616,174, dated December 20, 1898.

Application filed January 16, 1897. Serial No. 619,481. (No model.)

To all whom it may concern:

Be it known that I, FRANK S. WOOD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Electric Voting-Machine, of which the following is a specification.

My invention relates to improvements in a voting-machine operated by electricity, governed by the well-known laws of physics, working through electromagnets in conjunction with suitable mechanical attachments acting upon specified devices through and by means of a combination of electric circuits.

The objects of my invention are, first, to do away with the perplexities of printed ballots, as well as the errors arising from counting same; in fact, to do away with all individual ballots and, therefore, the necessity for subsequent counting; second, to give the voter absolute secrecy and the simplest means for registering his choice of candidates with the utmost expedition; third, to provide means by which the voter may not only register his choice of candidates, but also compute his vote with all others previously registered by automatical invisible means; fourth, to have all necessary safeguards, not only to protect the voter in his legal privilege, but also to prevent fraud, so that no voter can vote more than once for the same candidate nor for more than one candidate for the same office; fifth, to provide means by which when the polls are closed the proper election-officers may have access to the total computed vote for all candidates, which, being transcribed and attested, will be the accurate official vote; and to these ends my invention consists in a mechanical arrangement adapted to automatically and electrically register and compute the legal choice of the voter.

I have illustrated the nature of my invention and the manner in which it is operated by the accompanying drawings, in which—

Figure 1, in its four parts, is a view of the entire machine, the upper half of the three parts Nos. 1, 2, and 3 being a view in perspective of the casing and the lower half a detailed plan view of the circuit arrangement and connecting devices and part No. 4 a vertical cross-section of the floor and its circuit

connections; and Fig. 2, a side elevation of the switching device and actuating mechanism.

In showing the circuit arrangements the connections are merged into the different parts when necessary.

Similar letters refer to similar parts in both views.

It should be understood that my invention is designed to be fastened to one or more walls of a room or compartment especially prepared and to the floor and is to be entirely inclosed, with a door leading to it, so as to insure secrecy in voting.

In the upper half of Fig. 1 I have shown one form of my voting-machine adapted to three sets of candidates, consisting of a box-casing, which incloses the various registering-dials, disclosed by the open door *D* in part No. 2, and the other mechanism included in the plan view below it. Corresponding to the various candidates for election I have preferably shown an arrangement of names upon the casing, so that they appear in groups under their respective party headings. These names are secured to the outside surface of the casing by suitable detachable means, so that different names may be substituted at every election, corresponding, in effect, to what is now known as the "official ballot." At the right of each name is a push-button, by depressing which a vote is registered for the candidate whom the name represents. Above each list of names is a push-button, by pressing which each and every candidate in that group may be voted for simultaneously.

In part No. 4 I have shown one form of circuit-controller or locking device, which will be hereinafter more fully explained.

Between part No. 4 and the casing in Fig. 1 and connected therewith in electric circuit are the different circuit combinations, acted upon by both push-buttons and locking device, which I will now proceed to explain. When referring to the various circuits, I term those circuits "first" which are closed by the voter at the push-button and those circuits "second" which are closed by the switching devices acting under the impulse imparted to them by the operation of the primary circuits, as will be hereinafter specified.

These circuits are designated in the claims by the words "first" and "second," respectively.

Unless otherwise noted solid lines designate primary circuits and dotted lines secondary circuits.

Referring now to Fig. 1, part No. 1, the push-button X connects the two poles of a primary circuit through the wire A from battery V and through wire B to and through electromagnet C, wire D to and through auxiliary electromagnet Re, wire E to and through armature and switch S, which is normally against contact-point P, continuing through wire G, contact-point P', wire H to and through armature-switch S², contact-point P², wire I to and through armature R_m of auxiliary electromagnet to contact-point m, and thence by wire J to battery V. This constitutes what I call the "first primary circuit," and it is normally open at X, with the switches S, S', and S² and armature R_m resting against their correlative contact-points P, P', P², and m, respectively, said circuit ready to be operated for its candidate for office. Take now a second primary circuit, representing another candidate for the same office—push-button X', for instance. This circuit is formed by wires A and A', push-button X', wire B', coil C', wire D' to and through Re, wire E', armature S', contact-point P', and thence to battery V, same as in the first primary circuit. For the third primary circuit, starting at A, we reach push-button X² by wire A², thence by wire B² to coil C², thence by wire W to armature S², and thence to battery V, as described in previous circuits.

I will now describe the switching device which actuates the registering device.

Referring to Fig. 2 and similar parts in Fig. 1, C is an electromagnet connected by a conductor W with its armature S, which is pivotally hinged and insulated at its right-hand end and has a lever-arm PT at the other end adapted to engage the teeth of a ratchet-wheel T, attached to a registering device R. This armature is adapted to oscillate between contact-points P and T and in so doing to act as an electric switching device, thereby transferring from one circuit to another, as required, the coil C, the conductor W, and the armature S, which elements or their equivalents form an essential part of all the secondary circuits and are shown in the drawings by solid lines and to actuate the registering and computing device in the following manner: When the coil C is not magnetized, the armature S rests against contact-point P and in circuit with it without touching any of the teeth T on registering device R; but upon the coil C being magnetized the armature S is attracted. The impulse of this attraction causes it to move, breaking the circuit at point P, while instantaneously the lever-arm PT comes in contact with a tooth of the ratchet-wheel T,

making another circuit at that point in the manner hereinafter explained, armature S being now in circuit with T through the coil C, and battery V is further attracted, causing the lever-arm PT, which still engages T, to actuate the registering device. The ratchet-wheel is provided with ten teeth, one of which is adapted to be engaged by the lever-arm upon each attraction of the armature by the electromagnet. The armature is so adjusted as to turn the ratchet-wheel through an arc of thirty-six degrees at each engagement. The dotted line leading from the ratchet-wheel indicates the circuit connection at that point. Now since the armature S in vibrating switches its coil off of one circuit and onto another I call the mechanism which makes this result possible, and shown in Fig. 2, my "switching device."

In utilizing my electric registering device for other purposes than that of voting the wire W will preferably be omitted; but with that modification Fig. 2 represents all the essential features of such an application.

Referring to the third primary circuit previously described, it will be seen that while the wire W appears in its switching device, as shown in Fig. 2, it is apparently missing at similar points in the first and second primary circuits. A closer inspection of these latter circuits will reveal that the wires D and E of the first and D' and E' of the second are but an elongation through the coil Re of the wire W, all having the same office—namely, of connecting their correlative coils and switches—and all these elements not only form parts of their respective primary circuits, but are also switched off of said primary circuits by the operation of their respective switches, and thereby become parts of their corresponding second circuits, and vice versa. Now the electromagnet Re is an auxiliary coil acting in unison with either coil in the first and second circuits, with which it is connected, the object of same being to cut out the battery from all the primary circuits when any circuit with which it is connected is closed.

It is obvious that no auxiliary cut-out is needed by coil C² of the third circuit, since by connecting wire H with switch S² instead of with contact-point P² the movement of switch S², which is similar to that of switch S, previously described, serves to cut out the battery from all the primary circuits with which it is in circuit.

I will now describe my locking device, which, referring to Fig. 1, part No. 4, consists of a double floor, the lower section F' being stationary and the upper section F perpendiculary movable, but normally held up by the elastic reaction of suitable springy devices SP. Fastened to the top surface of the under floor is a conductor L in circuit with a binding-post BP³ and contact-points B K, while fastened to the bottom surface of the upper floor is a conductor K in circuit with bind-

ing-posts BP, BP', and BP² and other contact-points B K, diametrically opposite to similar points on lower floor. When the upper floor is in its normal position, these upper and lower contact-points B K are separated from one another, as shown in the drawings; but when it is depressed the points above are in contact and in circuit with the points beneath and the locking mechanism is set. The circuit arrangement described in this device forms an essential part of all the secondary circuits, which I will now describe.

The first secondary circuit is formed as follows: Beginning at battery *v* in part No. 1 wire Z leads to binding-post BP³ in floor F', which is connected with binding-post BP in floor F, as previously described in the locking device, and thence through wire *b* to coil C. From this point it continues to armature S through a portion of the first primary circuit, previously described, which portion, including coil C, wire D, coil Re, wire E, and armature S, is at one time a part of the first primary circuit and at another a part of the first secondary circuit. From armature S it continues to ratchet-wheel T and thence through wire *a* to battery. The next secondary circuit is formed from battery *v* through locking device to binding-post BP', same as above described, continuing by wire *b'* to coil C', thence through its corresponding portion of primary circuit and switching device, and thence by wire *a'* to battery. The third secondary circuit is a counterpart of the other two described to binding-post BP², continuing through wire *b*² to coil C², thence through switching device, as in its corresponding primary circuit, and being completed through wire *a*² and *a'* to battery. Now all these secondary circuits are normally open at two points—namely, at the contact-points B K in the locking device and at the lever-arm PT of the switching device—and for a special object, which will be hereinafter explained.

Having explained the principal circuits and parts of the voting mechanism, I will now proceed to explain their coöperation and the practical working of my invention, which is as follows: The voter having satisfied the election-officials of his right to vote is permitted to enter the compartment containing my invention for the purpose of voting, the door of same being then closed by any desired means. As he steps upon the movable floor F his weight depresses same, placing points B K in contact, as before mentioned, and closing all the secondary circuits therein; but we have already seen that each secondary circuit is open at two different places. Therefore, although the points B K are in circuit, all the secondary circuits still remain open at the lever-arms PT of their respective switching devices, any one of which is ready to be operated upon the closing of its primary circuit. Suppose now that the voter desires to vote for the Republican candidate for lieutenant-governor. He may do so by press-

ing push-button X, thus closing the first primary circuit already described. When this circuit is closed, the armature S is attracted, as already explained, and instantaneously the lever-arm PT closes the secondary circuit through the ratchet-wheel T by the inertia which it gained from the electric impulse imparted to it. Upon the closing of this secondary circuit the armature S is further attracted to the extent of its capacity and rotates the registering device, as has been described, turning up a number on the registering-dial, which number is at all times the computed vote of the candidate voted for; but when the armature S has reached the limit of its motion it is still in contact with the ratchet-tooth engaged and remains locked in that position as long as the secondary circuit is kept closed by the weight of the voter upon the locking device. Therefore no further voting by pressing the push-button X is possible, even if by so doing the first primary circuit could now be closed, which, however, is impossible, as will presently be explained. Consequently no voter can vote more than once for the same candidate. Now when the voter closed the first primary circuit at X the auxiliary electromagnet Re attracted its armature Rm, which opened all the primary circuits at point *m*, and when the switch S closed the secondary circuit it switched Re onto same, causing armature Rm to remain attracted, where it is locked synchronously with armature S, as above described. At the same time that switch S closed the secondary circuit it switched off of the primary circuit that portion previously described and switched same onto the secondary circuit, of which it now forms a part. Therefore, all the primary circuits now being open, it is obviously impossible to vote for more than one candidate for the same office, since the pressing of either push-button X' or X² can have no effect on an open circuit. Had the voter's choice been the Democratic candidate for lieutenant-governor he would have pressed the push-button X' instead of X and the results just described would have been transferred to the second primary and secondary circuits. If the voter had chosen the Prohibition candidate for lieutenant-governor and pressed the button X², the results of the first description would have reverted hereto. There is a slight modification of the mechanical action in this latter circuit, there being no auxiliary electromagnet used or needed. The primary circuit in this case is opened at P² instead of *m*, but the results are precisely the same—i. e., that whichever primary circuit is operated by the voter said primary circuit closes its correlative secondary circuit and opens all the primary circuits, the whole remaining locked, as described before. Referring, again, to the first circuits, the operation is thus continued: After voting the voter upon leaving the compartment steps off of the floor F, which springs up by means of an

elastic reaction previously described, opening the secondary circuits at the points B K. This demagnetizes the coils, releasing the armatures S and Rm, which fly back into place, and the cycle of the voting mechanism is completed.

Having described the principal attributes of my invention, I will now explain its minor features.

Referring to part No. 2 of Fig. 1, the dotted lines joining the various push-buttons show one system of wiring by means of which all the candidates of any party may be voted for simultaneously at a single push-button. This is accomplished by connecting the poles of each individual push-button, as represented in the drawings by the dotted lines leading from X', X¹³, and X¹⁴, from which poles wires leading to the additional push-button X¹⁵ group all the primary circuits connected therewith under its control, provided that no candidate in any other group has previously been voted for. The effect of pressing the button X¹⁵ is the same as though all the buttons grouped under it were separately pressed; but its control over any primary circuit ceases when any other correlative primary circuit has been operated. The same result may be accomplished by connecting the poles of push-button X¹⁵ with each individual push-button by separate wires, which makes button X¹⁵ the composite circuit-closer for all the primary circuits.

By means of the composite circuit-closer all individual candidates of a given party may simultaneously be voted for; but it is provided that if any candidate or candidates of any other party for the same office or offices shall have previously been voted for then the circuit arrangement so automatically adapts itself as to prevent said simultaneous voting in so far as it relates to the candidate or candidates for the same office or offices previously voted for, whereby simultaneous voting is adapted to take place for only such candidates of one party as have not been previously preferred in another.

At the left of each group of candidates in Fig. 1 is a small door D₀ designed to be closed, locked, and sealed when the voting is going on and to be opened by the proper election official when the polls are closed. The opening of this door reveals the dial of the registering devices, which show the computed vote of each candidate, as illustrated in part No. 2.

The last feature of my invention is a tell-tale device the object of which is to furnish an additional safeguard against any attempt at fraudulent voting, however crafty, and which I will now describe. At the extreme left of the circuit arrangement in Fig. 1 will be seen an electric bell BL in the circuit indicated by the dotted lines leading therefrom to the battery v and to the two contact-points designated by the plus and minus signs, which I will call "positive" and "negative." The negative point is attached to

the floor F and moves with it. The positive point is fixed above the floor F and so adjusted that when the floor is in its normal position both points are in contact, closing the circuit, which causes the bell to ring. When the floor is depressed, the negative point recedes from the positive, opening the circuit, and the bell stops ringing. It is obvious that so long as the voter stands upon the floor F no fraudulent voting is possible, as has been previously explained, and the bell cannot ring; but should the voter by any artful means and fraudulent intent remove his weight from the floor the bell would ring, giving warning to all within sound of it that an attempt at fraudulent voting was being made.

I have herewith explained and illustrated an invention adapted to three sets of candidates or parties and to three candidates of each party. I have also shown the circuit arrangement and operating devices for but one candidate of a single party and three candidates for the same office. It is obviously within the design of my invention that it be adapted to any number of tickets or parties and to any number of candidates for each party, that the circuit arrangement shown for a single office is therefore adaptable to any number of candidates for that office, and that there will be as many identical circuit arrangements as there are offices to be filled.

I have described and shown two separate batteries for operating the primary and secondary circuits; but it is clear that this was merely to avoid confusion in the description, since a single battery is all that is required. Further, I do not confine myself to batteries, for any source of electric energy will suffice.

In my invention I prefer using push-buttons for primary circuit-closers, but any desired circuit-closer may be used—such as knobs which pull out, push in, or rotate, or levers which move in any direction—to close a circuit.

Open circuits where I have described closed, or vice versa, are equally applicable to my design by the mere reversal of conditions, and any suitable registering and computing device may be used.

While I have preferably shown a double floor in my locking device, the same result may be obtained by using a portable mat or any desired variation, by means of which the weight of the voter operates the locking device and an elastic reaction completes its cycle, as described.

While my invention is especially advantageous in the form of a voting-machine, as described, its main feature may be applied to anything requiring automatic registration and computation. For example, any turnstile could by this means be made to register at any distant point the number of people passing through it, the number of trains or cars, especially electric, could be registered in a similar manner, and the number of calls

made in a given time upon a telephone-circuit could be similarly registered, &c., Finally, it is not beyond the scope of my design to have the registering devices explained located at some central point and circuits radiating therefrom in all directions to push-buttons at various voting-booths for any purpose of registration whatever or for any desired combination of purposes within the design of my invention.

I am aware that prior to my invention electromagnets with vibrating armatures have been made to operate so as to open and close circuits. I therefore do not claim such a combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. An electric voting-machine provided with a framework or casing having names arranged in party groups as candidate-indicators, corresponding circuit-closers contiguous thereto as means for voting, and a hinged door therein for each group adapted to make visible or invisible the inclosed registering-dials; first electric circuits, connecting said circuit-closers with cooperating switching devices, adapted to transmit voting impulses; correlative second electric circuits, connecting two independent circuit-closers with each other and with cooperating devices adapted to receive and register voting impulses; registering and computing devices for all candidates, adapted to be electrically operated but once by a single voter and for only one candidate for a single office and then only by the simultaneous cooperation of all the circuit-closers correlative therewith; a vertically-movable horizontal section adapted to be operated as a circuit-controller by means of the weight of the voter resting upon it while voting; and a telltale device adapted to be operated by means of an elastic reaction upon the removal of the weight of the voter from said horizontal section, substantially as described.

2. In an electric voting-machine the combination of a plurality of circuit-closers in a casing, operated as means for voting, with a plurality of first circuits adapted to transmit voting impulses, a plurality of correlative second circuits adapted to receive and register voting impulses, a circuit-controlling device operated by the weight of the voter resting upon it, and a telltale device operated by an elastic reaction upon the removal of the voter from said circuit-controller.

3. In an electric voting-machine, a framework or casing provided with names arranged in party groups and adapted to take the place and form of printed ballots, corresponding circuit-closers at one side thereof as means for voting, adapted to produce voting impulses and electric registration thereof, and a hinged door for each party group of candidates, adapted to make visible or invisible the registering-dials thereof.

4. In an electric voting-machine, a switching device, a registering device and means for operating same, means for operating said switching device comprising a first circuit normally open at one point, means for closing same through the switch whereby the first circuit is completed and the switch operated, thereby opening the first circuit at another point.

5. In an electric voting-machine, a switching device an auxiliary switching device working synchronously with a switching device, means for operating said switching devices comprising a first circuit normally open at one point and means for closing same whereby the first circuit is completed and the switches operated, thereby opening the first circuit at two other points.

6. In an electric voting-machine, a register, means for operating said register comprising a normally open first circuit, means for closing same, a switching device operated thereby, and a second circuit normally open at two points one of which is closed by the weight of the voter and the other closed by the closing of the first circuit through the switch, whereby the second circuit is completed and the register operated.

7. In an electric voting-machine, a register, means for operating said register comprising a normally open first circuit, means for closing same, a switching device operated thereby, an auxiliary switching device also operated thereby, and a second circuit normally open at two points, one of which is closed by the weight of the voter and the other closed by the closing of the first circuit through the switch whereby the second circuit is completed and the register operated.

8. In an electric voting-machine a series of first circuits—one of which includes a circuit-closer a registering device and means for operating same and a switching device and the others an auxiliary switch in addition thereto—placed in such a relation to one another as to be interdependent so that the operation of any one of them prevents the operation of the others as well as the further operation of itself and that said operation transmits a voting impulse through the circuit operated.

9. In an electric voting-machine a series of second circuits—each of which includes two independent circuit-closers and a registering device and all but one of which include an auxiliary electromagnet in addition thereto common to same—and cooperating first circuits placed in correlation with said second circuits whereby the operation of any one of said first circuits prolongs the inoperativeness of the others and causes the said first circuit to be controlled and locked in operated position so that no further operation is possible, said operation registering a voting impulse through the circuit operated.

10. In an electric voting-machine, the combination of an auxiliary electromagnet and

armature with a plurality of electromagnets and armatures in first circuits, and registering devices, said auxiliary electromagnet and armature adapted to work synchronously with
 5 any one of the electromagnets to which it is auxiliary, and to open all of said first circuits simultaneously upon the operation of any one of same.

11. In an electric voting-machine, the combination in series of a plurality of first circuits adapted to transmit voting impulses whereby said circuits are made interdependent, one circuit of said series having its switching device adapted to open all the circuits
 15 when operated, while the other circuits have an auxiliary device coöperating therewith and producing the same result.

12. In an electric voting-machine, the combination of a series of first circuits, adapted
 20 to act as transmitters of voting impulses, any one of which is adapted to be operated but which being operated renders inoperative the entire series, with a series of correlative second circuits adapted to register voting im-
 25 pulses, any one of which is adapted to be operated by its correlative first circuit, but which being operated prolongs the inoperativeness of the entire series of both second and first circuits.

13. In an electric voting-machine a plurality of independent series of interdependent first and second circuits, each of said first and second circuits including two circuit-closers, a registering device, and a locking device and
 35 each of said series having an auxiliary device common to all but one first and second circuit thereof, whereby any one of said first and second circuits in any series may be operated as means of producing and registering
 40 a voting impulse; but the operation of any one of said circuits produces and registers a voting impulse therein and cuts out the entire series so that a voting impulse can be produced and registered in no other first and second circuit of that series by a single voter.

14. In an electric voting-machine, the combination in an improved switching device of a ratchet-wheel having ten teeth all of which act successively as contact-points, with a vibratory armature having a lever-arm at one
 50 end adapted to electrically engage said contact-points in numerical order, a fixed contact-point, an electromagnet adapted to operate and in circuit with said armature, and
 55 a conductor connecting said electromagnet with said armature and adapting it to act as a circuit maker and breaker between contact devices.

15. In an electric voting-machine the combination with a group of interdependent series of circuits of a vertically-movable locking device and an auxiliary switch adapted to operate as a common circuit-controller, means for operating said circuit-controller,
 60 comprising a first circuit normally open at one point, means for closing same, and a second circuit normally open at two points one

of which is closed by the weight of the voter and the other closed by the closing of the first circuit through the switch, said circuit-controller being operated by the simultaneous
 70 closing of said second circuit at both points subsequent to the closing of the first circuit, whereby an entire series of circuits is controlled and locked by the weight of the voter.

16. In an electric voting-machine, a locking device adapted to complete the cycle of the voting operation after having been operated as a circuit-controller, means for operating
 80 said locking device while in this position, comprising an elastic reaction and a second circuit actively closed at two points one of which is opened through the locking device by the removal of the weight of the voter and
 85 an elastic reaction and the other opened by the opening of the second circuit whereby the cycle is completed.

17. In an electric voting-machine, the combination of an improved switching device with a first circuit adapted to transmit voting im-
 90 pulses and a second circuit adapted to register same, said improved switching device being adapted to act at one time as the operating device of one circuit and again as the operating device of the other and to automatic-
 95 ally transfer its operation from one circuit to the other as required.

18. In an electric voting-machine, the combination with a registering device of a ratchet-wheel, a vibratory armature with a lever-arm
 100 at one end adapted to engage and actuate said ratchet-wheel, an electromagnet adapted to operate and in circuit with said armature, and a conductor connecting said electromagnet with said armature and adapting it to act
 105 as a circuit maker and breaker between contact devices.

19. In an electric voting-machine, the combination in a composite circuit of a group of independent first circuits corresponding to
 110 the candidates of each party, means for operating said composite circuit comprising a circuit arrangement connecting said independent first circuits with an isolated circuit-closer through which the circuit is completed and
 115 all of the independent first circuit adapted to be simultaneously operated by the closing of the composite circuit when no circuit of said group has previously been operated, the said first circuits being arranged to constitute
 120 interdependent series each series comprising the first circuits of all the candidates for a given office, there being as many series as there are offices to be voted for, means for closing one and only one circuit of any series
 125 which circuit being closed opens thereby all the circuits of that series, whereby said series is automatically cut out from the composite circuit, substantially as described.

FRANK S. WOOD.

Witnesses:

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 WM. H. STEVENS.