J. H. McELROY.

VOTING MACHINE.

APPLICATION FILED JAN. 18, 1907.

1,049,382.

Patented Jan. 7, 1913.

5 SHEETS—SHEET 1.

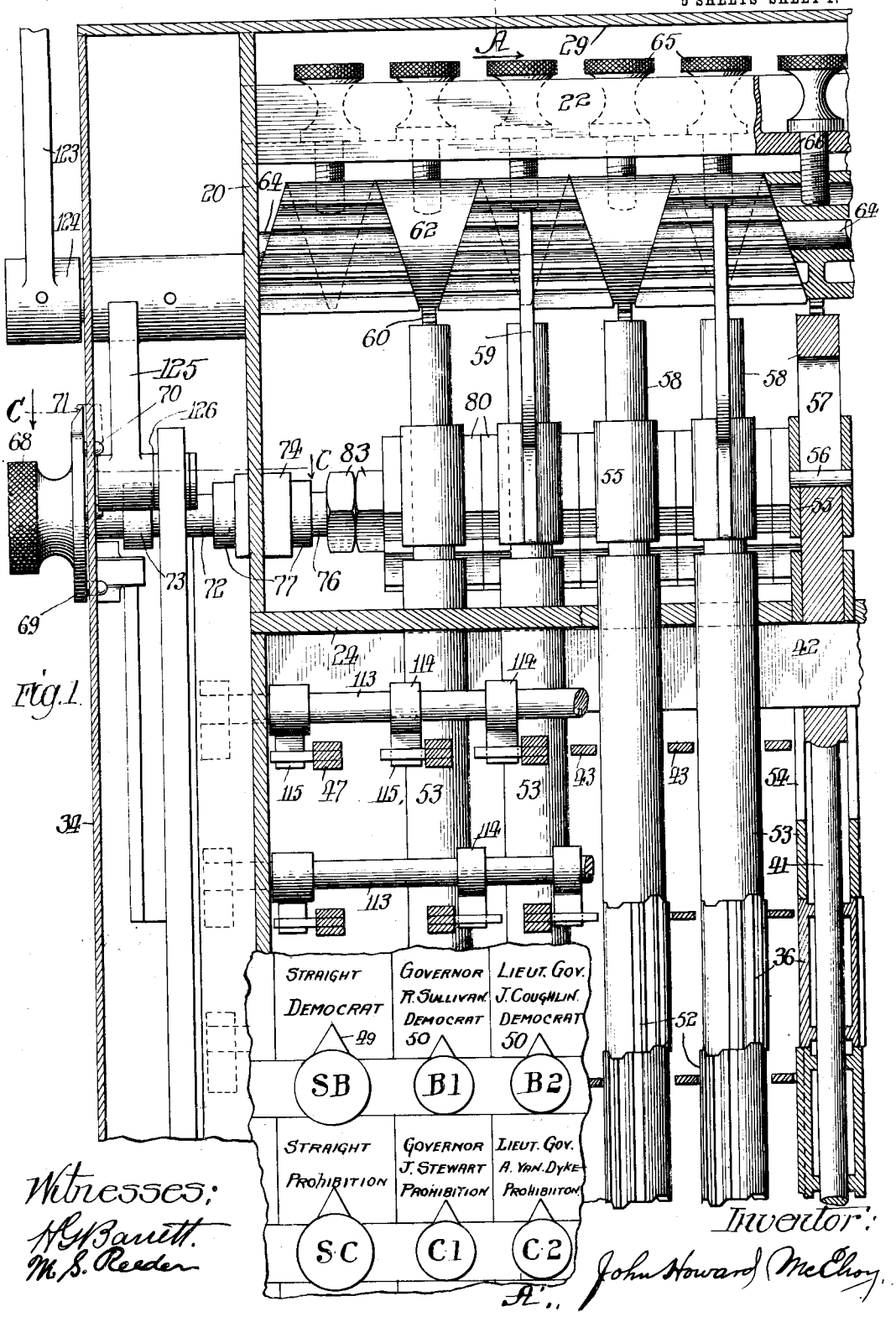


Fig. 1.

Witnesses:
H. G. Barrett.
M. S. Reeder

Inventor:
John Howard McElroy.

J. H. McELROY.

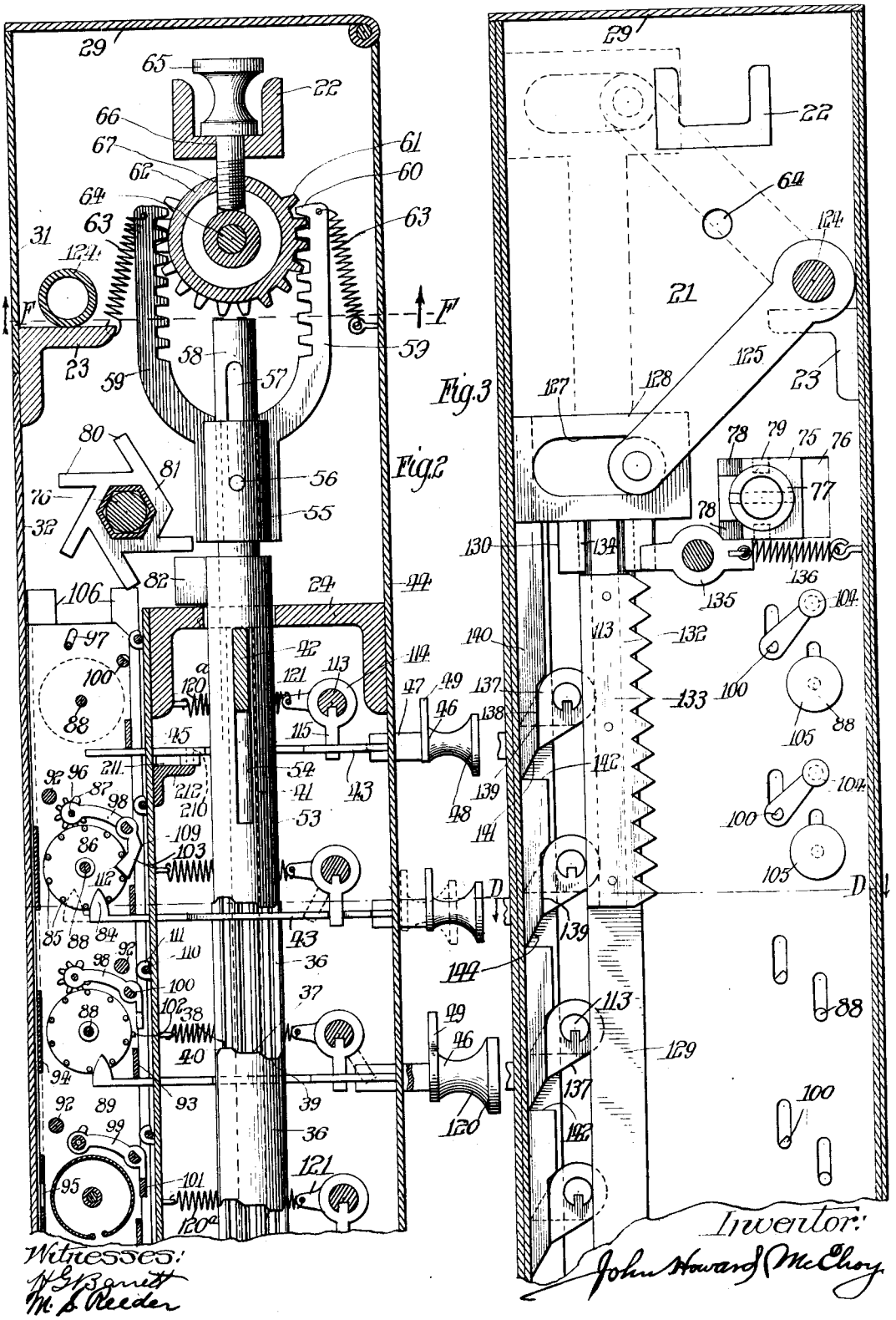
VOTING MACHINE.

APPLICATION FILED JAN. 18, 1907.

1,049,382.

Patented Jan. 7, 1913.

5 SHEETS—SHEET 2.



J. H. McELROY.

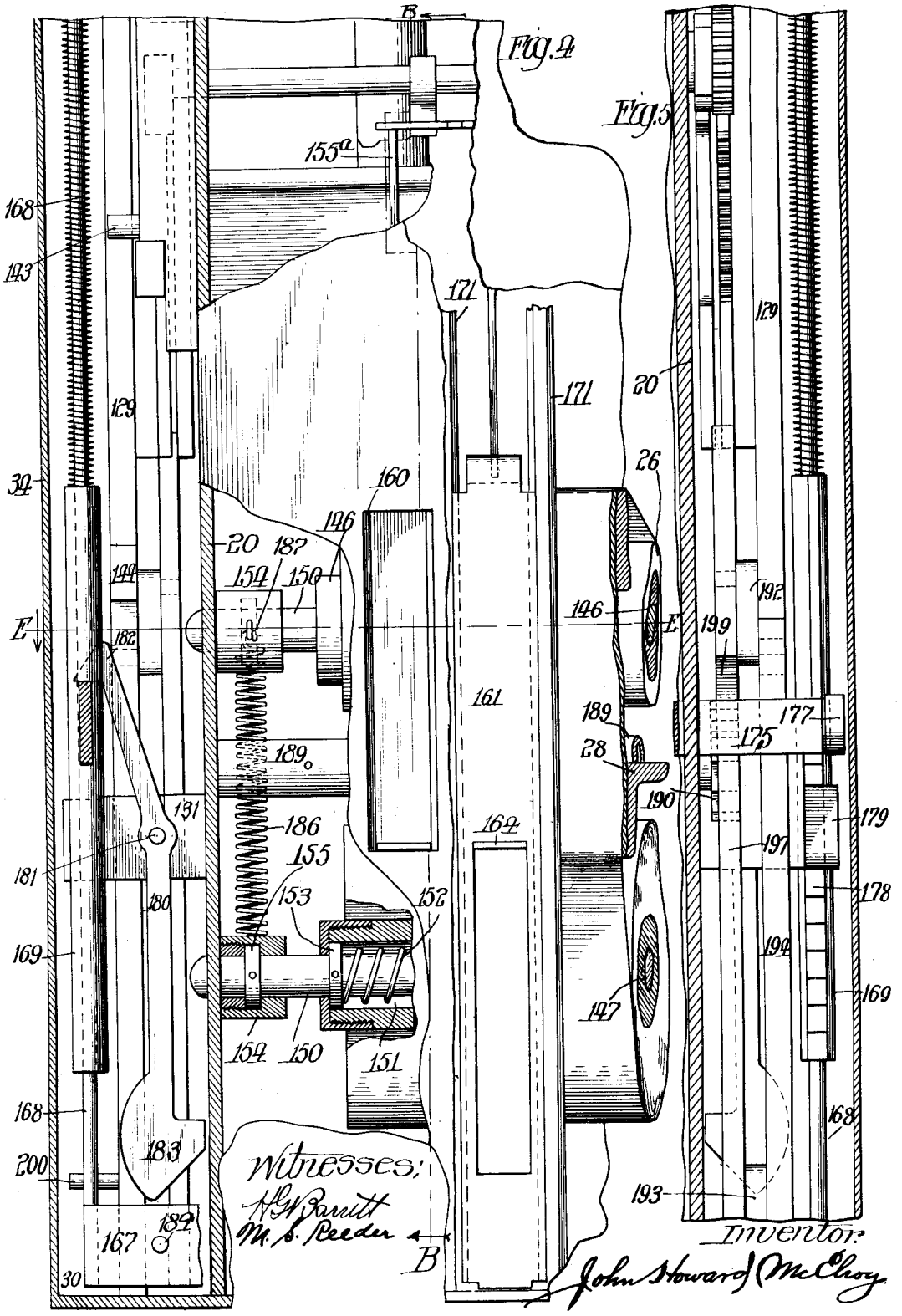
VOTING MACHINE.

APPLICATION FILED JAN. 18, 1907.

1,049,382.

Patented Jan. 7, 1913.

6 SHEETS—SHEET 3.



J. H. McELROY.

VOTING MACHINE.

APPLICATION FILED JAN. 18, 1907.

1,049,382.

Patented Jan. 7, 1913.

5 SHEETS—SHEET 4.

Fig. 6

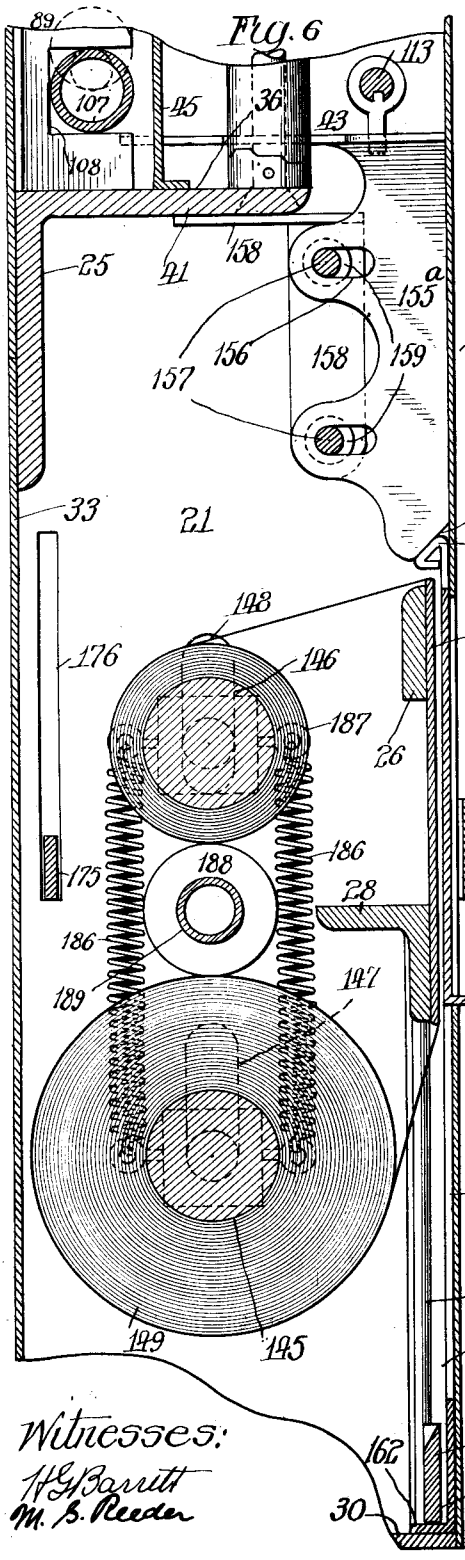
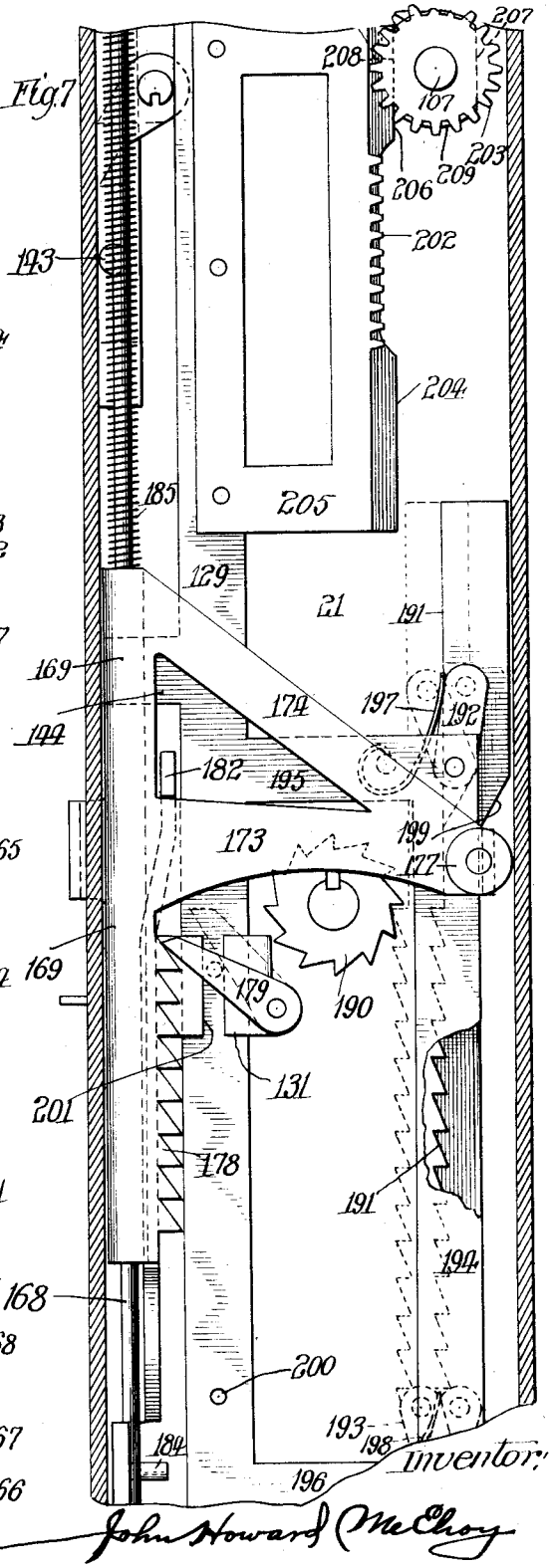


Fig. 7



Witnesses:

H. G. Barrett

M. B. Reeder

Inventor:

John Howard McElroy

J. H. McELROY.

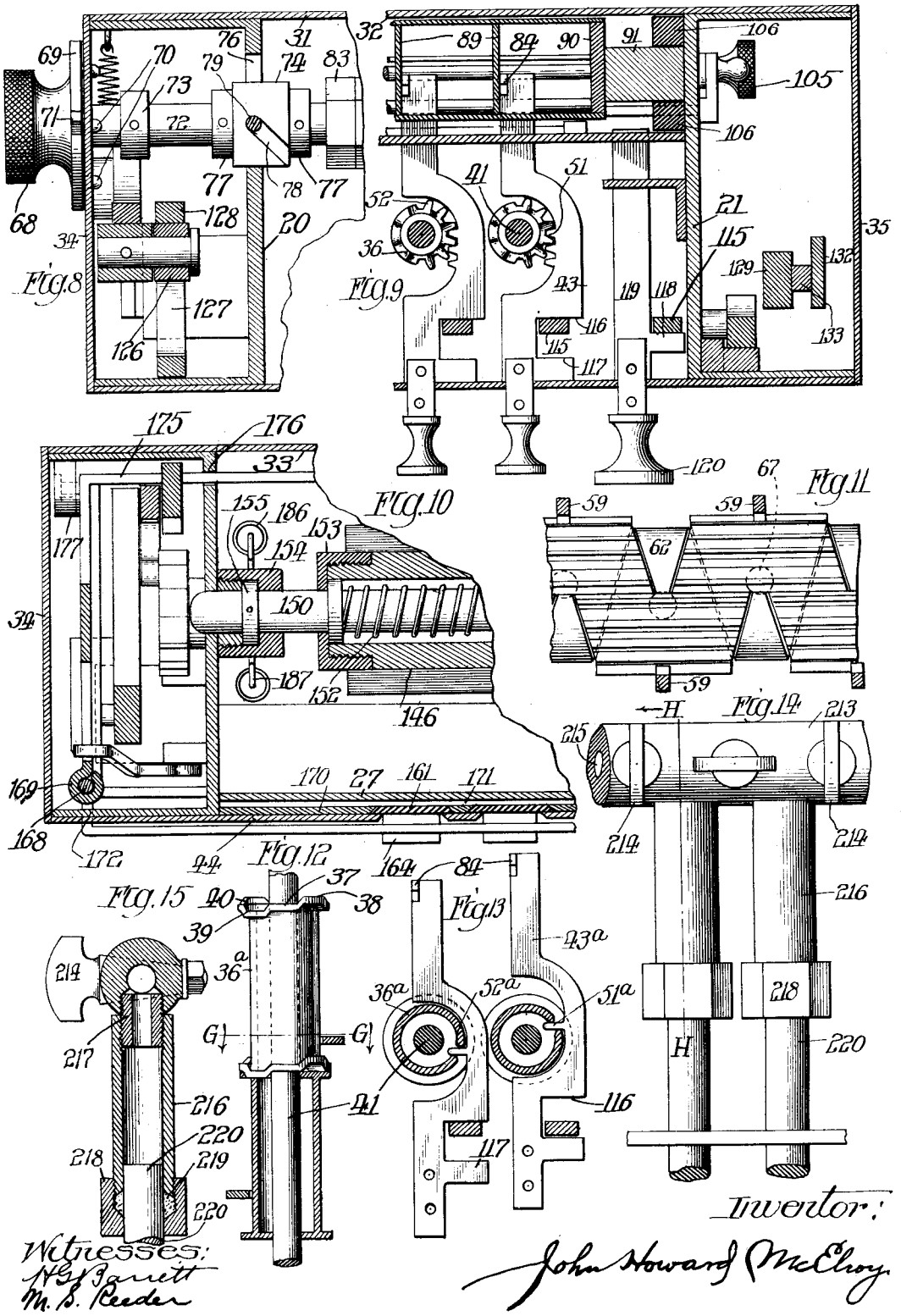
VOTING MACHINE.

APPLICATION FILED JAN. 18, 1907.

1,049,382.

Patented Jan. 7, 1913.

5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

JOHN HOWARD McELROY, OF CHICAGO, ILLINOIS.

VOTING-MACHINE.

1,049,382. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed January 18, 1907. Serial No. 352,850.

To all whom it may concern:

Be it known that I, JOHN HOWARD McELROY, a citizen of the United States, resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Voting-Machines, of which the following is a full, clear, and exact specification.

My invention is concerned with voting machines of the type adapted for use in general elections, and comprises (1) a novel interlocking mechanism adapted to be interchangeably used for single-candidate-to-be-elected and multi-candidate-to-be-elected groups, as occasion may demand; (2) a novel resetting mechanism, parts of which may be combined with the straight-ticket mechanism, when the latter is employed, thereby reducing the number of parts necessary; (3) a novel free-balloting mechanism; (4) a novel franchise limiting or controlling mechanism; (5) novel means for resetting the registers to zero; and, finally, certain novel features concerned with voting-machine mechanism generally.

To illustrate my invention, I have annexed hereto five sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which:

Figure 1 is a front elevation of the upper portion of one end of the machine, with the greater portion of the front wall of the casing removed, and with a portion of the drawing in vertical section on different planes, to more clearly show the mechanism; Fig. 2 is a vertical section on the line A—A of Fig. 1, the register frame and registers being in section on different vertical planes; Fig. 3 is an end view of the upper part of the machine, as seen from the right-hand side thereof, and with the end plate removed; Fig. 4 is a front elevation of the lower left-hand corner of the machine, with the greater portion of the front of the casing removed, and with some of the mechanism in section to more clearly illustrate the details thereof; Fig. 5 is a rear elevation of the mechanism seen at the left-hand side of Fig. 4; Fig. 6 is a vertical section on the line B—B of Fig. 4; Fig. 7 is a side elevation of the lower portion of the right-hand end of the machine, with the outer wall of the casing removed; Fig. 8 is a horizontal section on the line C—C of Fig. 1; Fig. 9 is a similar view in section on the line D—D of Fig. 3; Fig. 10 is a horizontal section on the line E—E of Fig. 4; Fig. 11 is a detail in section on the line F—F of Fig. 2; Fig. 12 is a detail, partly in section, showing a modified form of the primary interlocking sleeves; Fig. 13 is a detail in section on the line G—G of Fig. 12, further illustrating the modification; Fig. 14 is a rear elevation of a different form of the secondary interlocking mechanism, adapted to coöperate with the novel primary interlocking mechanism; and Fig. 15 is a detail in section on the line H—H of Fig. 14.

In carrying out my invention, I preferably employ the generally rectangular casing, which is provided at its ends with the vertically-disposed trough-like end-pieces 20 and 21. These trough-like end-pieces are connected by various horizontal members, such as the small channel bar 22 at the top, the angle bar 23 near the top, the larger channel bar 24 in the upper end, the large angle iron 25 in the lower portion, the bar 26 supporting the upper portion of the writing tablet 27, and the angle bar 28 supporting the lower half of said tablet. The top piece 29 and the bottom piece 30 are, of course, employed, and the top piece is preferably hinged and provided with a suitable locking mechanism so as to give access to the secondary interlocking mechanism for the purpose of changing the grouping as may be required. The rear wall 31 of the machine may be made of sheet-metal, and the portion 32 thereof covering the registers and the portion 33 thereof back of the irregular balloting mechanism are preferably hinged, so that they can be opened to give access to the registers for inspection of the same, and to the irregular ballot roll for the purpose of examining the same and removing the used portions thereof. The end plates 34 and 35 of the casing may be of sheet-metal, and are preferably provided with doors opposite at least one end of the registering mechanism, to give access to the same for resetting them to zero.

The interlocking mechanism to prevent the simultaneous operation of more than the permitted number of keys in any office group

is a modification of the interlocking mechanism shown in my application No. 348,987, filed December 21, 1906. In that application are shown thin disk-like interlocking members having surfaces in three different planes and inclined cam portions connecting the different surfaces, so that when the adjacent disks are rotated in opposite directions they will be separated by bringing the different surfaces into engagement, thereby taking up any space that is allotted for the number of candidates to be voted for in the group. In that construction the entire series of interlocking elements were arranged in one continuous row across the bottom of the machine, and this arrangement necessitated the connecting of these interlocking elements with the keys by straps of different lengths, according to the position of the row of keys to which the straps were connected. In my present construction, I provide a set of primary interlocking elements for each office row of keys, and the end members of these primary interlocking members coöperate with a transverse row of secondary interlocking elements, each primary row moving its associated secondary interlocking element a distance proportional to the number of keys moved for operation in its primary row. By suitably securing the secondary interlocking elements in the position to which they would be moved by the operation of a single key in that primary row, all of the office rows may be employed for single candidate-to-be-elected groups, and by loosening the secondary interlocking elements, the various office rows may be thrown into groups permitting the operation of as many keys anywhere in the group as there are secondary interlocking elements loosened.

As shown in Figs. 1, 2 and 11, the primary interlocking elements consist of elongated sleeves 36, these sleeves having a length preferably slightly less than the distance between the keys in the column. These sleeves have their ends formed with cam surfaces like the surfaces of the disks of my aforesaid application, there being four equi-distant surfaces 37 on one plane, two equi-distant surfaces 38 on a plane above the four planes 37, and two equi-distant surfaces 39 on a plane as far below the surfaces 37 as the plane 38 is above said surfaces. The surfaces 37, 38 and 39 are connected by the inclined cam surfaces 40, and the arrangement is such that when turned in their normal unoperated positions, the ends of the sleeves nest in the ends of the adjacent sleeves, so that they take up a minimum of space. All the eight essential sleeves 36 for each office group (there being seven sleeves for the regular candidate keys, as provided for by law, and one sleeve for the irregular balloting mechanism of the group) are mounted to slide and rotate upon the bearing rod 41, the lower end of which is secured in the angle bar 25, and the upper end of which is secured to the flat bar 42, extending between the end pieces 20 and 21 just beneath the large channel bar 24. The various rods 41 are spaced apart an equal distance, and the key blades 43 are mounted to slide in bearings formed in the front wall 44 and the intermediate wall 45, which is secured to one flange of the channel bar 24 at its top and to the angle bar 25 at its bottom. The key blades 43, preferably, are provided with the key buttons 46, which have the rectangular inner portions 47 extending into the casing and secured to the blades 43, the button portion proper 48, and the pointer 49 indicating the portion 50 of the ballot sheet to which the key belongs. As seen in Fig. 9, the blades 43 are provided with the teeth 51, which mesh with the teeth 52 extending the length of one side of the sleeve 36. This arrangement, of course, is provided so that the key will be in engagement with the sleeve to rotate the same no matter how far the sleeve may have been lifted by the operation of keys in the same column beneath it. The teeth 52, of course, need not extend over an angle of more than sixty degrees, as the sleeves are only rotated through an angle of forty-five degrees, but I preferably provide the teeth 52 extending over an angle of substantially one hundred and eighty degrees, so that the adjacent sleeves in the same vertical column can be reversed without changing their design. It will be seen from Figs. 1 and 2 that the key blades 43 coöperate with the alternate sides of the sleeves, in order that all the keys may be moved in the same direction to operate a register or set the key for operation, and at the same time the alternate sleeves will be rotated in opposite directions, as is necessary for securing the interlocking action in all possible arrangements of the keys.

In Figs. 12 and 13, I have illustrated a preferred form of the engagement between the key blade 43^a and the sleeve 36^a, in which, for the numerous teeth 51, I substitute a single tooth 51^a, and for the numerous teeth 52 on the sleeve I substitute a single slot 52^a in the side of the sleeve, the slot preferably having its edges arranged with the two angles shown, so that the tooth 51^a is engaging the same squarely in whichever position the blade 43^a may be moved.

It will be apparent from the foregoing description that if a single key in a vertical column be operated, it will swing its associated sleeve 36 through an angle of forty-five degrees, and during the first third, say, of this movement the cam surfaces 40 will cause the sleeve to be raised the distance between the surfaces 37 and 39 on the sleeve

below it, and also to raise the sleeve above it, and necessarily all the sleeves above it, a distance equal to twice the distance between the surfaces 37 and 39, or 37 and 38. In the full scale of the drawings shown, as each key is operated, the non-rotating sleeve 53 above the topmost sleeve 36 will be raised a distance of one-eighth of an inch, and if all seven of the keys in the column and the irregular balloting mechanism be operated, the sleeve 53 will be raised one inch, and will be raised a quarter, a half, or three-quarters of an inch, depending upon whether two, four or six keys are operated, and so on. During the latter portion, say the latter two-thirds, of the rotation of the sleeves, they are not raised any farther, but it is desirable to have the entire expanding effect occur the first third of the movement of the key, so as to insure that there be no attempt to beat the machine by only pressing in some of the keys just far enough to operate the registers. In the construction of the keys and registers herein shown, the movement of a key less than one-half of its full stroke will not serve to operate the associated register, but if it is moved more than one-half of its complete stroke, the register will be fully operated.

The expanding effect of the operation of the keys in the office column is transmitted to the secondary interlocking mechanism by means of the previously mentioned sleeve 53, which is allowed to move vertically, but which is held from rotation by reason of the elongated slot 54, with which it is provided, coöperating with the plate 42. In order to employ a franchise-limiting mechanism, I preferably do not have the sleeve 53 cooperating directly with the secondary interlocking mechanism, but cause it to cooperate with another sleeve 55, which is normally just above it when the column of keys is in a multi-candidate group, but which is held above it an eighth of an inch when it is in a single candidate-to-be-elected group. The sleeve 55 is held from rotation while it is permitted to move vertically by any suitable means, such as the pin 56 which is secured therein, extending from side to side through the elongated slot 57 formed in the enlarged upper end 58 of the rod 41. Each one of these sleeves 55 has secured in one side thereof the rack bar 59, and the adjacent sleeves have their rack bars 59 on the opposite sides. These rack bars are provided with teeth 60, which engage with teeth 61 of the secondary interlocking sleeves 62, which, like the primary sleeves, have cam surfaces at their ends and are adapted to be rotated in alternate directions, but instead of being rotated through a certain distance at each operation, they are arranged to be rotated through varying angles, depending upon how many keys have been operated in that associated column. I have shown the sleeves 62 as designed to be rotated through an angle of ninety degrees when all eight of the primary interlocking sleeves 36 in its associated column have been operated, and to be rotated through only one-eighth of that distance when one primary sleeve has been operated, and so on throughout. By an examination of Fig. 11, which represents the sleeves in their unoperated position when they are arranged for multi-candidate groups, to which position they are drawn as soon as released by the helically-coiled contractile-springs 63 secured at one end to the rack 59 and at the other end to the front wall 44 of the casing, or to the angle bar 23, depending upon which side of the machine they are located, it will be seen that in their unmoved position there is a certain amount of lost motion between the sleeves, *i. e.*, the sleeves are not quite long enough to entirely fill up the space which they occupy upon the rod 64, upon which they are strung. If any one of these sleeves 62 be rotated through a peripheral distance of one-eighth of an inch, the expanding action due to the shape of its cam edges will take up the lost motion which belongs to that particular sleeve, and if the adjacent sleeves 62 are held from movement, it cannot be rotated any further. If, however, there are eight sleeves in the group, so that they are free to not only rotate, but to slide longitudinally upon the supporting rod 64, the sleeve being operated can be rotated through a total angular distance of ninety degrees, during which rotation it will have shoved the sleeves on either side thereof a sufficient distance to take up the lost motion permitted in the group, and when this sleeve has been rotated the full ninety degrees, no other sleeve in the group can be rotated at all. Of course, it will likewise be obvious that each sleeve in the group may be rotated through one-eighth of ninety degrees, or two sleeves can be rotated through forty-five degrees each, or any other possible combination, so that, as a result, any eight of the total number of sixty-four primary sleeves 36 in the group can be operated by their keys, but no more. The fact that the sleeves 62 have the teeth on the longest surfaces thereof, and that these teeth will be in engagement with the teeth of the racks 59 in any position to which they can be adjusted, insures the proper action of the secondary interlocking mechanism under any operation of the keys that may take place. This mechanism gives a very flexible arrangement, and one that enables me to put any number of the primary sleeves 36 in a group that is ever required in actual prac-

tice. The proportions of the sleeves 62 shown enable me to place, say, sixteen columns in a single group, and if it is desired to place more in a group, it is only necessary to decrease the pitch of the cam ends of the sleeves 62 proportionately, making it one-half as great as illustrated, if it is desired to put twice as many columns of keys in a group. The grouping of these sleeves 62 is very readily controlled by means of the set screws 65, which pass through suitable unthreaded apertures 66 in the channel bar 22 and are screwed into the threaded apertures 67 in the sleeves, which apertures are at the highest point when the sleeves have been rotated through a peripheral distance of one-eighth of an inch. The channel bar 22 thus, in effect, supports the sleeves 62, so that the rod 64 can be made small in diameter, thus reducing the friction of the sleeves as they are rotated. When any desired group is to be formed, all that is necessary is to remove the associated set screws 65, when the apparatus is ready for use in the group of that size.

The franchise-limiting mechanism is best shown in Figs. 1, 2, 3 and 8, and will be seen to consist of the handle 68, which is provided with the disk 69 carrying a plurality, preferably six, pins 70 projecting from its inner face and adapted to coöperate with six equi-distant and equal-sized apertures in the end wall of the casing. A pointer 71 is provided, which coöperates with an indicating dial (not shown) arranged on the outer wall of the casing and labeled with the franchise groups, where it is for use in a general election, or with the names of the parties, where it is to be used for a primary election in which all the parties hold their primaries on the same day and at the same place. The handle 68 is secured on a shaft 72, which has the collar 73 thereon to limit the distance to which the shaft can be pulled out for resetting purposes, as hereinafter described. It is provided with the similar bearing blocks 74 and 75, the bearing blocks 75 being at the other end from the handle 68 and sliding in an aperture 76 in that end piece, while the bearing block 74 slides in a corresponding aperture in that end piece. The collars 77 are employed on each side of the blocks 74 and 75, to hold them in position. These blocks, as shown, are preferably square and coöperate with the rectangular apertures, so as to prevent their turning. As seen in Fig. 8, each block is provided with the cam slots 78, which cooperate with the pins 79 projecting from above and below into the cam slots, which are preferably on both the top and bottom of the bearings. With this construction, it will be perfectly apparent that as the shaft 72 is pulled out to reset the franchise-limiting mechanism, it will be moved bodily to the rear of the machine an equal distance, thereby carrying the arms 80 of the limiting elements 81, of which there is one for each column of keys, out of engagement with the lugs 82 secured to or formed integral with the upper ends of the sleeves 53, as clearly shown in Fig. 2. These franchise-limiting elements 81 are provided with the preferably tangential arms 80, which are one less in number than the positions to which the shaft can be adjusted. I have, for convenience, indicated six positions of adjustment and five of these arms 80. The arms 80 are spaced apart an equal distance, and one of them is omitted, as it were, and this enables me to make any desired adjustment of these franchise-limiting elements upon the shaft 76, which preferably has the equi-angular cross-section shown, with as many angles as there are adjustments for the shaft. By stringing these elements 81 upon the shaft in any desired arrangement, and securing them by the lock nuts 83, it will be perfectly apparent that I can arrange it for any desired franchise limitation that may be necessary.

The key blades 43 are provided at their inner ends with the actuating teeth 84, which, as shown in Fig. 2, are adapted to take between the ten pins 85 projecting from the edge of the units wheel 86, which may be of any ordinary Geneva-stop variety, and which engages with the carrying pinions 87 to carry the tens to the tens wheel, and so on for as many wheels as may be employed. The wheels are strung upon the shafts 88 which pass through the partition plates 89 of the register frame, which, as seen in Fig. 8, is made up of the partition plates 89, the end plates 90, and the end pieces 91, the plates being secured together by the rods 92, which are preferably arranged in the staggered relation in the frame shown. To space the plates 89 apart the proper distance from the groups of wheels, there being the eight sets of wheels between each pair of plates, seven for the party candidates, and the uppermost set being for the "yes" and "no" propositions, I preferably provide these plates 89 with the projections 93 and 94 standing at right angles thereto and of a length just equal to the space between the adjacent plates. The projections 94 I preferably utilize to cover all the numbers on the registers which would be visible when the rear of the casing is open, except the ones at the reading point, which will be visible through the reading aperture 95 formed in the projection.

For the purpose of resetting the registers, the pinions 87 are mounted upon the rods 96, which may extend the length of the machine, the plates 89, 90, and the end pieces 91 being provided with the longitudinal slots

97 to accommodate the movement of these rods. Each of the registers is provided with a swinging frame, which is made up of the arms 98 and 99, in the outer ends of which the shafts 96 are journaled, and which arms are secured upon the rock shaft 100, which preferably has one side flattened for this purpose, as shown, so as to coöperate with the correspondingly shaped aperture in the arms 98 and 99. At their other end, these arms 98 and 99 are connected by the cross piece 101, which serves to coöperate with the peripheral pins 102 projecting at a suitable point from each of the register wheels. When the machine is to be reset, it is preferably inclined with its face downward so that the positioning dogs 103, which are loosely pivoted on the shaft 100, will fall away from the pins 84 and allow the primary wheel to rotate with as little friction as possible. The shafts 100 have on their ends, as seen in Figs. 8 and 3, the arms 104, which are turned, as seen in Fig. 3, to the left so as to raise the pinions 87 out of engagement with the primary wheels. The shafts 88 are then turned, by means of the buttons 105 secured on their ends, through three hundred and sixty degrees, and, as they are turned, all the register wheels, being freed from the pinions 87, will be turned therewith until their pins 102 engage with the stop bars 101, which are moved into the path of said pins at the same time that the carrying pinions are moved out. At the end of the complete rotation of all the shafts 88, the register wheels will all be set to their zero position.

As has been previously stated, the actuating lugs 84 on the ends of the key blades 43, engaging with the pins 85 on the primary wheel, will advance the wheel one number when the key is pushed all the way in. If the key is pushed less than half way in, however, the register wheel will be turned back to its initial position by means to be explained. If the key is operated more than half way, but less than the entire distance, the register wheel will be pushed on to its complete movement by the dog 103, as hereinafter explained. It will be understood that I have shown my present invention as applied to the class of voting machines in which the registers are operated directly by the keys as they are pushed in, and if a vote is to be corrected, the key is simply pulled out and unoperates the register. When the ballot has been finally selected, the registers, as a body, are raised out of engagement with the keys, and the keys are then returned. The register frame is mounted to slide vertically by reason of its end pieces 91 being confined between the guide strips 106, best seen in Fig. 9, and as the machine is reset, the register frame is raised by the rotation of the eccentric shaft 107, best seen in Fig. 6, which engages with the recess 108 formed in all the partition plates 89 and the end plates 90. This eccentric shaft 107 is rotated through an angle of one hundred and eighty degrees by the means to be subsequently described, as soon as the resetting movement of the machine begins, and it will be apparent that as it is rotated from the full-line position of Fig. 6 to the dotted-line position, the register frame, and consequently all the registers, will be raised, so that the keys can be returned to initial position without thereby unoperating the registers. As the register frame is thus raised, the humps 109 on the backs of the dogs 103 will be engaged by the projections preferably formed by rods 110 extending the length of the machine and secured to the partition 45 in any suitable manner, as by the hooks 111. As the registers approach the limit of their upward movement, the humps 109 engage the rods 110, and forcing the angular end 112 of the dog inward between the pins, the units wheels are not only accurately positioned, but are locked from any possible manipulation when the registers are raised, and the locking mechanism for the doors permitting access to the registers will preferably be arranged so that the doors cannot be opened except when the register frames are in their raised position, thus preventing any possible tampering with the registers by unauthorized officials.

For the purpose of operating all the registers in a party row for straight-ticket voting, and for the purpose of resetting the registers, I provide a common mechanism, but it will be understood that the two mechanisms might be separated, although I prefer to consolidate them for the simplification of the machine. Above the free-balloting mechanism to be hereinafter described, and above each party row of keys, as well as the uppermost row devoted to yes and no propositions, I place a rock shaft 113 extending the length of the machine and journaled in the end pieces thereof. Above each key I secure to said rock shaft a collar 114, which is provided with the downwardly-extending lug 115, which normally rests adjacent the abutment edge 116 of the key blade 43. Toward the outer end of this key blade 43, I form another abutment member having the abutting edge 117, and the distance between the abutments 116 and 117 being equal to the thickness of the member 115 plus the distance the key is moved in its normal operation. If now the shaft 113 be rocked in the proper direction, as by the lug 118 on the blade 119 of the straight-ticket key 120, the movement of the lugs 115 engaging the abutments 116 will carry all the key blades and the keys in that row into their operated position. The rock shaft is returned to its initial position as soon as the

straight-ticket key is released, by reason of the helically-coiled contractile-spring 120ª, which is secured at one end to the channel bar 24, as seen in Fig. 2, and at the other end to the arm 121 attached to the collar of the sleeve 114 which coöperates with the straight-ticket key. If any key, after having been voted by the straight-ticket mechanism, is to be retracted, it is obvious that there is nothing to prevent its movement, and if the keys are left in their operated position and the shaft 113 be rocked in the opposite direction, it will be obvious that all of the keys will be returned.

In connection with the casing, I employ booth mechanism, which is preferably of the form shown in my application No. 348,947, filed December 21, 1906. The arms 123, shown in Fig. 1, which carry the curtain, are secured on the rock shaft 124, which extends the length of the machine and is journaled in the end castings and the end plates. Within the end castings, the rock shaft 124 has secured thereon the arms 125, which normally stand in the full-line position shown in Fig. 3 when the booth is closed and the voter is therein. When the booth is open, the shaft 124 is rocked through an angle of ninety degrees to the dotted-line position shown in Fig. 3. This arm 125 is provided at its outer end with the abutment 126, which preferably takes the form of an anti-friction roller, which engages the slot 127 in the head 128 of the operating bar 129. This operating bar 129 is mounted to slide in the bearing bracket 130 (seen in Fig. 3) and in the similar bearing bracket 131 (seen in Fig. 7), which brackets project from the end castings. A complete stroke of the operating bar, and consequently of the curtain mechanism, is preferably compelled by providing the toothed bar 132, which is spaced at a distance from the bar 129 by the bar 133, which is narrowed, as shown, in order that it may pass through the opening 134 provided in the bearing bracket 130 to accommodate its movement. A dog 135 pivoted to the outer casing, and held normally in horizontal position by the helically-coiled contractile-spring 136 secured at one end to the dog and at the other end to the rear of the casing, coöperates with the toothed bar 132 in the well-known manner to cause a complete stroke of the mechanism in both directions.

The rock shafts 113 have secured on their outer ends the members 137, which preferably take the form of collars having triangular projections, the sides 138 of which are locking surfaces and coöperate with the locking surfaces 139 on the key-resetting bar 140, which is mounted to slide in suitable bearings in the corner of the end frames. This resetting bar 140 is provided beneath each of the locking surfaces 139 with the recess 141 and the engaging surface 142, and it will be apparent that when the bar 140 is in its normal position, the shafts 113 can be rocked in the proper direction to permit the straight-ticket mechanism to act to set the keys, but cannot be rocked in the other direction from its normal position to reset the keys. Toward the end of the upward movement of the operating bar 129, the pin 143 carried by the lower end of the key-resetting bar 140 is engaged by the lug 144 on the bar 129, as will be apparent from Fig. 4, and during the remaining and last portion of the upper movement of the bar 129, the bar 140 is raised therewith. When the surface 142 engages the tip of the member 137, the recess 141 permits said member to swing inward to the dotted-line position, thus rocking the shafts 113 in the proper direction to return all the keys to their normal unoperated position.

The free-balloting mechanism is illustrated in Figs. 4, 5, 6, 7 and 10, and consists generally of the supply roller 145 and the storage roller 146, which are mounted to rotate in suitable slotted bearing guides 147 and 148 formed in the lower part of the end castings 20 and 21. The paper strip 149 wound on the supply roll passes over the writing table 27 and is wound up upon the storage roll, means being provided for rotating both of these rolls a sufficient distance to cover the table with a fresh supply of paper every time one of the irregular balloting devices has been operated. The table 27 is supported upon the cross bars 26 and 28, as shown, and the supply and storage rollers 145 and 146 are preferably formed at their ends with the bearing shafts 150, which are mounted to slide in a recess 151 formed in the ends of the rollers. A helically-coiled expanding-spring 152 is interposed between a shoulder in the recess and the collar 153 secured on the shaft 150, so that the shaft normally stands in the position shown in the various figures. A bearing box 154 is provided, and it is secured upon the shaft 150 by means of the collar 155 secured on the shaft coöperating with the channel in the box. The function of this box 154 and the sliding shaft 150 is to enable the rollers to be readily removed when the door 33 is opened, as it will be apparent that by seizing the two boxes 154 at each end and pressing them inward, the shafts 150 will be pushed into the rollers so that they will be released from the slots with which they coöperate, so that the roller and its contents can be readily removed from the casing.

The interlocking mechanism for the free-balloting apparatus is the same as the regular mechanism, consisting essentially of the blades 43 which coöperate with the sleeves 36 in the same manner, and are reset in the

same manner. Instead of having the keys projecting outwardly, the blade 43 has secured thereto the downwardly-projecting plate 155ª, which is provided with the pair of slots 156, through which pass the bearing rods 157 extending between the end castings and supported thereby, as well as at intervals by the brackets 158 extending downward from and secured to the angle bar 25. The plates 155 are spaced apart the unit distance by means of the sleeves 159 strung on the shafts 157 between the plates. The front plate 44 of the machine is provided at the unit intervals in its lower part with the slot 160, which preferably has its edges beveled, as shown, and which extends a trifle less than the width of the table 27. Mounted just back of the slots 160 are the covers 161, which, as best seen in Fig. 4, consist of the long plate having three transverse projections. The uppermost of these projections, numbered 162, is preferably bent into the angular shape shown in Fig. 6, and has its inclined face coöperating with the incline 163 on the botom of the plate 155ª, so that as the cover plate is raised, the plate 155ª will be shoved in to operate the interlocking mechanism almost as soon as the plate 161 is started upward. About midway of the length of the plate 161 is the intermediate projection 164, which extends outward, as shown, and is designed to coöperate with the bar 165, to be further described, which controls the operation of the paper feed roll. The lowermost projection 166 extends inwardly at the bottom of the plate 161 and coöperates with the bar 167, which extends across the machine and is secured at its ends to the pair of parallel rods 168 which have their bearings in the sleeves 169 connected to the bar 165, and in another bearing (not shown) secured to the casing in the intermediate portion of the machine, which is broken out in the drawings. The plate 161 preferably has its edges beveled to coöperate with the reversely beveled edges of the end plates 170 and the intermediate strips 171, which are secured to the front plate 44 so as to form guides for the plates 161. By beveling these plates and the guide plates, a very compact construction is obtained. The bar 165 is bent inward at its ends and passes through the pair of elongated slots 172 formed in the ends of the casing, as seen in Fig. 2, and joins the tubes 169. These tubes 169 are connected by the cross piece 173 and the brace 174 with the rear cross bar 175, which extends the length of the machine and passes through the elongated slots 176 in the end castings. I preferably mount the anti-friction rollers 177 on the ends of the cross pieces 173, and these bearing against the rear wall of the end castings serve to guide the frame and cause it to move more easily. The tubes 169 are provided beneath the cross bar 173 with the ratchet teeth 178, with which coöperate the detent dogs 179 pivoted on the bearing brackets 131. A locking pawl or detent 180 is pivoted at 181, as best seen in Fig. 4, on the bearing 131, and has the hook 182 at its upper end, which takes over the cross bar 173 and normally holds the frame locked in its downward position. The lower end of the latch 180 is, however, enlarged and shaped and balanced so that it will naturally hang with the hook 182 in locking position. A cam surface 183 is formed on this enlarged end of the detent 180, and a pin 184 projecting rearwardly from the cross piece 167 engages the cam surface 183 as the frame 167 is moved upward by the raising of any cover plate, so that as soon as the cover plate has been raised far enough to operate the interlocking mechanism, and thus prevent the operation of a regular balloting key after the free-balloting apparatus has been tampered with, the detent 180 is rocked so that the frame comprising the bars 165 and 175 is unlocked and is free to be raised. At this time, the further upward movement of the cover plate brings the projection 164 into engagement with the bar 165 and lifts the frame, it sliding on the bearing formed by the rods 168. As the frame ascends, the detent dogs 179, coöperating with the ratchet teeth 178, prevent the frame returning under the stress of the helically-coiled expanding-springs 185 surrounding the rods 168 between the upper ends of the tubes 169 and the upper bearing for said rods, not shown. The supply roller 145 and the storage roller 146 are drawn toward each other by means of the helically-coiled contractile-springs 186, which are secured to the eyes 187 projecting outwardly from the bearing boxes 154. The paper on these rolls is thus drawn tightly against the feeding rollers or disks 188 which are secured on the shaft 189 extending the length of the machine and journaled in the end castings. The shaft 189 has secured on its ends the ratchet wheels 190, which are in the plane of the ratchet bars 191, which are pivoted by the links 192 and 193 to the extension bar 194 formed integral with or secured rigidly to the lower end of the bar 129, it being illustrated as connected thereto by the cross pieces 195 and 196. A pair of leaf springs 197 and 198 fastened to the cross bars 195 and 196, have their upper ends bearing against the links 192 and 193 so as to hold the ratchet bars normally in their rearward position, in which they do not engage the teeth of the ratchet wheels 190.

The ratchet bars 191 have their upper ends enlarged and connected with the smaller portion by the cam surfaces 199, which are engaged by the bar 175 as the

frame is raised, and thus the ratchet bars are swung from the full-line position shown in Fig. 7 to the dotted-line position, in which they will engage the teeth of the ratchet wheels 190. As the bar 129 is raised as the voter leaves the booth, by operating the curtain, the ratchet wheels 190, and thereby the shaft 189, will be rotated the proper distance to remove the portion of the paper 149 which is over the table and present a fresh surface for the next voter. At the end of the upward movement of the bar 129, the pin 200 at the lower end thereof, which passes into the slot 201 formed in the bearing 131 to accommodate it, contacts with the pawl 179 and rocks it upward so as to release the frame and allow it to descend under the action of gravity, preferably reinforced by the stress of the spring 185. As soon as the cover plate has been raised by the operator previous to lifting the machine, and the name has been written upon the paper, the bar 167 and its annexed rods 168 descending by gravity, preferably reinforced by a helically-coiled contractile-spring (not shown), preferably surrounding the upper ends of the rods 168 and secured thereto and to the upper bearing lug (not shown), return the cover plates to their concealing position. Of course, it will be understood that this return of the cover plate does not release the interlocking mechanism and thus permit a further and fraudulent operation of the machine. It will also be understood that the special locking mechanism provided by the detents 180 and the bar 167, carrying the pins 184 cooperating therewith, is provided to prevent the possibility of malicious persons causing the feed of the paper when no cover plate has been raised, which they could do by merely lifting the bar 165, without thereby operating the interlocking mechanism and losing their vote for any candidate.

The shaft 107 is rotated, both as the bar 129 is raised and lowered, through an angle of one hundred and eighty degrees, by means of the rack bar 202 meshing with the gear wheel 203. This occurs during the middle portion of the movement of the bars 129, and at the beginning and end of said movement, and when the machine is at rest, the shaft 107 is locked from movement by means of the locking surfaces 204 and 206 on the extension 205, which extension also carries the rack bar 202, engaging with the flat surfaces 207 and 208 on the locking disk 209, which is secured upon the shaft 107, and which may be formed integrally with the ratchet wheel 203, if desired.

As previously stated, the uppermost row of registers is devoted to the yes and no propositions, and these keys, instead of cooperating with the regular interlocking mechanism, are provided with the pins 210 seen in Fig. 2, which project downward and coöperate with the levers 211 pivoted on the small angle bar 212 secured to the partition plate 45. There will be one of these levers 211 for each pair of the yes and no keys, and the levers are so shaped and located relative to the pins that but one key can be moved to operative position at a time.

In Figs. 14 and 15, I have illustrated another form of secondary interlocking mechanism, which I may employ instead of the sleeves 62 which have been previously described. This secondary interlocking mechanism is a modification of the interlocking mechanism shown in my application for Patent No. 729,274, filed September 2, 1899, and will be seen to consist of the tube 213, which in the present case will extend between and be supported by the end plates, and this tube is provided at each unit interval with a stop cock 214 passed therethrough, which, when turned in the position shown at the ends of Fig. 14, will stop the channel 215 through the tube 213, and which when in the other position, shown in the middle of Fig. 14, will open the channel and leave it unobstructed. Extending downwardly from the tube 213, there being one at each unit interval, is a barrel 216, which may be conveniently connected with the tube 213 by the exteriorly-threaded sleeve 217, which is screwed into the threaded recess in the tube 213 and has the barrel 216 screwed thereon. The bottom of the barrel 216 is provided with the stuffing box 218 and the packing 219, so that the piston 220 reciprocating therein will be liquid tight. This piston 220 takes the place of the sleeve 55, the connections being conveniently modified for this purpose, and is, of course, raised an eighth of an inch, in the proportions described, for each key that is operated in its vertical column. The channel 215 and the barrels 216 are filled with just enough of some heavy liquid, preferably glycerin, to permit the raising of each of the pistons 220 one unit distance, but no more. When the apparatus is used for single-candidate-to-be-elected groups, all the stop cocks are in the vertical position, and, of course, but one key can be operated in the column. When a group is to be formed, the intermediate stop cocks are turned so as to open the channel 215 at each of these points, and it will then be readily apparent that the pistons 220 can be completely or partially operated, depending on the size of the group.

While I have herein shown and described a novel interlocking mechanism, I do not herein claim the same, but reserve the subject matter thereof for my application No. 429,976 filed Apl. 29, 1908.

While I have herein shown and described

a novel franchise limiting or controlling mechanism, I do not herein claim the same, but reserve the subject-matter thereof for my application No. 429,976, filed Apl. 29, 1908.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In a device of the class described, the combination with the keys, of the rock shaft having the arms thereon, abutments on said keys with which the arms coöperate, means for rocking said shaft in one direction from its normal position to move the keys to operative position, and resetting mechanism cooperating with the rock shaft to move it in the other direction from normal position to return the keys to their unoperated position, consisting of the sliding bar having the locking portion and the actuating portion cooperating with the lug on the rock shaft having a locking portion and a portion adapted to be engaged by the actuating portion of the bar.

2. In a device of the class described, the combination with the keys, of the rock shaft having the arms thereon, abutments on said keys with which the arms coöperate, means for rocking said shaft in one direction from its normal position to move the keys to operative position, and resetting mechanism coöperating with the rock-shaft to move it in the other direction from normal position to return the keys to their unoperated position, consisting of a triangular lug having a rounded end coöperating with a sliding bar having a locking portion and an actuating portion coöperating with the lug, substantially as described.

3. In a device of the class described, the combination with the paper supply and the aperture adjacent the paper supply, of the mechanism for actuating the paper supply, means extending outside of the casing for controlling the effective operation of the actuating mechanism, a cover for the aperture, regular balloting mechanism, interlocking mechanism between the cover and the regular balloting mechanism operated by the cover during the first portion of its complete movement, and a locking mechanism for the actuating mechanism released by the movement of the cover after the interlocking mechanism has been actuated thereby.

4. In a device of the class described, the combination with the paper supply and a plurality of apertures adjacent the paper supply, of the mechanism for actuating the paper supply, means extending outside of the casing for controlling the effective operation of the actuating mechanism, a plurality of covers for the apertures, a series of regular balloting mechanism for each cover, interlocking mechanism between the cover and its associated series of regular balloting mechanism operated by the cover during the first portion of its complete movement, and a locking mechanism for the actuating mechanism released by the movement of any of the covers after its interlocking mechanism has been actuated thereby.

5. In a device of the class described, the combination with the paper supply and the aperture adjacent the paper supply, of the mechanism for actuating the paper supply, said mechanism including the sliding frame, a bar connected with said frame extending outside of the casing for controlling the movement of the actuating mechanism, a cover for the aperture, interlocking mechanism between the cover and the regular balloting mechanism operated by the cover during the first portion of its complete movement before it strikes the actuating bar, and a locking mechanism for the actuating bar released by the movement of the cover after the interlocking mechanism has been actuated thereby.

6. In a device of the class described, the combination with the paper supply and the aperture adjacent the paper supply, of the mechanism for actuating the paper supply, means extending outside the casing for controlling the effective operation of the actuating mechanism, a cover for the aperture, regular balloting mechanism, interlocking mechanism between the cover and the regular balloting mechanism operated by the cover during the first portion of its complete movement and locking mechanism for the actuating mechanism released by the movement of the cover after it has been moved a certain distance.

7. In a device of the class described, the combination with the paper supply and the plurality of apertures adjacent the paper supply, of the mechanism for actuating the paper supply, means extending outside of the casing for controlling the effective operation of the actuating mechanism, a corresponding plurality of covers for the apertures, corresponding pluralities of regular balloting mechanisms, interlocking mechanisms between the covers and the regular balloting mechanisms operated by the cover during the first portion of its complete movement and locking mechanism for the actuating mechanism released by the movement of any of the covers after they have been moved a certain distance less than their complete movement.

8. In a device of the class described, the

combination with the register wheel, of the actuator therefor, the positioning dog movable out of engagement with the teeth of the wheel, means for translating the registers bodily, and a member for engaging the positioning dog when the register is moved out of engagement with its actuator.

9. In a device of the class described, the combination with the register wheel, of the actuator therefor, the swinging positioning dog movable out of engagement with the teeth of the wheels, means for translating the registers bodily, and a member engaging the back of the positioning dog when the register is moved out of engagement with its actuator.

10. In a device of the class described, the combination with a plurality of register wheels, of the plurality of actuators therefor, interlocking mechanism to prevent the simultaneous operation of more than the desired number of registers, said interlocking mechanism being actuated before the register is moved half way, positioning dogs movable out of engagement with the teeth of the wheel, means for translating the registers, and a member for engaging the positioning dogs when the register is moved out of engagement with its actuator to thereby force them to move the primary registering wheels to complete operated position or unoperated position, depending upon whether the actuator has been moved more or less than half a full stroke.

11. In a device of the class described, the combination with the register frame, of the spacing plates therein, and the eccentric shaft beneath the frame coöperating therewith and with the spacing plates to raise and lower the frame.

12. In a voting machine, the combination with the registers, of the actuators therefor movable directly by hand in voting far enough to completely actuate and serving to finally cause the actuation of their associated registers if they are moved more than a certain fraction of their intended stroke, interlocking mechanism to prevent the simultaneous operation of more than the desired number of registers and moving with the actuators and acting before the actuators have been moved said fraction, and means for moving the registers back if they are actuated less than said fraction, and forward if they are actuated more than said fraction and less than a whole unit.

13. In a voting machine, the combination with the registers, of the actuators therefor movable directly by hand in voting far enough to completely actuate and serving to finally cause the actuation of the associated registers if they are moved more than a certain fraction of their intended stroke, interlocking elements connected to the actuators to prevent the simultaneous operation of more than the desired number of registers and acting before the actuators have been moved said fraction, and means for moving the registers back if they are actuated less than said fraction, and forward if they are actuated more than said fraction and less than a whole unit.

14. In a voting machine, the combination with the registers, of the actuators therefor freely movable directly by hand into and out of engaging position and far enough to completely actuate and serving to finally cause the actuation of their associated registers if they are moved more than a certain fraction of their intended stroke, interlocking mechanism to prevent the simultaneous operation of more than the desired number of registers and moving with the actuators and acting before the actuators have been moved said fraction, and means for moving the registers back if they are actuated less than said fraction, and forward if they are actuated more than said fraction and less than a whole unit.

15. In a voting machine, the combination with the registers, of the actuators therefor freely movable directly by hand into and out of engaging position and far enough to completely actuate and serving to finally cause the actuation of the associated registers if they are moved more than a certain fraction of their intended stroke, interlocking elements connected to the actuators to prevent the simultaneous operation of more than the desired number of registers and acting before the actuators have been moved said fraction, and means for moving the registers back if they are actuated less than said fraction, and forward if they are actuated more than said fraction and less than a whole unit.

16. In a voting machine, the combination with the registers, of the actuators therefor serving to finally cause the actuation of their associated registers if they are moved more than a certain fraction of their intended stroke, interlocking mechanism to prevent the simultaneous operation of more than the desired number of registers and moving with the actuators and acting before the actuators have been moved said fraction, and means for moving the registers back if they are actuated less than said fraction, and forward if they are actuated more than said fraction and less than a whole unit, consisting of a dog engaging with the positioning abutments on the primary register wheel.

17. In a voting machine, the combination with the registers, of the actuators therefor serving to finally cause the actuation of their associated registers if they are moved more than a certain fraction of their intended stroke, interlocking mechanism to prevent the simultaneous operation of more than the

desired number of registers and moving with the actuators and acting before the actuators have been moved said fraction, and means for moving the registers back if they are actuated less than said fraction, and forward if they are actuated more than said fraction and less than a whole unit, consisting of a dog engaging with the positioning abutments on the primary register wheel, and means for forcing the dog into engagement with the abutment.

18. In a voting machine, the combination with the registers, of the actuators therefor serving to finally cause the actuation of their associated registers if they are moved more than a certain fraction of their intended stroke, interlocking mechanism to prevent the simultaneous operation of more than the desired number of registers and moving with the actuators and acting before the actuators have been moved said fraction, and means for moving the registers back if they are actuated less than half a unit, and forward if they are actuated more than said fraction and less than a whole unit, consisting of a dog engaging with the positioning abutments on the primary register wheel, and means for forcing the dog into engagement with the abutment when the registers are disengaged from the actuators.

19. In a voting machine, the combination with the registers, of the actuators therefor freely movable into and out of actuating position and serving to finally cause the actuation of their associated registers if they are moved more than a certain fraction of their intended stroke, interlocking mechanism to prevent the simultaneous operation of more than the desired number of registers and moving with the actuators and acting before the actuators have been moved said fraction, means for moving the registers back if they are actuated less than said fraction and forward if they are actuated more than said fraction and less than a whole unit, consisting of a dog engaging with the positioning abutments on the primary wheel, and means for forcing the dog into engagement with the abutment when the registers are disengaged from the actuators, means for moving the registers and actuators away from each other to disengage them, and means for returning the actuators to normal position when the registers and actuators are disengaged.

20. In a voting machine, the combination with the registers, of the actuators therefor freely movable into and out of engaging position and serving to finally cause the actuation of their associated registers if they are moved more than a certain fraction of their intended stroke, interlocking mechanism to prevent the simultaneous operation of more than the desired number of registers and moving with the actuators and acting before the actuators have been moved said fraction, means for moving the registers back if they are actuated less than said fraction and forward if they are actuated more than said fraction and less than a whole unit, consisting of a dog engaging with the positioning abutments on the primary wheel, and means for forcing the dog into engagement with the abutment when the registers are disengaged from the actuators. means for moving the registers away from the actuators to disengage them, and means for returning the actuators when the registers are moved.

In witness whereof, I have hereunto set my hand and affixed my seal, this 15th day of January, A. D. 1907.

JOHN HOWARD McELROY. [L. S.]

Witnesses:
M. S. REEDER,
JNO. G. ELLIOTT.