W. J. BOHAN & D. D. SMITH, Jr.

VOTING MACHINE.

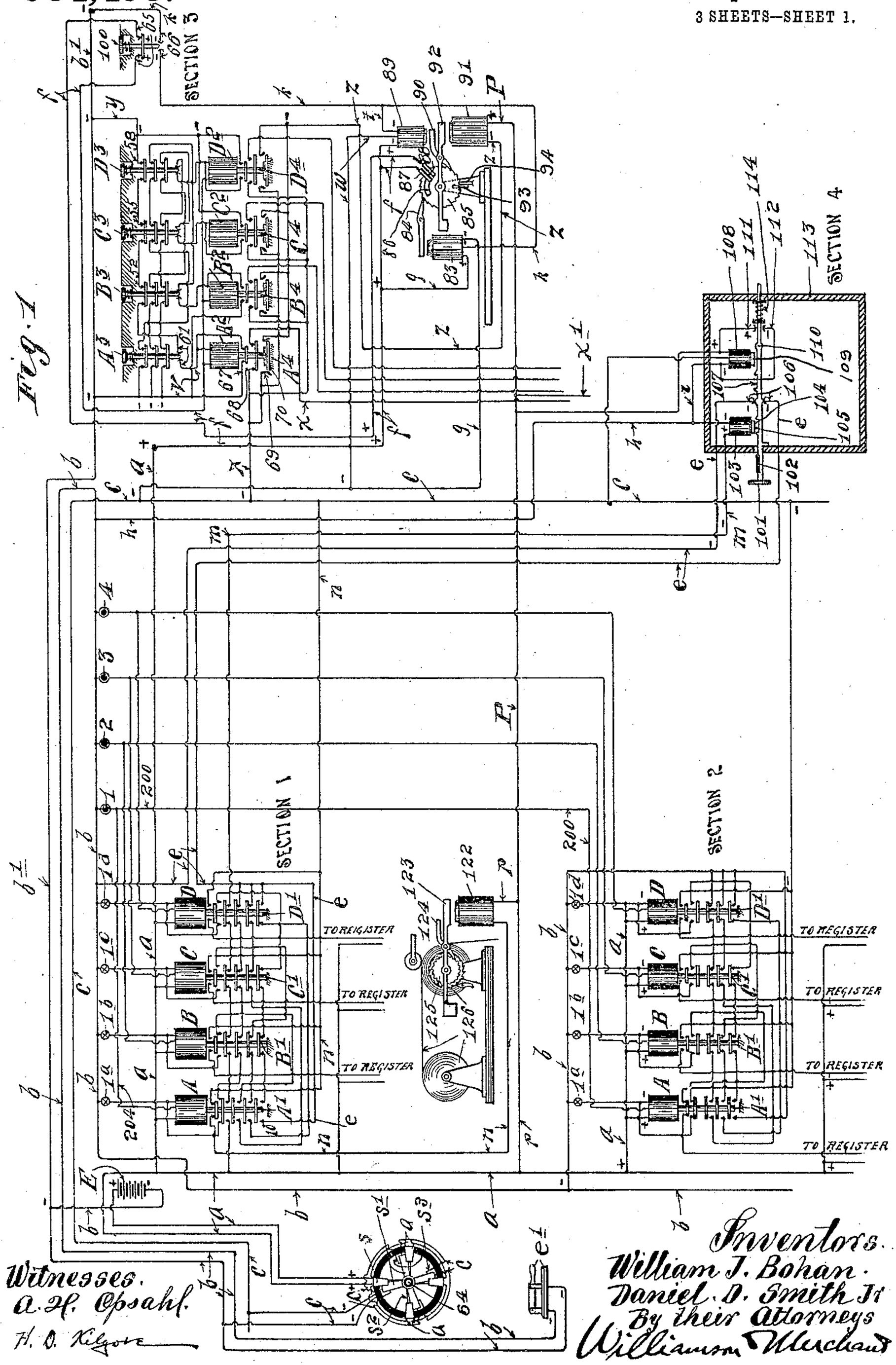
APPLICATION FILED JUNE 27, 1908.

934,498.

Patented Sept. 21, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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3 SHEETS—SHEET 2.

Fig. 2

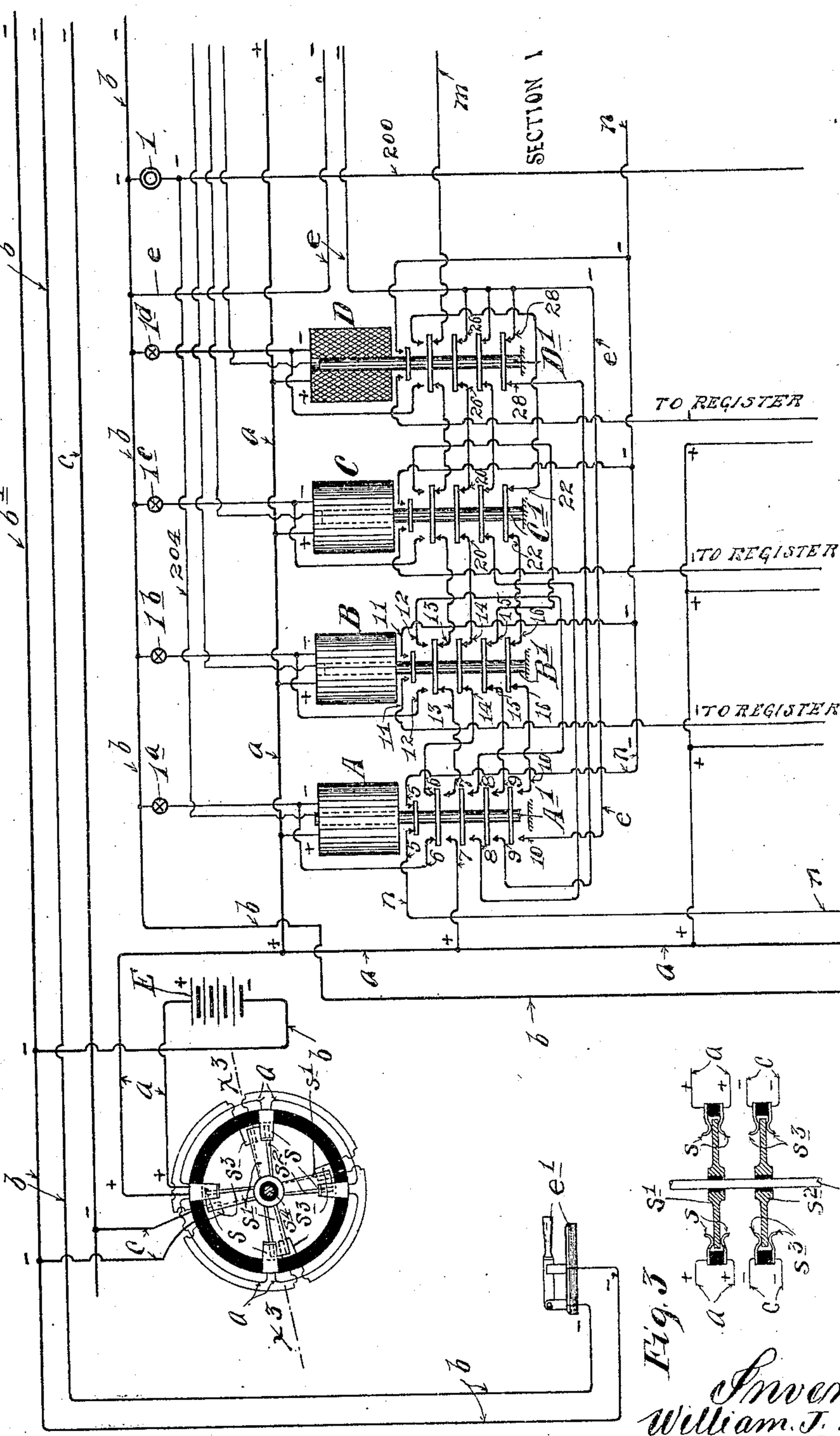

Fig. 3

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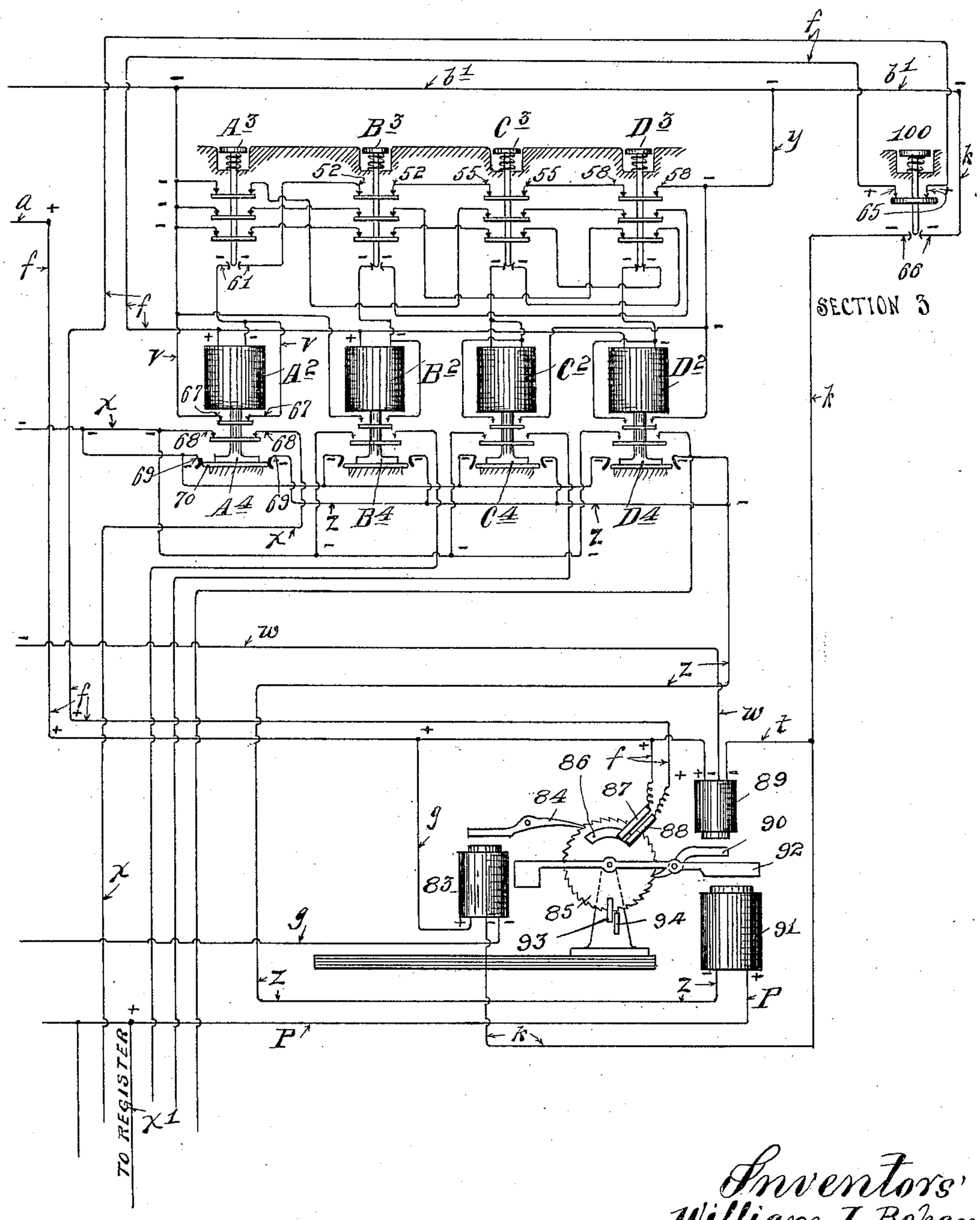
3 SHEETS—SHEET 3.

Fig. 4



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UNITED STATES PATENT OFFICE.

WILLIAM J. BOHAN, OF ST. PAUL, AND DANIEL D. SMITH, JR., OF MINNEAPOLIS, MINNESOTA.

VOTING-MACHINE.

934,498. Specification of Letters Patent. **Patented Sept. 21, 1909.**

Application filed June 27, 1908. Serial No. 440,726.

To all whom it may concern:

Be it known that we, WILLIAM J. BOHAN and DANIEL D. SMITH, Jr., citizens of the United States, residing, respectively, at St. Paul and Minneapolis, in the counties of Ramsey and Hennepin and State of Minnesota, have invented certain new and useful Improvements in Voting-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to electric voting machines, and has for its object to simplify the construction and to generally increase the efficiency of voting machines of this type.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In this machine there is provided for each candidate represented on the ticket, an individual vote switch, (preferably in the form of a normally open push button) a register or counter, and a magnetically actuated selecting switch which is under the control of the said individual switch or push button. The magnetic devices for controlling these selecting switches are preferably afforded by magnets and armatures of the solenoid and core type, and the said selecting switches, which are of complex form, are afforded by a series of contact pieces carried by each armature. A storage battery will usually be employed to supply the required electrical force. The selecting switches are connected in groups and in such manner that they are interdependent, that is, only a predetermined number, one or more, of the controlling magnets can be permanently closed at any one time. The function of these selecting switches is not to directly or immediately actuate corresponding registers, but simply to set the circuit, to the selected register, which is assigned to the candidate for whom a vote is desired to be cast, so that by subsequent completion of the circuit the register will be actuated and the vote actually cast. For effecting the completion of the circuits to the selected registers, a register actuating switch—so-called—is provided. This register actuating switch may be operated at the proper time, to-wit, after all of the votes have been selected by proper manipulation of the push buttons, in any suitable way, but preferably by the election judge or by a turn stile at the entrance to the voting booth.

For so-called group voting where several candidates may be elected to the same office, as, for instance, judges of the district or State supreme courts, the push buttons and coöperating registers and intermediate devices are grouped, and a magnetically-actuated vote limiting device is provided for each such group. The function of this vote limiting device is to permit the setting of the proper number of register selecting switches and then to prevent or make impossible the setting of any other or further number of the selecting switches of that group.

The individual vote circuit closers or push buttons, in the preferred arrangement of the machine, are alined in several vertical columns, and one column is assigned to each political party. For instance, in the drawings there are shown four columns of these push buttons and coöperating elements, and this would provide, for example, for the republican, democratic, populistic, and prohibition tickets. In the diagram view of the drawings, the group vote push buttons are shown as located at one side of the individual vote push buttons, for the sake of clearness, but in practice they will be alined vertically in the columns assigned to the respective political parties; and the push buttons that are assigned to different political parties but which are appropriated for the same office are alined in horizontal rows. For instance, individual push buttons assigned to the several political parties but to the office of governor will be alined horizontally. Also the names of the respective candidates will preferably appear in horizontal line with the respective push buttons and the name of the political party will appear over the several vertical columns. Preferably the machine also includes an irregular vote device by means of which votes may be cast for parties not represented on any of the several tickets. In the complete machine, one such irregular vote device should be provided for each office represented on the ticket or on the several tickets. Also, there is preferably provided for each political ticket or party represented at the election, a straight vote switch or push

button with electrical connections so arranged that by manipulation of a single button all of the register selecting switches assigned to any one of the several political parties may simultaneously be set so that by such manipulation of the register actuating switch a straight party vote may be cast.

The details of construction of the parts of the machine and the arrangement of the various circuits will appear in the following description of the operation of the machine.

In the accompanying drawings which illustrate the improved machine, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view, chiefly in diagram but with some parts shown in full, illustrating the construction of the improved machine and showing what we have for convenience designated as sections 1, 2, 3, and 4, the said sections 1 and 2 being groups of mechanism for offices to which but one candidate may be elected; said section 3 being a group of mechanism for so-called group voting; and the section 4 being a mechanism for irregular vote balloting. Fig. 2 is a diagrammatic view showing section 1 on a larger scale than in Fig. 1. Fig. 3 is a vertical section taken through the so-called register actuating switch on the line x^3 x^3 of Fig. 2; and Fig. 4 is a diagrammatic view showing the group voting mechanism section 3 on a larger scale than in Fig. 1.

For our first illustration we will refer to section 1, which we will assume is assigned to the office of governor. Current leaves the positive terminal of the storage battery E through leads or live wires *a*, of which latter, it will be noted, there are several, and normally passes through fixed contacts *s* and movable contact arms s^1 of the register actuating switch. It may be here noted that this switch has a multiplicity of arms s^1, a multiplicity of pairs of contacts *s*, a multiplicity of lower contact arms s^2, and a multiplicity of lower pairs of fixed contacts s^3, and that the contact arms s^1 and s^2 are connected to a common shaft s^4. To the negative terminal of the battery E current flows through leads or live wires *b*, of which there are several, and through a normally closed cut-out switch e^1.

Assume now that an individual vote is to be cast for the republican candidate for governor. To accomplish this result the voter pushes and thereby closes normally open push button 1^a and current will then flow from the negative battery lead or live wire *b* through said button, through magnet A of section 1 to positive battery lead or live wire *a*. This will instantaneously energize magnet A, causing the magnet to attract and raise its complex armature A^1, thus closing the contacts 5—5, 6—6, and opening contacts 7—7, 8—8, 9—9 and 10—10. The armatures B^1, C^1, D^1 being in their normal or lower position, all their lower contacts are closed. The contacts 6—6 of armature A^1 being closed by push button 1^a, current will flow from the negative side of the battery through wires and contacts 26—26, 20—20, 14—14 and 6—6 to the negative side of the magnet, forming a permanent magnetic circuit which holds the armature A^1 of magnet A permanently closed and selects the circuit to the actuating magnets 122 of the corresponding register through wires *c*—*n*, contacts 5—5, magnet 122 and wire *p*, which latter connects said magnet to one of the positive live wires *a*. This merely connects the magnet 122 so that it can be subsequently closed and energized by movement of the register actuating switch. When the voter, by operation of the turn stile in leaving the voting booth, imparts, say, a one-half rotation to the movable arms s^1—s^2 of the register actuating switch, or when such movement is imparted by an election judge, said arms s^2 will be caused to close the circuit between contacts s^3 for a short interval, while the circuit is still closed, by arms s^1, between contacts *s*. This causes current to flow from negative live wire *b* through contacts s^3 to live wire *c* and through *n*, 5—5, *n*, to register actuating magnet 122, and from said magnet through wires *p*, *a*, to positive side of battery E. Thus the magnet 122 will be energized for a short interval of time during which contact arms s^1—s^2 have coincident engagement with their coöperating contacts *s* and s^3.

So far as the present invention is concerned, any suitable kind of magnetically actuated register or counting device may be employed, but in Fig. 1 of the drawings we have shown a register of novel construction and which will be sufficiently described by the following description of its operation. The magnet 122, when magnetized as just stated, attracts an armature lever 123, and this, through driving pawl 124, ratchet wheel 125 and suitable tape rollers, moves register tape 126 one step or division, the said tape being numbered consecutively so that it will serve as a record for the number of votes cast for that particular candidate. The magnet 122 will hold the armature 123 down until the contact arms s^1—s^2 pass out of engagement with contacts *s*—s^3 when the entire electrical circuit is broken and armature 123 will be returned to normal position, by its weighted end, simultaneously with the return of selecting armature A^1 to its normal position.

If, for instance, after the selecting armature A^1 has been permanently set, the voter, intentionally or otherwise, pushes the button 1^b and closes the magnetic circuit to the magnet B representing the second candidate for the same office, armature of that

magnet will be moved, closing contacts 11—11, 12—12, and breaking contacts 13—13, 14—14, 15—15 and 16—16. As the permanent setting of magnet A requires that 14—14 remain closed, it will now be seen that circuit to magnet A will be broken and its armature dropped off, thus disconnecting the magnet A from its counter, by opening circuit at 5—5. The action of pushing the button 1^b and magnetizing the magnet B closes the circuit at contacts 11—11, and 12—12, instantaneously releases the armature A^1 of magnet A and sets the armature B^1 of magnet B. It is therefore evident that if two or more buttons, such as 1^a, 1^b, 1^c, are pushed at the same time, the respective armatures would be attracted by the cooperating magnets, and a permanent circuit to the magnets could not be established, as all of the lower contacts would be opened. In other words, but one magnet can be permanently magnetized at one time, and the last actuated is the one that is set for registration of a vote, under subsequent action of the register actuating switch. To cast a straight vote, say for the republican party, button 1 is pushed or closed so that current will flow from the negative battery lead *b*, through the button 1, through the wire 204 to magnet A of section 1, and through the wire 200 to the magnet A of section 2, and in similar manner through all magnets in the republican column. The other sides of these magnets A are permanently connected to the positive lead *a* of the battery E, so that action of the magnets in this case will be exactly the same as if buttons 1^a of sections 1 and 2 were pushed in succession, and the selecting armatures act as before, except that two or more work at once. In case a voter changes his mind and wishes to vote another straight party ticket, all that is necessary is to push one of the other buttons 2, 3 or 4 controlling the magnets B, C and D, respectively, the last button pushed being the one which would set the electroswitches for counting.

Group voting.—Push buttons A^3, B^3, C^3 and D^3, each of which carries a multiplicity of contact pieces, control, respectively, magnets A^2, B^2, C^2, D^2, and these magnets, respectively, move armatures A^4, B^4, C^4 and D^4, which armatures each carry a multiplicity of contacts. Let it be assumed that candidates to whom magnets A^2, B^2, C^2 and D^2 are assigned are running for an office, such as judge, to which but three can be elected and that the voter pushes button A^3, thereby closing contacts 61 by engagement therewith of its stem. The rest of the buttons B^3, C^3 and D^3 are in normal positions and, hence, current will flow from live wire b^1 (which is connected to one of the wires *b*), through wire *y* and contacts 58—58, 55—55, 52—52, 61—61 to one side of the magnet A^2, the other side of said magnet being connected to one of the positive battery leads *a*, through wires *f*, switch contacts 65—65 of a re-setting switch or push button 100 (the stem of which carries a contact normally closing contact 65—65), and through contacts 87—88 of the vote limiting device. This will cause magnet A^2 to be energized so that the latter will attract its armature A^4, permanently closing the circuit to magnet A^2, through wire *v*, contacts 67—67, and through connections just described to the connected positive battery lead *a*. This will close the register magnet circuit (except through the register actuating switch) by closing contacts 68—68, so as to subsequently, under the action of said switch, allow current to pass from the negative wire *c* (which is connected to contacts s^3 of register actuating switch), by wire *x*, and through wire P, *p*, to positive battery lead *a*.

The magnetizing of magnet A^2 also magnetizes, by induction, an iron contact piece 70 located under the armature A^4 and lifts the same, thereby momentarily closing the circuit at contact 69—69, but the pulling action and upward movement of the said armature disconnects said contact piece 70 after it has been engaged with contact 69—69 long enough to make a circuit. The closing of the circuit at 69—69 allows current to flow from the negative side of the battery E through circuit *x*, *z*, 69—69, *z*, to magnet 91 of the vote limiting device, and from thence through wire P, *p*, to the positive side of the battery E. This energizes magnet 91, causing the same to attract a weighted armature lever 92, and this lever carries a driving dog 90 that imparts one step of movement to a ratchet wheel 85 that is held against backward movement by a retaining dog 84, one end of which is subject to a magnet 83. Ratchet wheel 85 carries a contact segment 86 that normally closes the circuit between the contacts 87—88. The driving dog 90 on armature lever 92 is subject to a magnet 89. When three steps of movement have been imparted to the ratchet wheel 85 by the successive pressing of any three of push buttons A^3, B^3, C^3, D^3, the contact segment 86 will be moved beyond the contacts 87—88, so that the depression of any further of the said push buttons will have no effect whatever because the circuit will remain broken between the said contacts 87—88.

As soon as contact piece 70 is closed and the circuit is broken at 69—69, it can be readily seen that armature lever 92 will be released from magnet 91 (after having moved contact segment 86 and ratchet wheel 85 one step), thus reducing the number of candidates which can still be voted for, from three to two. The voting of any two of the remaining candidates possible for elec-

tion will, as is evident, produce the next two steps of movement of the ratchet wheel 85 required to throw the contact segment 86 out of its range of action upon contacts 87—88. It can also be readily seen that in case more than two of the buttons are pushed at the same time, no circuit can be established to magnet 91 as the circuit would be broken by separation of contact at more than one of the said buttons. The vote registers or counters which are connected to wires x—x^1 may be, and preferably are, identical with those used in connection with the individual vote groups.

It is, of course, necessary that as soon as the voter passes out of the booth and the register actuating switch is operated, that the movable parts of the vote limiting device be set back to normal position for another voter. The release of the ratchet wheel 85 is accomplished by simultaneously throwing the dogs 84 and 90 out of engagement with the teeth thereof. This requires that the magnets 83 and 89 be simultaneously energized, and this is done when the arms s^1, s^2 of the register actuating switch are moved, by closing the circuit from the two leads of the battery E, through wires w—w and f, which lead to the magnet 89, and through wires g, f, that lead to the magnet 83. As shown, the ratchet wheel 85 is provided with a counter weight 93, which, when said wheel is released, throws it back to its normal position in which said weight strikes a fixed stop 94. The vote limiting device is then again in normal position.

If a voter who has gone through the preliminary steps of voting for three candidates of the group, should change his mind in respect to voting for any one thereof, he may do this by pushing a releasing button 100, the stem of which carries a contact that normally closes contacts 65 and the end of which stem, by a movement, is adapted to close contacts 66. When this releasing button 100 is thus pushed, by breaking circuit between contacts 65, it breaks the circuit in wires f and hence in all of the magnets A^2, B^2, C^2, D^2, thus simultaneously releasing all of the raised armatures of said magnets, and at the same time, by closing circuit between the contacts 66—66, it closes circuits to magnets 89 and 83 by way of circuit k to magnet 83 and k—t to magnet 89, the other sides of said magnets being connected to the positive side of the battery, through connections already described. This, as is evident, effects the resetting of the vote limiting device so that the voter may again set up his vote by the proper manipulation of the push buttons A^3, B^3, C^3, D^3.

Irregular vote mechanism.—This device comprises magnets 103 and 108, and a slide 101, shown as mounted in a box 113 and spring-pressed outward. The slide 101 is provided with a seat into which any irregular vote ticket 102 may be placed. It will be noted that the particular irregular vote device shown is connected to section 1 through wires e—e, and through the contacts 10—10, 16—16, 22—22, and 28—28. Assume, now that a ticket 102 is placed in the seat provided therefor in the slide 101 and that the said slide is pushed inward so as to deposit said ticket within the box 113. When this is done, contacts 106 of the wires e are opened, thus breaking the circuit through the magnets A, B, C and D, and rendering them inoperative, so that no vote for a regular candidate for that particular office, to-wit, as assumed for Governor, may be voted for by the party who has elected to vote an independent or irregular candidate for that office. As soon as the slide 101 is moved far enough to allow the ticket 102 to drop into the box 113, contact 110 on said slide closes circuit 111—112. This will short-circuit magnet 108 which is permanently connected to wires i—r—h, thus deënergizing said magnet and allowing its armature 109 to drop into the notch 107 of said slide, thereby locking the said slide in its innermost position. In case any of the candidates to whom magnets A, B, C and D are assigned have been voted for before an attempt is made to push in the slide 101, it is evident that the circuit including wires m—h which lead to the magnet 103 will be broken, thereby allowing the armature 104 of said magnet 103 to drop into a notch 105 of said slide and thereby lock the said slide in its normal position, so that an irregular vote can not be cast for that office, to-wit, as assumed for Governor.

Assuming that a voter has voted an irregular ballot and that magnet 108 has been short-circuited and its armature dropped into the slot 107, locking same and rendering the box inoperative, the voter finished voting and passes out through the turn stile, operating the register actuating switch. As soon as the circuit at s^3 s^3, by arms s^2, is closed, magnet 108 will be reënergized and the slide unlocked, spring 114 pushing it into normal position. When the circuit is broken by contact arms s^1 in the releasing switch passing off s—s, both magnets 103 and 108 will be momentarily released but will be re-magnetized as soon as the switch assumes its normal position, when the entire machine will be set for another voter, as only the positive side of the battery is connected to both of these magnets through the contacts s—s, the negative side being permanently connected to the negative side of the battery through the wires i, h, b.

In many States women are permitted to vote for certain offices, such, for instance, as members of the school board, and it usually happens that for such offices several mem-

bers may be elected from a large number of candidates. This class of voting can be taken care of by one of the sets of group voting devices, and when a woman steps into the booth to vote, the judge, by opening the cut-out switch e^1, can cut out sections 1, 2, etc., of the machine which are assigned to candidates for whom a woman can not vote and can leave operative one or more of the group voting mechanisms so that the woman may cast ballots for the particular candidate for whom she is entitled to vote.

The so-called register selecting switches, it will be noted, are not arranged to interlock, that is, are not so arranged that when one switch is set no other switch can be set, but, on the contrary, they are arranged for inter-tripping action, that is, any register selecting switch may be set in an operative position at any time, regardless of whether or not one of the other register selecting switches of the group has been previously set, but under this action, the previously set switch will be dropped back or moved to its normal or inoperative position, and only the last set switch will remain in its set or operative position.

What we claim is:

1. In an electric voting machine, individual registers, corresponding magnetically-actuated register selecting switches, said switches being so related that the actuation of a second one thereof will restore one previously set to its inoperative position and a common register-actuating switch, with the said register selecting switches arranged to set the circuits to said registers for subsequent closing by said register-actuating switch.

2. In an electric voting machine, the combination with individual registers, corresponding magnetically-actuated register selecting switches and individual vote circuit closing devices, said switches being so related that the actuation of a second one thereof will restore on previously set to its inoperative position of a common register actuating switch, with the said register selecting switches arranged to set the circuits to said registers for subsequent closing by said register actuating switch.

3. In an electric voting machine, the combination with individual magnetically-actuated registers, magnetically-actuated register selecting switches, and normally open individual circuit closing devices, said switches being so related that the actuation of a second one thereof will restore one previously set to its inoperative position of a common register actuating switch, with said register selecting switches arranged to set the circuits to said registers for subsequent closing by movement of said common register selecting switch.

4. In an electric voting machine, the combination with magnetically-actuated registers, magnetically-actuated register selecting switches and normally open circuit closing devices for operating said register selecting switches, said switches being so related that the actuation of a second one thereof will restore one previously set to its inoperative position of a common register actuating switch, and with said interdependent register selecting switches arranged when set to break the circuits through other register selecting switches, and with the set register selecting switches arranged to set the circuits to corresponding registers for subsequent closing by movement of said common register-actuating switches.

5. In an electric voting machine, the combination with several groups of magnetically-actuated individual registers, corresponding magnetically-actuated register selecting switches and corresponding normally open individual vote push buttons, said switches being so related that the actuation of a second one thereof will restore one previously set to its inoperative position of a common rotary register-actuating switch, and with said register selecting switches arranged to set the circuits to corresponding registers for subsequent closing by a movement of said register actuating switch.

6. In an electric voting machine, the combination with several groups of magnetically-actuated individual registers, arranged in rows in one direction for different political parties, and arranged in interdependent sets in the other direction for different offices, and each assigned to a different candidate, of corresponding magnetically-actuated register selecting switches, normally open individual vote circuit closing devices, said switches being so related that the actuation of a second one thereof will restore one previously set to its inoperative position and a common register actuating switch, and with the register selecting switches arranged, when actuated, to cut out the interdependent members of that set and to set the circuits to corresponding magnets for subsequent closing by said register actuated-switch.

7. In an electric voting machine, the combination with several groups of magnetically-actuated individual registers arranged in columns for different political parties and in horizontal rows or sets for different offices, of corresponding magnetically-actuated register selecting switches arranged in interdependent sets in horizontal rows or sets of registers, normally open individual vote circuit closing devices for the respective selecting switches, the switches of each interdependent set being so related that the actuation of a second one thereof will restore one previously set to its inoperative position normally open straight vote circuit

closing devices for each column of registers and coöperating register selecting switches, and a common register actuating switch, substantially as described.

8. In an electric voting machine, group voting mechanism comprising individual magnetically-actuated registers, corresponding magnetically-actuated register selecting switches, corresponding individual vote circuit closing devices for said selecting switches, and a magnetically-actuated vote limiting device operative after a predetermined number of said register-selecting switches have been set to render the other register-selecting switches of that group inoperative, substantially as described.

9. In an electric voting machine, a group voting mechanism comprising individual registers assigned to different candidates for the same office, corresponding magnetically-actuated register selecting switches, individual vote circuit closing devices for actuating said selecting switches, a magnetically-actuated vote limiting device operative after a predetermined number of said selecting switches have been set to render the rest inoperative, and a common register actuating switch, and with the set selecting switches arranged to set the circuits to corresponding registers for subsequent closing by movement of said register-actuating switch, substantially as described.

10. In an electric voting machine, the combination with a group of magnetically-actuated individual registers assigned to the same office, of corresponding magnetically-actuated register-selecting switches, individual vote circuit closing devices for controlling said selecting switches, a magnetically-actuated vote limiting device operating to limit the number of register selecting switches that may be set at one time, a resetting key operative to restore said vote limiting device and the set selecting switches to normal positions, and a common register actuating switch, and with said register selecting switches arranged to set the circuits to corresponding registers for subsequent closing by movement of said register actuating switch.

11. In an electric voting machine, the combination with several groups of magnetically-actuated individual registers, corresponding magnetically-actuated register selecting switches and corresponding normally open circuit-closing devices for controlling said selecting switches, of an irregular vote device operating electrically, when manipulated to cast an irregular vote, to render inoperative all register selecting switches appropriated to the same office, a common register-actuating switch, and connections for restoring said irregular vote device, substantially as described.

12. In an electric voting machine, a group of individual registers, corresponding magnetically-actuated register selecting switches, each having a multiplicity of contacts controlling a multiplicity of circuits, individual vote circuit closing devices, the said circuits being so arranged, that when a second switch is set in an operative position, a previously set switch will be moved back into its in-operative position, and a common register actuating switch, the said register selecting switches being arranged to set the selected circuit for subsequent closing by said register actuated switch.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM J. BOHAN.
DANIEL D. SMITH, Jr.

Witnesses:
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F. D. MERCHANT.