

G. STACY & G. A. JULIUS.
VOTING MACHINE.
APPLICATION FILED DEC. 26, 1906.

939,755.

Patented Nov. 9, 1909.
6 SHEETS—SHEET 1.

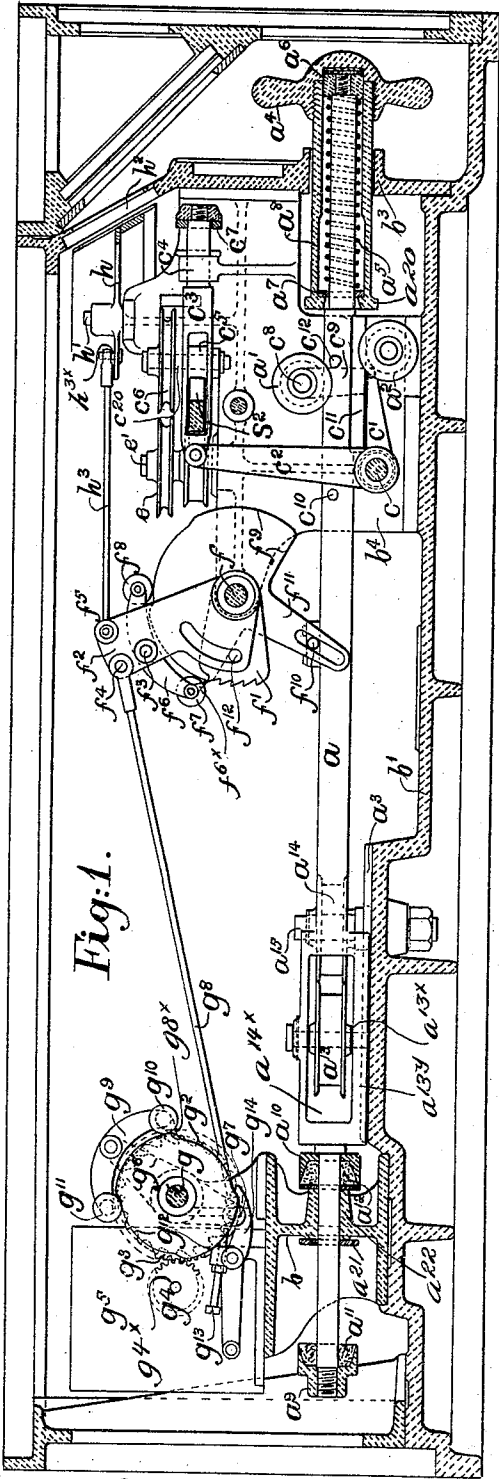


Fig. 1.

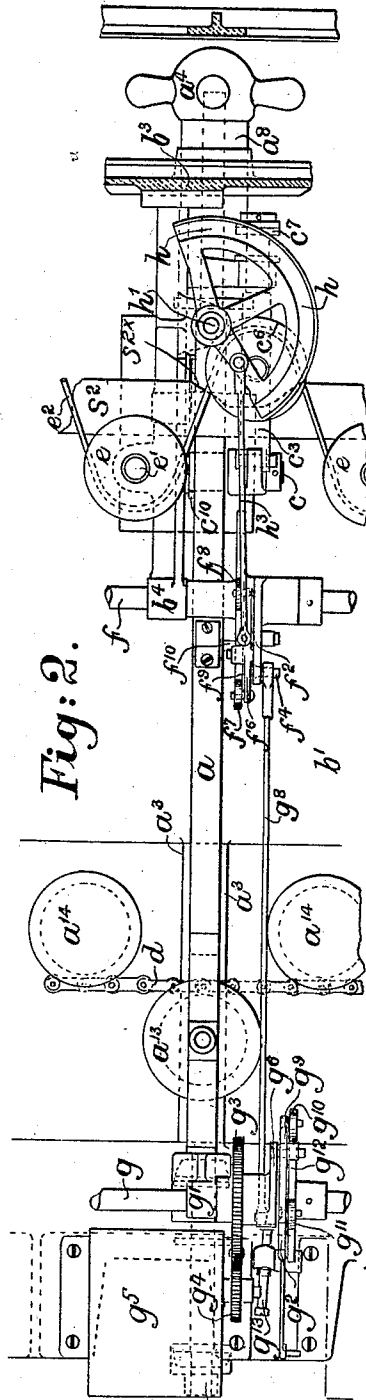


Fig. 2.

Witnesses
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5 SHEETS—SHEET 2.

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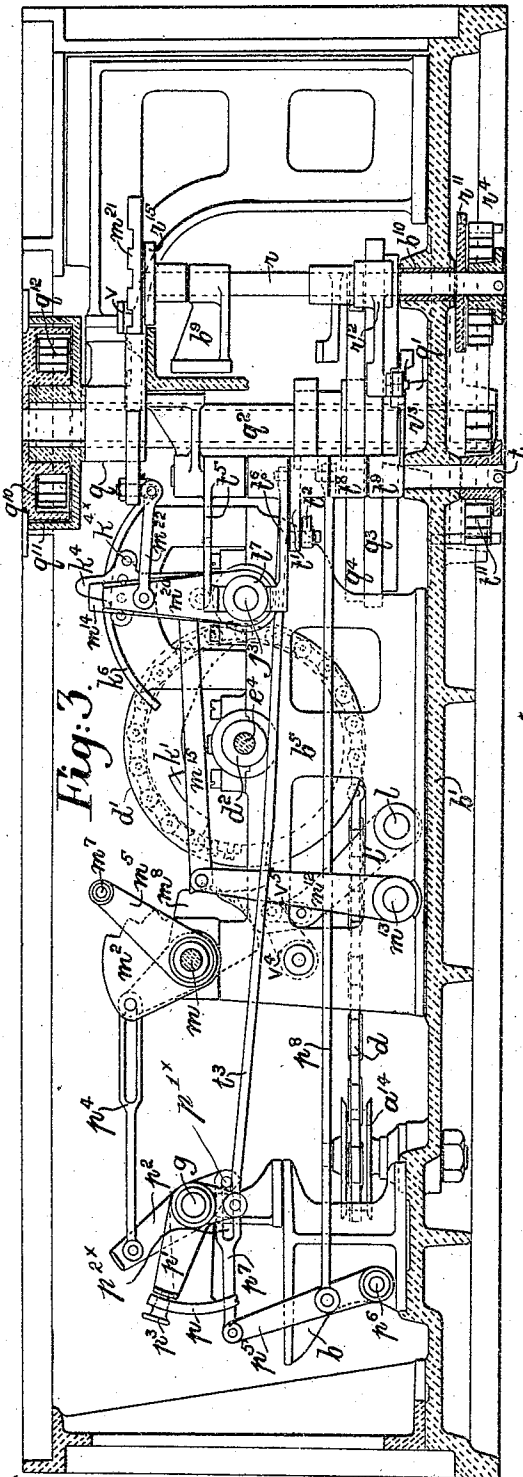


Fig. 3.

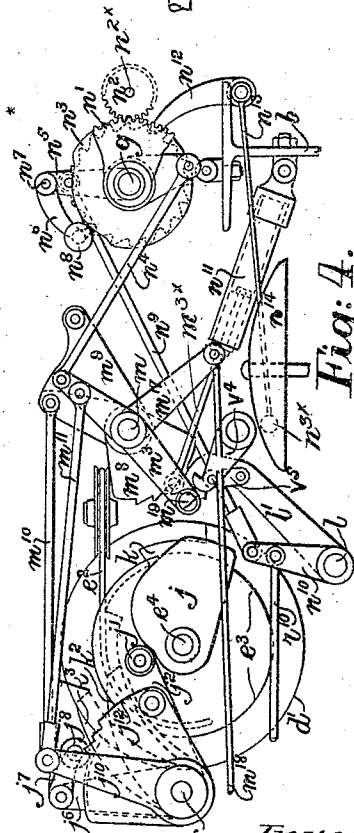
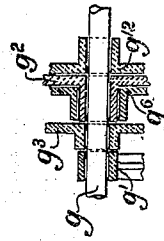


Fig. 4.



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5 SHEETS—SHEET 3.

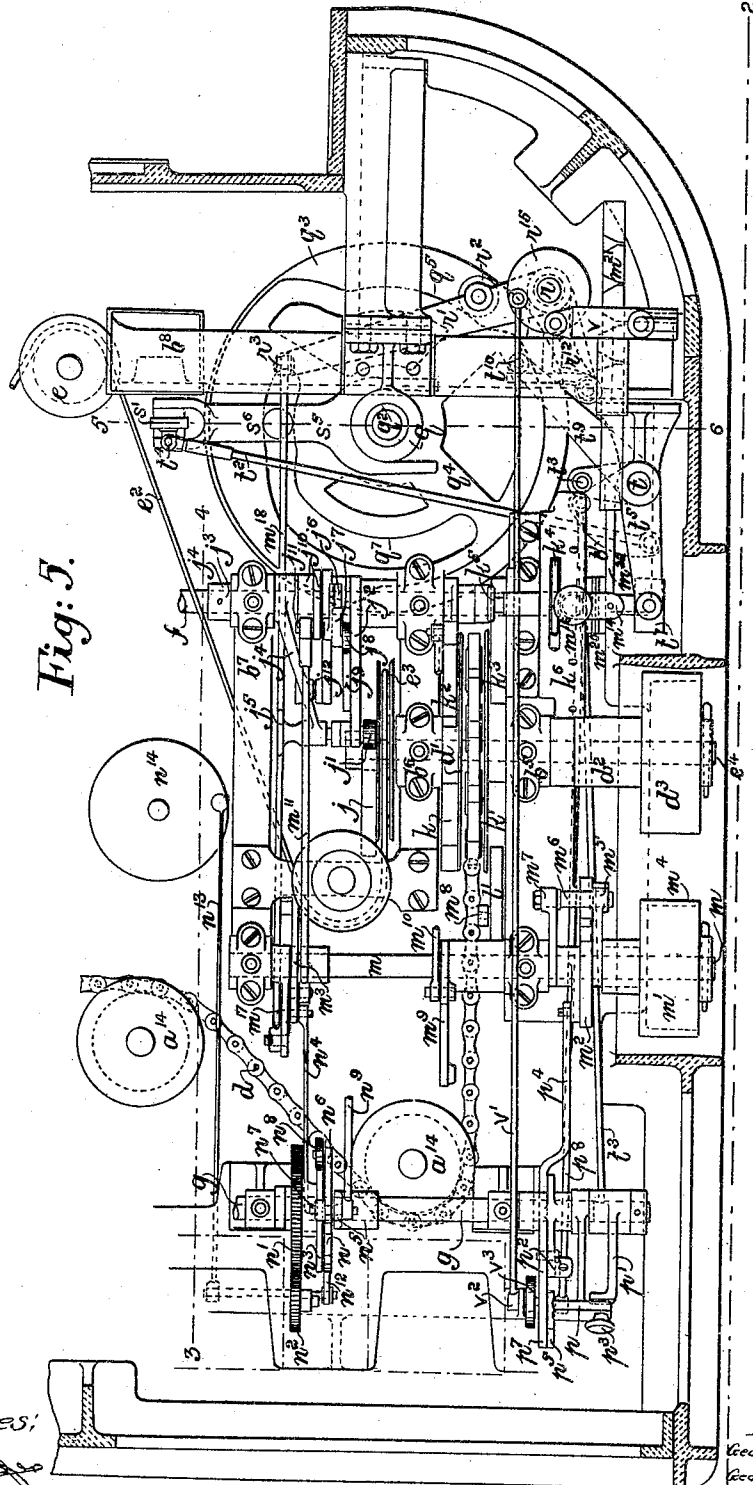


Fig. 3.

Witnesses:

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VOTING MACHINE.

APPLICATION FILED DEC. 28, 1906.

939,755.

Patented Nov. 9, 1909.

5 SHEETS—SHEET 4.

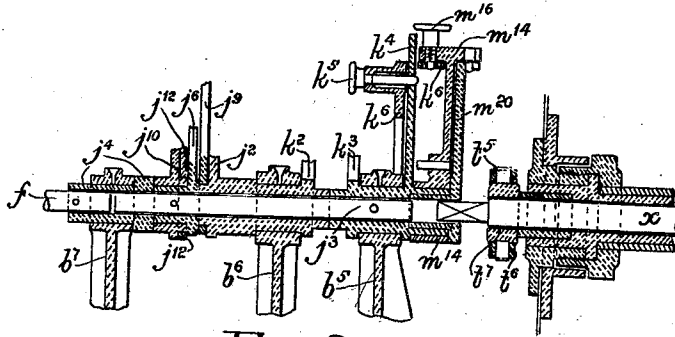


Fig. 8.

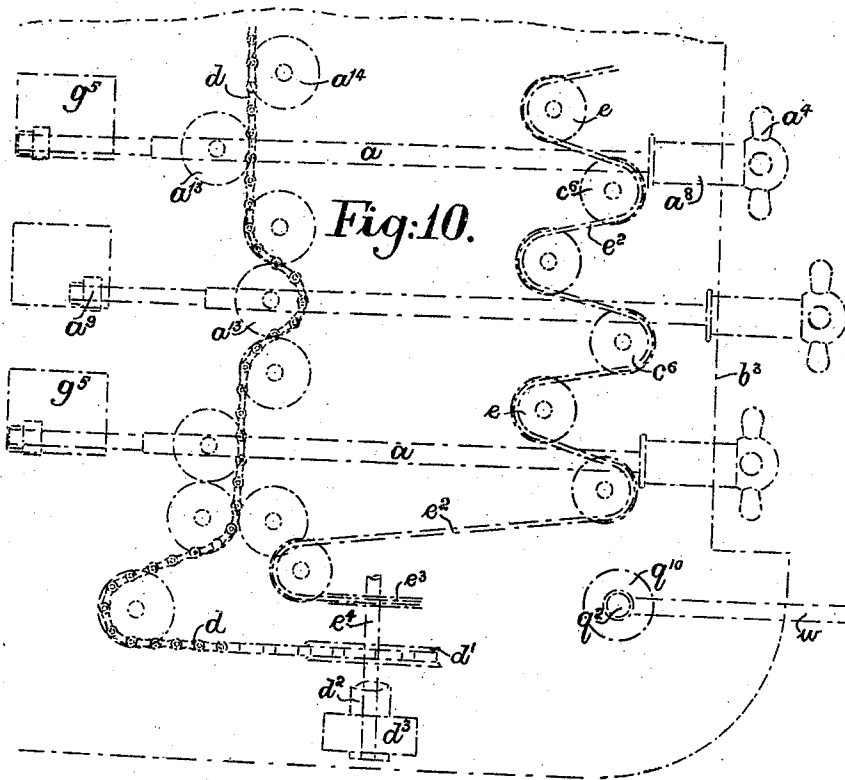


Fig. 10.

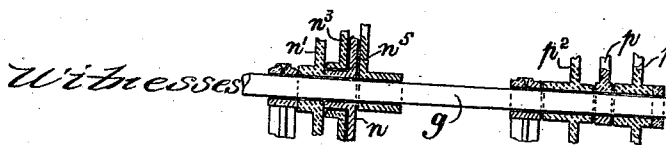


Fig. 9.

Witnesses

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5 SHEETS—SHEET 5.

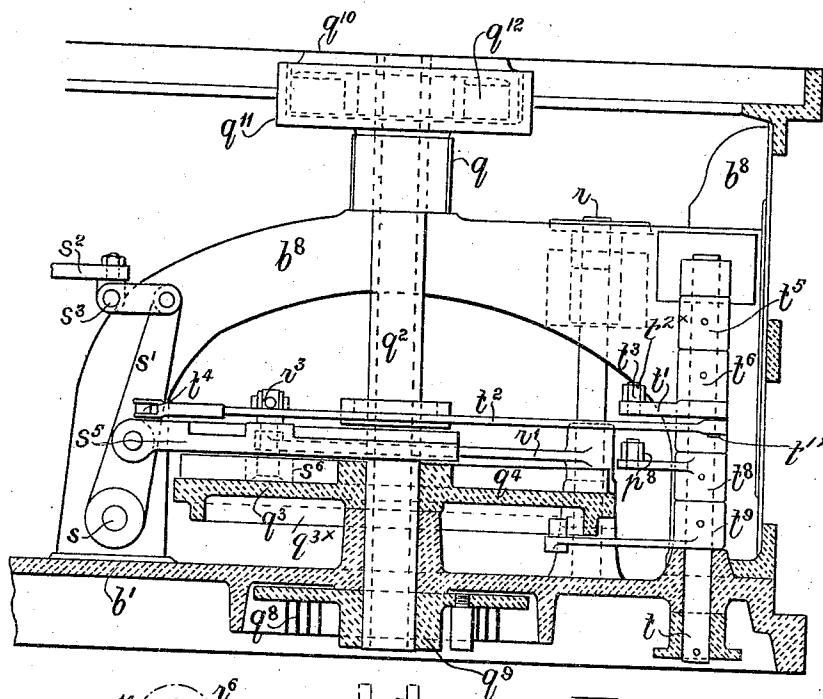


Fig. 11.

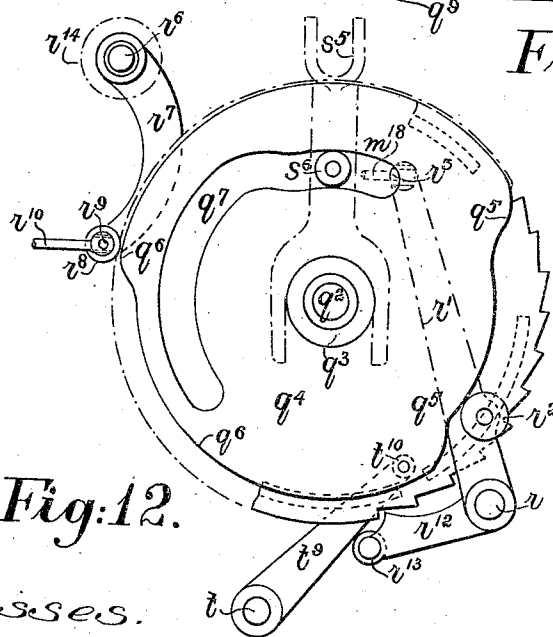


Fig. 12.

Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE STACY AND GEORGE ALFRED JULIUS, OF PERTH, WESTERN AUSTRALIA,
AUSTRALIA.

VOTING-MACHINE.

939,755.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed December 26, 1906. Serial No. 349,478.

To all whom it may concern:

Be it known that we, GEORGE STACY and GEORGE ALFRED JULIUS, citizens of Australia, and residing at Perth, Western Australia, (and whose post-office address is 23 Ventnor avenue, Perth, aforesaid,) have invented an Improved Voting-Machine, of which the following is a specification.

This invention relates to voting machines; and the object thereof is to provide a machine of such class having novel means for registering in an accurate, secret and reliable manner, direct, preferential, multiple or variable value votes.

A further object of the invention is to provide a machine of such class in a manner as hereinafter set forth whereby the manual operation thereof is reduced to a minimum, consequently preventing fraudulent operation and inaccuracies.

A further object of the invention is to provide a machine of such class with means whereby the vote registered is unidentifiable, consequently insuring absolute secrecy, and, owing to such arrangement no indication exists whereby it could be ascertained how an individual elector voted.

A further object of the invention is to provide a voting machine with novel means in a manner as hereinafter set forth as to enable a voter to express a first, second, and a third or further preference for any candidate, but the machine may be adapted to give a greater number of preferences for the voter by means of a multiple set of unit mechanisms without departing from the nature of the invention or altering its construction.

A further object of the invention is to provide the machine with means whereby illiterate persons may register votes without the assistance of any one at the polling booth.

A further object of the invention is to provide a machine having means whereby the arrangement of certain of the elements of the machine is such as to enable the blind voting, after being informed of the position of such elements by an officer in attendance at the polling booth.

A further object of the invention is to provide a machine of such class with adjustable means in a manner as hereinafter set forth whereby the voter is allowed to vote for one or any number of vacancies

and said means being furthermore adapted to prevent the registering of a complete vote unless the voter votes for the full number of vacancies.

A further object of the invention is to provide a machine of the class referred to with means in a manner as hereinafter set forth for recording the total number of complete votes cast and to provide the machine with means for registering the total number of incomplete votes, the means for registering the complete votes being independent of the means for registering the incomplete votes.

A further object of the invention is to provide a machine of such class with novel means for obtaining an absolutely reliable check upon the number of votes registered for individual candidates, the total number of informal votes cast and the total number of persons admitted to vote.

A further object of the invention is to provide in a machine of the class referred to novel means whereby it will be impossible for an officer in charge of the polling booth to alter the value of a vote other than votes of a variable value or multiple votes, and furthermore to provide the machine with means which will prevent the voter from altering the number of the vote to be cast.

A further object of the invention is to provide a machine of such class with means in a manner as hereinafter set forth for notifying an officer in attendance at the polling booth that an incomplete vote has been cast.

A further object of the invention is to provide a machine of such class with novel means in a manner as hereinafter set forth for indicating to the voter the value of the vote cast and for returning said indicating means to normal position to destroy the indication upon the voter leaving the booth so as to insure absolute secrecy.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the drawings wherein is shown the preferred construction of a voting machine in accordance with this invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, wherein like characters denote corresponding parts throughout the several views and in which—

Figure 1 is a sectional elevation of a machine in accordance with this invention; Fig. 2 is a plan, showing the arrangement of one of the voters-actuating pull bars; Fig. 3 is a sectional elevation; Fig. 4 is a similar view on line 3—4 of Fig. 5; Fig. 5 is a plan; Fig. 6 is a sectional detail of a portion of the counter selecting mechanism; Fig. 7 is a like view of a detail of the counter operating mechanism; Fig. 8 is a sectional view of the controlling mechanism; Fig. 9 is a sectional detail showing the incomplete and aggregate total gears carried by the spindle *g*; Fig. 10 is a diagrammatic view showing the bar arrester mechanism; Fig. 11 is an elevation of the gate-operated controlling mechanism; Fig. 12 is a plan of a portion of the gate-operated mechanism.

A voting machine in accordance with this invention embodies in its general organization one or more voter-actuating pull bars for throwing into operation certain mechanisms of the machine for the purpose of registering a vote or votes; a bar-locking mechanism; a counter selecting mechanism for controlling the number of votes to be registered on the actuation of a bar by the voter; a counter operating mechanism; an indicator mechanism for indicating to the individual voter the value of the vote cast by him; a controlling mechanism for preventing the registering of votes until the voter has complied with all requirements and for controlling the number of bars to be actuated by the voter; a registering mechanism for incomplete votes; an incomplete vote indicating mechanism; a gate operated controlling mechanism for the machine to prevent fraudulent voting; mechanism for releasing the gate from open position and for resetting the machine when the gate is moved to closed position; mechanism for operating the total counter; mechanism for preventing locking of certain mechanisms of the machine during the return of the pull bar or bars to normal position, and means for varying the value of a vote.

Voter actuating pull bar or bars.—The function of such bars, which are operated by the voter, is to throw into operation certain mechanisms of the machine to register a vote whether the vote be complete or incomplete. As shown, the machine is provided, by way of example, with three pull bars. This number can be increased or diminished. The pull bars are indicated by the reference character *a* and each of the bars is positioned between a pair of flanged guide rollers *a'* and *a''* at the front end of the machine. The rear of the pull bar *a* is

supported in the machine frame *b* at the back thereof. The bar *a* is prevented from turning by the guide strips *a'''*, positioned at each side of the bar *a*, and supported upon the base *b'* of the machine frame. Each of the bars *a* at the forward end thereof carries a handle *a¹* fixed to an inwardly extending sleeve *a²* which projects through an opening formed in the front *b³* of the machine frame. That portion of the bar *a* which is inclosed by the sleeve *a²* is surrounded by a compression spring *a³*. The forward end thereof bears against a fixed collar *a⁴* on the bar *a*, and its rear end abuts against an internal shoulder *a⁵* formed on the sleeve *a²*. The spring *a³* is set to such an initial tension that it will project the bar forwardly if the bar is free when the handle *a¹* is pulled; but if the bar *a* is locked in a manner as hereinafter described the spring *a³* is compressed when the handle is pulled until the flange *a²⁰*, formed on the inner end of the sleeve *a²* abuts against the inner face of the front *b³* of the machine frame. The interposition of the spring *a³* in a manner as stated overcomes any extensive strain being placed upon the mechanism when a pull bar is actuated. Each of the pull bars is provided upon its inner end with a pair of buffers to assist in cushioning the outward, as well as the inward, movement of the bar. One of the buffers is indicated by the reference character *a⁶* and is positioned upon the inner terminal of the rod, the buffer *a⁶* being arranged exteriorly of the back wall *b* of the machine frame and on the forward movement of the bar, is adapted to engage an abutment disk *a²¹*. The cushioning medium employed is cork or other suitable material, the cork being indicated by the reference character *a¹¹*. The other buffer is indicated by the reference character *a¹⁰* and is carried by the bar forwardly of the back wall *b* of the machine frame. On the rearward movement of the bar the buffer *a¹⁰* is adapted to engage a boss *a²²* formed on the inner face of the back wall *b*. The cushioning or shock-absorbing material forming a part of the buffer *a¹⁰* is indicated by the reference character *a¹²* and is of cork or other suitable material. The manner in which the pull bars are operatively connected with certain mechanisms of the machine so as to operate such mechanisms will be hereinafter referred to.

Bar locking mechanism.—The function of the bar-locking mechanism is to lock the bars when in initial or actuated positions. The said mechanism comprises a pin *c*, fixed in each bar frame *b⁴*, and, carried by the pin *c* is a stop arm *c'* and an operating lever *c²*. Attached to the upper end of the lever *c²* is one end of the slide frame *c³*, the other end of the frame *c³* being supported by a fixed guide *c⁴* which is

a part of the bar frame b^4 . Each of the slide frames c^3 carries a roller c^5 and a wheel c^6 , both of which are free to rotate about a vertically-extending axis c^{20} . The movement of the slide frame c^3 rearwardly is controlled by a stop c^7 carried on the forward end of the frame c^3 and adapted, during the rearward movement of the frame c^3 , to abut against the guide c^4 . The stop arm c' and lever c^2 are pivotally mounted upon the pin c and the said arm c' and lever c^2 are normally retained from movement upon the pin c through the medium of a locking lever c^9 which normally engages the stop arm c' . The lever c^9 is pivotally suspended from the pin c^8 upon which is journaled the flanged roller a' , the pin c^8 being connected to the bar frame b^4 . Projecting laterally from one side of the bar a is a trip pin c^{10} adapted to engage the lever c^9 , and, carried by and projecting from the under side of the pull bar a is a fixed steel strip c^{11} . From such construction it is evident that when the bar a is pulled forwardly the pin c^{10} will engage the lever c^9 and shift it clear of the stop arm c' . By this time the inner end of the fixed strip c^{11} is beyond the outer end of the stop arm c' . Therefore as the locking lever c^9 slides off the stop arm c' the slide frame c^3 moves rearwardly until the stop c^7 contacts with the guide c^4 , thus shifting the lever c^2 rearwardly and the free end of the arm c' upwardly. The free end of the stop arm c' is thus raised behind the inner end of the lock strip c^{11} , thereby preventing the return of the pull bar a when the handle is released. The bar a is held in its outward position until such time as the slide frame c^3 is pulled back into the position as shown in Fig. 1. Such action would depress the outer end of the arm c' which frees it from the strip c^{11} and allows the pull bar a to return to its normal position.

The position of the locking lever c^9 with respect to the position of the lock strip c^{11} carried by the bar 2 is such as not to release the end of the arm c' until the strip c^{11} is well past the free end of the arm c' , thus insuring the full upward travel of the free end of the arm c' when so released and thereby causing such engagement between the free end of the arm c' and the strip c^{11} as to render an effective lock between said parts. The arm c' is so positioned with respect to the strip c^{11} that the upper surface of the arm c' is arranged slightly below the lower surface of the strip c^{11} so that when the bar a is pulled outwardly there is no wear between the two surfaces. Projecting laterally from that side of the bar a from which the pin c^{10} projects is a trip pin c^{12} , said pin being arranged forwardly of the lever c^9 and the function of the pin c^{12} is to engage the lever c^9 on the rearward movement of the bar a so as to return the locking

lever c^9 to its initial position, so that the lower end of said lever c^9 will engage at its free end the upper face of the arm c' , thereby maintaining said arm in its locked position.

The reference character a^{13} denotes a tension-applying wheel which is journaled in the pull bar a upon a vertical axis a^{13x} , the pull bar a being enlarged as at a^{13y} , and such enlargement is provided with an opening a^{14x} in which is arranged the wheel a^{13} . There is a wheel a^{13} arranged in each of the pull bars, the wheel a^{13} being free to rotate upon its axis. At each side of each pull bar a is positioned a tension-applying wheel a^{14} which is free to rotate upon a vertically-extending pin a^{15} , the latter being fixed to the base b' of the machine frame. The wheels a^{14} are arranged forwardly of the wheels a^{13} . Traveling over and between the wheels a^{13} , a^{14} is a link chain d , more clearly shown in Fig. 10. One end of the chain d is fixedly secured to the base b' of the main frame, while the other end of said chain d is carried around and attached to a chain wheel d' , the latter being fixed to a rotatable spindle d^2 journaled in bearings b^6 , b^5 supported upon the base b' of the machine frame. A rotative spring d^3 is so connected to the chain wheel d' through the medium of the spindle d^2 as to maintain the tension in the chain d , thus always tending to keep it straight. When a bar a is pulled forwardly, the tension-applying wheel a^{13} is moved forward between a pair of wheels a^{14} , thereby forming a loop in the chain d and drawing up the free end of the chain. This rotates the chain wheel d' against the pull of the spring d^3 . As each pull bar a is moved forwardly, it rotates the chain wheel d' through a definite distance, but when the pull bars a are released by the withdrawal of the stop arm c' , the action of the spring d^3 tends to straighten the chain d , thereby assisting in returning the pull bars a to their initial position.

As heretofore pointed out, each slide frame c^3 carries a grooved wheel c^6 and arranged at each side of each slide frame c^3 is a grooved wheel e , rotatably mounted upon a vertically-extending pin e' fixed to the bar frame b^4 . The grooved wheel c^6 of one frame c^3 associates with the two grooved wheels e , which are positioned one at each side of the slide frame. The function of such arrangement will be presently referred to. A flexible wire or chain e^2 travels around the wheels e and c^6 in an alternate member, as clearly shown in Fig. 10. One end of the wire e^2 is fixed rigidly to the machine frame and the other end is attached to a grooved wheel e^3 fixed upon the spindle e^4 . The spindle e^4 is carried by and is free to rotate in the spindle d^2 of the chain wheel d' . As before stated, one end of the rotative spring

d^3 is attached to the spindle d^2 , thereby maintaining the tension upon the chain d . The other end of the spring d^3 is attached to the spindle e^4 in such a manner that constant tension is maintained upon the wire e^2 . Therefore, when any slide frame c^3 is released by the pulling out of a bar a the wire e^2 pulls the corresponding wheel c^6 , and hence the frame c^3 attached thereto, toward the fixed wheels c and thus locks the pull bar in the out position. As each frame c^3 is freed the wheel c^3 rotates through a fixed angle, thereby winding up the wire e^2 .

Counter selecting mechanism.—This mechanism is for controlling the number of votes to be registered on the actuation of a pull bar by a voter and comprises a spindle f , which is journaled to freely rotate in bearings on each bar frame b^4 . The spindle f extends at right angles with respect to the line of travel of the pull bars a and fixedly secured to said spindle above each pull bar, is a toothed segment f' and upon the boss of each segment f' is carried an arm f^2 which is free to rotate on the said boss and carries the pins f^3 , f^4 and f^5 . Loosely mounted upon the pin f^3 is a pawl f^6 which has the rollers f^7 and f^8 attached to the ends thereof. The pawl f^6 is formed with a nose f^{6x} which extends in the same vertical plane as the toothed segment f' . Mounted loosely upon the spindle f above each pull bar a is a cam disk f^9 . The rollers f^7 and f^8 bear upon the periphery of the cam disk f^9 . The latter is rotated about the spindle f through the medium of a pin f^{10} , which is rigidly attached to the top of a pull bar a and engages in a slotted arm f^{11} depending from the cam disk f^9 . When the pull bar a is in its initial position, if the spindle f is rotated, carrying with it the toothed segment f' , the arm f^2 is not shifted since the nose f^{6x} of the pawl f^6 is held clear of the toothed segment f' by means of the roller f^7 , which rests upon the high portion of the cam disk f^9 ; but if the pull bar a is drawn forwardly it rotates the cam disk f^9 and prior to the pull bar reaching its extreme outward position, the cam disk f^9 lifts the roller f^8 and at the same time allows the roller f^7 to move inwardly, thereby throwing the nose f^{6x} of the segment f' into engagement with whatever tooth of the segment f' the said nose may be opposite to. If then the spindle f is rotated the pawl f^6 and arm f^2 are turned to the same extent.

Operating mechanism for the counter.—Carried by the bearings g' , which are attached to the frame b is a spindle g , and opposite each pull bar a , is a ratchet wheel g^2 coupled rigidly to a gear wheel g^3 , the wheels g^2 and g^3 being carried by the spindle g , but free to revolve upon it. The toothed wheel g^3 gears with the toothed wheel g^4 carried by the spindle g^{4x} of a counter g^5 . Upon the common boss of the gear wheels

g^2 and g^3 is mounted a double-arm lever g^6 , the latter being free to revolve upon said boss. The lower arm of the lever g^6 carries a pin g^7 , to which is attached one end of a link g^8 , the other end of the link g^8 being connected to the pin f^4 upon the arm f^2 which is mounted upon the boss of the toothed segment f' , the latter being fixed to the spindle f . The upper arm of the lever g^6 is provided with a pawl g^9 , the latter carrying at each end a roller, the rollers being indicated by the reference characters g^{10} and g^{11} . The nose of the pawl g^9 is indicated by the reference character g^{9x} and lies in the vertical plane in which the ratchet wheel g^2 extends. Rigidly secured to the spindle g at one side of each toothed wheel g^2 is a cam disk g^{12} , the position of the disk being such that the rollers g^{10} and g^{11} will bear upon its periphery. When the disk g^{12} is in the position shown in Fig. 1 the nose g^{9x} of the pawl g^9 is held clear of the teeth of the ratchet wheel g^2 . If, therefore, the arm f^2 is rotated about the boss of the segment f' , it moves the lever g^6 about the boss of the wheels g^2 and g^3 by means of the link g^8 . The nose of the pawl g^9 is then drawn over one or more teeth of the ratchet wheel g^2 , but held entirely clear above such teeth through the medium of the roller g^{10} which bears on the periphery of the cam disk g^{12} . If, after the operation just mentioned, the spindle g is rotated, carrying with it the cam disk g^{12} , the roller g^{11} is lifted, thereby throwing the nose of the pawl g^9 into engagement with a tooth of the ratchet wheel g^2 and when this has occurred the return of the arm f^2 , and, therefore, that of the arm g^6 , to its initial position, moves the toothed wheel g^2 forward through one or more teeth, thereby operating the counter g^5 . If, however, the arm f^2 is returned to its initial position prior to the rotation of the shaft g , the pawl g^9 does not engage with the teeth of the ratchet g^2 and the counter is therefore not moved.

To limit the backward movement of the lever g^6 , the adjustable stop g^{13} is provided, the said stop being carried by the back wall b , and to prevent the backward movement of the ratchet wheel g^2 a pawl g^{14} is provided which is also carried by the back wall b . The pawl g^{14} prevents any backward movement of the ratchet wheel g^2 should the non-return movement in the counter fail to act. From the foregoing construction and arrangement of parts it is evident that the counter cannot be operated until the following movements have all taken place in the order here given:—

First.—The complete pulling forward of the pull bar a , thereby rotating the cam disk f^9 and engaging the nose of the pawl f^6 with the toothed segment f' .

Second.—A rotation of the shaft f which

is obtained in a manner as hereinafter described. The rotation of the shaft f will rotate the toothed segment f' which in turn will move the arm f^2 if the pull bar is out. The actuation of the arm f^2 shifts the lever g^6 and moves the pawl g^9 back over the teeth of the wheel g^2 .

Third.—The rotation of the shaft g , thereby causing the engaging of the nose of the pawl g^9 with the teeth of the wheel g^2 .

Fourth.—The return of the spindle f and toothed segment f' to its initial position which also returns the arm f^2 by means of the pin f^{12} which engages in the slot formed in the arm f^2 .

Fifth.—The simultaneous returning of the lever g^6 and pawl g^9 to normal position by the link g^8 and the rotation of the wheel g^2 in a forward manner, thereby operating the counter through the medium of the toothed wheels g^3 and g^4 .

Vote value indicating mechanism.—This mechanism is for indicating to the individual voter the value of the vote cast by him, and comprises an indicator element in the form of a wheel segment h , arranged at the forward portion of the machine frame and mounted upon a vertical pin h' secured to a bar frame b^4 . There is an indicator element for each pull bar a . A portion of the periphery of the segment h is, when said segment is shifted, visible to the voter through the glass window h^2 formed in the front wall of the machine frame. The segment h is coupled to the arm f^2 by the link h^3 . One end of the link h^3 is pivotally connected, as at h^{3x} to the segment h , while the other end of the link h^3 is loosely mounted upon the pin f^5 carried by the arm f^2 . By such arrangement it is evident that if the arm f^2 is actuated the segment h will be revolved about the pin h' . On the periphery of the wheel are arranged the figures 0, 1, 2, 3, etc. to indicate the value of the vote. When the arm f^2 is in normal position as shown in Figs. 1 and 2, the figure "0" is visible to the voter through the window h^2 . If the arm f^2 is rotated through the unit distance as hereinafter described, the rotation of the segment h renders a figure "1" visible. The next unit movement of the arm f^2 will cause the figure "2" to be visible through the window and so on. When the arm f^2 has returned to its normal position the segment h is also carried to such position and the figure "0" will again be visible through the opening h^3 .

Vote registering controlling mechanism.—This mechanism is adapted to control the operation of the machine to prevent the registering of votes until the voter has complied with all requirements, and to control the number of bars to be actuated by the voter, and comprises a snail cam j attached to and rotating with the wheel e^3 and upon the

cam j bears a roller j' which is carried by the arm j^2 . The snail cam j is so proportioned that equal angular movements of the wheel e^3 produce equal angular movements of the arm j^2 about the spindle j^3 upon which the arm j^2 is mounted. The spindle j^3 is co-axial with the spindle f , but not directly connected thereto. Whenever a pull bar is moved outwardly its corresponding slide frame c^3 in locking the bar out allows the spring d^3 to turn the wheel e^3 through a certain angle by letting out the wire or chain c^2 to a certain extent. The pulling out of each and every pull bar similarly allows a definite angular movement of the wheel e^3 which turns through an equal angle with each bar pulled out. Therefore, as each bar is pulled outwardly, the arm j^2 is also turned through a fixed angle, by means of the snail cam j and roller j' bearing thereon.

As shown in Fig. 5 an arm j^4 , which is carried in a bearing in the support b^7 co-axially with the spindle f and rigidly connected thereto, is caused to move with the arm j^2 through the medium of a thumb pin j^5 and by such an arrangement the spindle f is turned through a certain angle whenever a pull bar is drawn tight and then locked. This angle is termed the "unit angle" and is so arranged as to be exactly equal to the angular pitch of the teeth on the toothed segment j' . On each side of the chain wheel d' and rigidly attached thereto is a step cam k and k' , respectively, which rotate with the chain wheel d' whenever a pull bar is drawn out. A pair of pawls k^2 and k^3 is so arranged as to engage with the steps on the cams k and k' . The pawl k^3 is attached to the spindle j^3 and is controlled by the arm k^4 which can be locked in any one of four or more positions through the medium of a spring-controlled pin k^5 carried by a fixed quadrant k^6 on the support b^5 , the pin k^5 engaging in the arm k^4 , a plurality of openings k^{4x} being provided to receive the pin k^5 . When the arm k^4 is fixed in the first position the pawl k^3 is so situated as to engage with the first step of the cam k' . This will only allow the chain wheel d' to revolve through the angle required when one pull bar is drawn out. When the arm k^4 is fixed in the second position the pawl k^3 will engage with the second step of the cam k' , thus allowing the chain wheel d' to be rotated to such an extent as will permit two bars being drawn out. By initially setting the arm k^4 , and therefore the pawl k^3 , in the first, second, third or other position, the maximum number of pull bars to be operated can be absolutely controlled, the first position allowing one vote to be registered, the second two, the third three and so on.

The pawl k^2 is rigidly attached to the arm j^2 , the latter revolving freely upon the spindle

j^2 which is supported by a bearing in the frame b^6 . The pawl k^2 is so set relatively to the roller j' on the arm j^2 that it will engage with the first step on the cam k , when the wheel c^3 and the roller j' and arm j^2 are in the initial position—that is prior to the pulling out of the bar a . In such position the pawl k^2 will allow one movement of the chain wheel d , and, therefore will only allow one bar a to be pulled out at a time, but immediately when a bar a is pulled out, the arm j^2 is turned through a unit angle by the rotation of the wheel c^3 , as previously described, and this rotation is just sufficient to shift the pawl k^2 so that it will now engage with the second step of the cam k , thereby allowing a second bar to be pulled out, providing that the pawl k^3 is set to allow of more than one vote to be registered. On the complete pulling of the second bar, the pawl k^2 automatically lifts and allows for the polling of a third vote. The function of the pawl k^2 is to prevent the pulling of two handles simultaneously, which as will be hereinafter referred to, would vitiate the results registered in what may be termed the preferential system of voting, the arrangement being such that the pulling out of the first bar a frees the machine for the pulling out of another bar a , which when carried out, frees the machine for another, and so on, always provided, however, that the fixed pawl k^2 is set to allow the polling of additional votes.

Mounted in the supports b^5 and b^6 is the spindle l , which carries an arm l' having one end thereof so constructed that it can engage with the last step of the stepped cam k' when the pull bars a are all in, and when so engaged prevents the pulling of any bar a until a rotation of the shaft l moves the arm l' out of engagement with the cam k' in a manner as hereinafter referred to.

From the foregoing it is evident that the two pawls k^2 and k^3 , with their corresponding stepped cams k and k' and the arm l' , control every pull bar, no matter how many there may be, no other individual lock of any kind being necessary to prevent the pulling of any bar a . This insures great simplicity, easy maintenance and efficient operation.

Attached rigidly to the spindle j^3 is an arm j^6 carrying at its upper end a pawl j^7 . The arm j^6 is set, together with the pawl j^7 , for a definite number of votes through the medium of the arm k^4 and the pin k^5 . The pawl j^7 carries a roller j^8 which rests upon the periphery of a cam disk j^9 attached to and rotating with the arm j^2 . Upon the boss of the arm j^6 and free to revolve upon it is an arm j^{10} provided at its upper end with a pin j^{11} which connects to the arm j^{10} a toothed segment j^{12} . The position of the segment j^{12} with respect to the

nose of the pawl j^7 is such that the nose of the pawl j^7 engages with the teeth of the segment when so permitted by the roller j^8 .

Carried on bearings in the supports b^5 and b^7 is a spindle m , and rigidly attached thereto is one end of a rotative spring m' , a stepped cam m^2 and a double-arm lever m^3 . Loosely mounted upon the spindle m is a spring barrel m^4 to which the other end of the spring m' is attached and through the medium of the arm m^5 and bridge piece m^6 the spring barrel m^4 is coupled to the arm m^7 , and upon the boss of said arm m^7 is fixedly secured a segment m^8 and an arm m^9 . By such an arrangement the arm m^5 , bridge piece m^6 , arm m^7 , segment m^8 and arm m^9 are free to revolve with the spring barrel m^4 upon the spindle m .

A connecting link m^{10} rigidly couples the arm m^9 to a vertically-projecting arm on the pawl k^2 , hence the spring barrel m^4 , toothed segment m^8 , arm m^9 , pawl k^2 , arm j^2 and roller j' all move together. The direction of winding of spring m' with relation to the spring barrel m^4 is such that when so allowed, the roller j' always presses upon the periphery of the snail cam j attached to the wheel c^3 .

A connecting link m^{11} couples the upper arm of the lever m^3 to the upper end of the arm j^{10} which carries the toothed segment j^{12} . The spring m' being coupled to the spindle m , rotates such spindle, as well as shifts the arm j^{10} and segment j^{12} in a direction looking from the spring side when so allowed.

The general operation of the controlling mechanism is as follows:—It will be assumed that the machine is set to allow three candidates to be voted for by each voter. The lever k^4 and pawl k^3 attached thereto are set in the third position—that is, so that the end of the pawl k^3 will engage with the third step on the stepped cam k' . Prior to the pulling out of a bar a the spindle m is set back to its extreme position in a manner as to be hereinafter referred to. The setting back of the spindle m carries with it the arm j^{10} and the toothed segment j^{12} and these are retained in such position against the tension of the spring m' by means of the pawl j^7 upon the fixed arm j^6 which engages with the teeth in the segment j^{12} attached to the arm j^{10} . The first bar a is now pulled out, and as it is locked out, the wheel c^3 , and hence the arm j^2 with cam disk j^9 attached, rotates through a unit angle, and the pawl k^2 is simultaneously raised to allow the polling of the second vote. The second bar a is now pulled out, such action shifting the cam disk j^9 and pawl k^2 through a further unit angle and the machine freed for the polling of the third vote. When the third bar a is pulled out the third unit movement of the cam disk j^9 causes the raised portion of

the periphery of the cam j^2 to overtake the roller j^8 on the pawl j^7 , thereby lifting it. This raises the nose of the pawl out of engagement with the tooth on the segment j^{12} which immediately rotates about the spindle j^3 , being urged to do so by the spring m' through the spindle m , arm m^2 and coupling link m^{11} . The extent of the rotation of these last-named elements is governed by the stepped segment m^2 which is rigidly attached to the spindle m .

An arm m^{12} carried by the pin m^{13} , and which is mounted in the support b^5 , is set to engage with any step of the segment m^2 by means of the arm m^{14} and coupling link m^{15} , the arm m^{14} being set on the quadrant l^6 by the thumb pin m^{16} . As shown in Fig. 3, the arm m^{12} is adjusted to engage with the third step on the segment m^2 , which when it is free, will revolve clockwise until its third step rests upon the top end of the arm m^{12} .

The mechanism is so proportioned that the rotation of the segment m^2 to the first step will result in a rotation of the segment j^{12} about the spindle j^3 , through an angle equal to that previously defined as a unit angle when referring to the arm j^2 and spindle f . As set, therefore, the segment j^{12} will rotate through an angle equal to three unit angles.

From the foregoing it is apparent that unless a full number of bars a is pulled out corresponding with the number to which the machine is set, the cam disk j^9 will not overtake the roller j^8 , and therefore, the pawl j^7 will not be lifted and the segment j^{12} will not be released, and hence the spindle m and segment m^2 will not be rotated. It is this movement which discriminates between complete and incomplete voting in all such cases where a vote is incomplete unless the full number of vacancies is voted for.

Register mechanism for incomplete votes.—The function of this mechanism is to register an incomplete vote whenever the required number of candidates is not voted for and the said mechanism comprises a ratchet wheel n and a gear wheel n' , each of which is free to rotate upon the spindle g . The wheel n is combined with the wheel n' and upon the common boss thereof a cam disk n^3 is free to rotate. The gear wheel n' engages with a gear wheel n^2 fixed upon the shaft n^{2x} of the counter of the incomplete vote registering mechanism. The cam disk n^3 is connected to the upper end of the arm m^3 by a coupling link n^4 so that when the arm m^3 is shifted the cam disk n^2 is turned about the spindle g . The reference character n^5 denotes an arm carried loosely by the spindle g and which has attached to its upper end a pin n^7 on which is mounted a pawl n^6 . The nose of the pawl n^6 lies in the same vertical plane as

the ratchet wheel n and the pawl n^6 at its free end has attached thereto a roller n^8 which rests on the periphery of the cam disk n^3 . The arm n^5 is connected to an arm n^{10} fast upon the spindle l by a link n^9 . The spindle l is rotated in a manner as herein-after described whenever a voter leaves the machine. The spindle l is rotated through a small angle and carries with it the arm n^5 and pawl n^6 upon the spindle g .

If the voter leaves the machine without registering the required number of votes, the double-arm lever m^3 remains in a set position and the rotation of the shaft l shifts the arm n^5 by means of the link n^9 and thereby imparts an impulse to the ratchet wheel n so that said wheel will move a sufficient distance to actuate the spindle n^{2x} of the counter of the incomplete registering mechanism, and an incomplete vote is thus registered. But if the voter does register the requisite number of votes the spindle m is rotated by the spring m' , the latter being free to act owing to the lifting of the pawl j^7 out of engagement with the toothed segment j^{12} as previously described. This rotates the cam disk n^3 by means of the link n^4 , the pawl n^6 being then lifted out of engagement with the ratchet wheel n , since the roller n^8 now rests upon the high portion of the cam disk and consequently the pawl n^6 will not operate the ratchet wheel n so that the incomplete vote will not be registered. The machine further comprises an alarm mechanism for indicating to an officer in charge of the booth that an incomplete vote has been polled and such mechanism consists of a pawl n^{12} engaging with the wheel n and which when actuated, lifts an arm n^{13} carrying a hammer n^{13x} so that upon the return of the pawl n^{12} to normal the hammer n^{13x} will strike the bell n^{14} and indicate that an incomplete vote has been cast. The machine further comprises means whereby a too sudden rotation of the spindle m is prevented and such means consists of a dash pot n^{11} coupled to the portion b of the machine frame and connected to the lower arm of the lever m^3 through the medium of the link m^{3x} , as clearly shown in Fig. 4.

The spindle g is operated through the medium of an arm p rigidly attached thereto. The arm p may be coupled either to the arm p' or to the arm p^2 by means of a thumb pin p^3 . The upper end of the arm p^2 is connected to the pin on the stepped segment m^2 through the medium of the slotted link p^4 . When in the position shown in Fig. 3 the release of the spindle m and consequent clockwise rotation of the segment m^2 is transmitted to the arm p^2 through the link p^4 , the arm p^2 being thereby rotated about the spindle g which will then be actuated if the arm p is coupled to the arm p^2 , as is not the case shown in Fig. 3. The slot in the link p^4

allows the segment m^2 to be re-set, that is turned backward without the re-setting of the arm p^2 . A horizontally-extending pin p^6 is fixed in the wall b of the machine frame and upon said pin is pivoted a lever p^5 , the upper end of which is attached to a slotted link p^7 which engages with a pin p^{7x} upon the lower end of the arm p^2 . When in the position shown in Fig. 3 the arm p^2 is free to be rotated about the spindle g through the medium of the segment m^2 . The pin p^{7x} at the lower end of the arm p^2 slides in the slot p^{7x} . As previously pointed out the segment m^2 can be re-set without moving the arm p^2 , which can, however, when required, be itself re-set by rotating the lever p^5 about the pin p^6 . The actuation of the lever p^5 is effected by a coupling rod p^8 . The manner in which the latter is shifted will be hereinafter referred to.

Gate operated controlling mechanism.—The function of this mechanism is for controlling the machine to prevent fraudulent voting and for releasing the gate w from open position so that it can be closed. The said mechanism comprises a vertically-extending post q^2 upon which the voters' gate swings. The post q^2 is journaled in bearings g carried by a portion b^8 of the machine frame and the base b' of the frame. Fixed to the post q^2 and rotating with it is a disk q^3 which carries the main gate cam q^4 , the latter having three working surfaces q^5 , q^6 and q^7 , respectively. A vertical spindle r is mounted in bearings b^9 and b^{10} and rigidly attached to the spindle r is an arm r' carrying a roller r^2 intermediate its ends and having its free end provided with a swivel knuckle joint r^3 . The roller r^2 bears against the surface q^5 of the cam q^4 and is held up against said surface by the spring r^4 one end of which is rigidly attached to the spindle r thereby tending to rotate the spindle in such direction as to hold the roller r^2 against the periphery of the cam q^4 . Carried freely on the spindle m is an arm m^{17} which is coupled to the arm r' by the connecting link m^{18} attached to the swivel knuckle joint r^3 . From the foregoing it is evident that when the gate is opened the cam is rotated and during the movement of the cam q^4 the surface q^5 thereof when it reaches the roller r^2 shifts the arm r' . This in turn shifts the arm m^{17} about the spindle m and thereby re-sets the arm m^2 , and spindle m , if such should be required, by means of the pin m^{19} which is carried by the arm m^2 at its lower end and which bears against the edge of the arm m^{17} . When the voters' gate is again closed the cam q^4 is rotated back to its original position, thereby allowing the arm r' , connecting link m^{18} and arm m^{17} to be returned to their initial positions by means of the spring r^4 ; but as previously described the arm m^2 and spindle m are held set by the

pawl j^7 and link m^{11} until released by the pulling outward of the required number of bars a .

Projecting upwardly from the base b' of the machine frame is a spindle r^6 which has attached to its upper end a curvilinear arm r^7 , the arm r^7 being shaped so as to clear the support b^7 . The free end of the arm r^7 is provided with a roller r^8 and a swivel knuckle joint r^9 . The roller r^8 bears against the surface q^6 of the cam q^4 and is pressed against such surface by a spring r^{11} attached rigidly to the lower end of the spindle r^6 . A coupling link r^{10} connects the arm r^7 through the swivel joint r^9 to the arm r^{10} which is rigidly attached to the spindle l as heretofore pointed out. It is evident, therefore, that when the voters' gate is opened the cam q^4 is rotated, thereby allowing the spring r^{11} to rotate the arm r^7 as the raised portion of the surface q^6 is withdrawn from the roller r^8 . The shifting of the arm r^7 rotates the spindle l by means of the link r^{10} thereby operating the locking arm l' and also the incomplete vote-counting mechanism.

Supported upon the portion b^8 of the machine frame near the base b' is a stud s carrying a vertically-extending arm s' , the latter being coupled at its upper end through the medium of a link s^3 to a slide bar s^2 . The slide bar s^2 is threaded through the slide frame c^3 for each pull bar a , and bears against roller c^5 carried by each slide frame c^3 . When in the position shown in Fig. 2, the gaps in the slide bar s^2 will allow any or all of the frames c^3 to move forward upon the drawing of corresponding pull bars a , the position of the slide bar s^2 being that as shown in Fig. 2 when the voters' gate is closed. Attached to the arm s' is a slide bar s^5 carrying a roller s^6 which works in the cam slot q^7 formed in the cam q^4 . The inner end of the slide arm s^5 is guided by the boss of the disk q^3 , and as the voters' gate is opened after a voter has registered a vote, the consequent rotation of the gate cam q^4 during a certain period of its revolution, moves the slide arm s^5 by means of the roller s^6 bearing against the walls of the cam slot q^7 of the cam q^4 . The slide bar s^2 is thereby moved through the frame c^3 , any of the latter that may previously have been released being thereby returned to the out position, then being coupled by the wedged surfaces s^{2x} on the slide bar s^2 engaging with the roller c^5 on each frame c^3 .

Loosely mounted upon a vertically-extending spindle t secured in the base b' of the machine is a quadrant t' provided with a pair of pins, one of which is indicated by the reference character t^x , and has attached thereto one end of a link t^2 . The other end of the link t^2 is connected to the arm s' by means of the swivel knuckle joint t^4 . The

other pin carried by the quadrant t' is indicated by the reference character t^{2x} and is attached by the link t^3 to the lower arm of the lever p' mounted on the spindle g . By such arrangement it is evident that when the voters' gate is opened the movement of the arm s' shifts the quadrant t' about the spindle t thereby actuating the arm p' about the spindle g and with it also the arm p and spindle g coupled thereto, if the thumb pin p^3 is in the position shown in Figs. 3 and 5, that is coupling the arms p' and p . When the thumb pin is so placed as to couple the arm p to the arm p^2 the movement of the lever p' that accompanies the opening of the gate is inoperative, that is, it does not rotate the spindle g .

The relative position of the cam surfaces q^5 , q^6 and q^7 upon the disk q^4 and the roller operated by such surfaces, are such that the opening of the voters' gate produces the various movements in the following order:—

First.—A rotation of about 15° causes the operation of the arm r^7 and roller r^8 upon the surface q^6 thereby rotating the spindle l and operating the incomplete counter gear and the main bar lock lever l' .

Second.—A subsequent rotation of about 25° operates the slide arm s^5 and the arm s' as well as the slide bar s^2 , thereby re-setting any of the slide frames c^3 which require re-setting and furthermore rotating the lever p' about the spindle g .

Third.—A further rotation of 15° operates the arm r' by means of the roller r^2 on the cam surface q^5 , thereby actuating the arm m^{17} about the spindle m and thus re-setting the arm m^3 and the spindle m whenever a complete vote has been cast.

Fourth.—Any further movement of the gate is inoperative so far as the various cams are concerned; but the machine is so set relative to the walls of the polling booth that sufficient width is not available between the end of the gate and the wall of the booth to allow a person to pass out until the gate has rotated 55° required to operate the machine. By suitably placing the cam surfaces on the cam q^4 the minimum gate opening can be made larger or smaller as desired.

The machine further comprises a mechanism to prevent a person after casting a vote from opening the gate for the purpose of re-setting the machine so as to cast a fraudulent vote. Such mechanism comprises a disk r^{11} rotating freely upon the spindle r , and the boss of which passes through a bearing b^{10} and carries at its upper end a pawl r^{12} which engages with ratchet teeth cut in the periphery of the gate disk q^3 . The outer end of the spring r^4 is attached to a pin on the disk r^{11} thereby holding the point of the pawl r^{12} in engagement with the teeth of the disk q^3 . The ratchet teeth have an

angular pitch of about 8° and the direction of the teeth is such that as the voters' gate is opened, thereby rotating the gate disk q^3 , this disk is prevented from returning, until the pawl r^{12} is lifted out of engagement. A heavy spring q^8 attached to the gate post q^2 by the disk q^9 is so set that it will return the gate post and hence the gate to the closed position when the pawl r^{12} is drawn out of engagement with the ratchet teeth on the disk q^3 . In the position shown in Fig. 5, that is with the gate closed, and the gate cam disk also in the corresponding position, a projection on the outer spring barrel q^{11} engages with the inner spring barrel q^{10} in such a manner that as the gate is opened the post q^2 and disk and cam attached thereto are forcibly rotated. If, however, the gate is again closed by the voter, the inner barrel q^{10} is rotated free from the outer barrel q^{11} and the gate post q^2 is prevented from following, by the engagement of the pawl r^{12} with the teeth formed on the disk q^3 . A spring q^{12} couples the inner and outer spring barrels q^{10} and q^{11} in such a manner that the gate always tends to occupy a position corresponding with the position of the gate post and disk, except when pulled back out of such position. The function of the spring and the spring barrels is to prevent a voter straining the gate post by closing the gate when not permitted by an officer in charge at the booth and the manner in which the closing of the gate is permitted by such officer will be hereinafter referred to.

Controlling mechanism for opening and closing the gate.—This mechanism comprises arms t^5 and t^6 fixed to the spindle t and having bosses on the outer ends thereof in which are arranged trunnions carrying a freely rotatable sleeve t^7 . The spindle t has also fixedly secured thereto an arm t^8 having the outer end thereof provided with a pin to which is attached a link p^8 , the latter being connected to the lever p^5 on the frame b . Fixedly attached to the spindle t is an arm t^9 which extends underneath the gate disk q^3 and carries at its outer end a roller t^{10} . The spring t^{11} is attached to the spindle t and the function thereof tends to rotate said spindle. The roller t^{10} of the arm t^9 lies inside an annular ring q^{3x} which projects from the lower face of the gate disk q^3 . The ring q^{3x} is formed with a pair of gaps each of which when it comes opposite the roller t^{10} will allow it, and the arm t^9 , to be moved outward, the roller t^{10} passing through the gap until it lies outside of the ring q^{3x} . The gaps in the ring q^{3x} are so located that one comes opposite the roller t^{10} when the gate is fully closed, and the other when the gate has been opened to the extent required to perform the registering and re-setting operations previously de-

scribed. Bearing against the side or edge of the arm t^9 is a roller r^{13} carried by a pin at the end of the pawl r^{12} , and these parts are so proportioned that when the roller t^9 5 on the arm t^9 lies inside of the annular ring q^{3x} the pawl r^{12} will engage with the teeth formed in the periphery of the disk q^3 ; but when the spindle t is rotated, bringing the roller t^9 outside of the ring q^{3x} , then the 10 pawl r^{12} is held out of engagement with the teeth on the disk q^3 .

The operation of the foregoing arrangement of parts is as follows:—It will be assumed that the gate is fully opened, after a 15 voter has left the machine. Then if the pivoted sleeve t^7 is pressed horizontally toward the machine in a manner to be hereinafter described, the spindle t is rotated in a clockwise direction. This brings the roller t^9 20 to the outside of the annular ring on the disk q^3 , through the wide gap and lifts the pawl r^{12} out of engagement with the teeth on the disk q^3 thereby allowing the gate to be closed by the spring q^8 . As it closes, the rotation 25 of the disk q^3 brings the annular ring inside of the roller t^9 , thereby preventing the return of that roller and therefore of the pawl r^{12} and spindle t to their initial positions until the gate is fully closed; then the 30 springs t^{11} and r^4 return the spindle t and pawl r^{12} to their normal positions, being allowed to do so by the roller t^9 passing through the narrow gap in the annular ring to the inside position. The rotation of the 35 spindle t by pressing inward of the sleeve t^7 , also pulls the connecting link p^8 , thereby rotating the arm p^5 about the pin p^6 and thus through the slotted link p^1 , re-setting the arm b^7 about the spindle g as previously described. 40

From the foregoing it will be seen that;

First.—After a voter has pulled a bar or bars a , and starts to leave the booth the gate is immediately opened to a very small extent. The pawl r^{12} engages with the tooth 45 on the disk q^3 and prevents backward rotation of the disk, although the gate may again be pulled shut by the voter.

Second.—When the gate starts to open the 50 narrow gap in the annular ring on the disk q^3 moves past the roller t^9 , thereby locking the roller and the spindle t in the inner position; and until the gate has been fully opened, it is impossible to move the 55 spindle t by pressure on the sleeve t^7 , and therefore the pawl r^{12} cannot be lifted out of engagement with the teeth on the periphery of the disk q^3 . This insures the complete opening of the gate and thereby the 60 complete registering and resetting of the machine, but the gate can be again freed to close after another incoming voter.

Third.—After the gate has been fully opened and the sleeve t^7 pressed, thereby

bringing the roller t^9 to the outside position, lifting the pawl r^{12} , and thus allowing the gate to close again behind another voter, the rotation of the disk q^3 brings the annular ring inside of the roller t^9 , thus holding the 70 roller in the out position and thereby holding the pawl r^{12} out of engagement with the teeth on the disk q^3 until the gate is fully closed. This prevents the gate from being checked before it is completely closed and furthermore insures a perfect unlocking of 75 the mechanism for the incoming voter.

As previously described the rotation of the spindle m and the parts attached thereto, is limited by the arm m^{12} , the point of which engages with the step on the stepped segment m^2 , the position of the arm m^{12} being 80 determined by the position of the arm m^{14} , which can either be locked in one of certain positions to the quadrant l^6 by means of the thumb pin m^{16} or can be locked by means of 85 the same thumb pin m^{16} to the free arm m^{20} , which rotates about the same center as the arm m^{14} , but is not attached thereto other than by the thumb pin m^{16} .

Sliding in a fixed bearing on the portion 90 b^8 of the machine frame is the bar m^{21} , which is attached to the arm m^{20} by a link m^{22} in such a manner that when the arm m^{20} is rotated the bar m^{21} slides horizontally in its bearing. When the bar m^{21} is locked the 95 arm m^{20} cannot be moved. Attached to the upper end of the spindle r and rotating with it is a disk r^{15} to which is attached one end of a locking bar v a projection upon the under side of which engages with triangular 100 notches cut in the surface of the bar m^{21} . When the voters' gate is closed the arm r' is in the "in" position shown in Fig. 12 and in that position the locking bar v is held in engagement with the slide bar m^{21} , thereby 105 preventing such bar m^{21} from being moved, thus locking the arm m^{20} and also the arms m^{14} and m^{12} if attached thereto. But when the voters' gate is opened the arm r' is rotated in a clockwise direction previously described thereby rotating the disk r^{15} and 110 drawing the lock bar v out of engagement with the notches in the bar m^{21} , thus freeing that bar and all the elements attached thereto. The arm m^{20} can then be set in any desired 115 position and when the gate is again closed the arm m^{20} is locked in that position and cannot be moved until the gate is opened.

Mechanism for operating the total counter.—This mechanism comprises a pin 120 carried by the disk r^{15} and to which is attached a connecting link v' , the other end of the link v' being connected to an arm v^2 carrying a pawl v^3 . The latter engages with a 125 toothed ratchet wheel attached to the spindle of the total counter. Whenever the voters' gate is closed after an ingoing voter

the consequent rotation of the spindle r and disk r^{15} moves the unit wheel of the total counter forward one division, thus registering the number of votes cast. As the voter leaves the machine, the rotation of the disk r^{15} draws the pawl v^3 back into the initial position, so that the mechanism is set for the incoming voter.

The machine further comprises a mechanism for preventing the locking of certain mechanisms of the machine during the return of the pull bars to normal position after a vote has been registered. Said mechanism embodies an arm v^4 having a tooth adapted to engage with the teeth on the segment m^8 . The toothed arm v^4 is withdrawn when the pull bars are returned to the in position by means of the toggle connection v^5 to the lever l' . When the toothed segment m^8 is locked the link m^{10} , pawl k^2 , arm j^2 and other elements attached thereto are locked until the pull bars are shifted to their initial positions.

The mechanism operated by an officer in charge of the booth to allow of the closing of the gate comprises a flexible shaft x which will transmit both a thrust and a turning movement. The operating handle of the shaft would be located on the officer's table or other convenient place within reach in such a manner that, when a thrust is given, the movement is transmitted through the flexible shaft x to the sleeve t^7 carried by the arms t^5 and t^6 on the spindle t ; and when a turning movement is made the arm m^{20} is rotated. The extent of the turning movement is shown by a pointer on a dial attached to the handle of the flexible shaft x and the thrust and turning movements are so interlocked that having once pushed the sleeve t^7 inward, no turning movement is possible until the said sleeve is again returned to its out position.

The means whereby the value of the vote can when registered, be varied by the officer in charge of the booth comprises the flexible shaft or spindle x having the squared end thereof engaging in arm m^{20} so that when the spindle x is rotated motion is transmitted to arm m^{14} by pin m^{16} , therefrom to arm m^{12} through link m^{15} , thus determining the extent of rotation of the spindle m by its engagement with the stepped segment m^2 .

The operation of the machine will be set forth in connection with the registering of one vote having a unit value, the casting of two votes each having a unit value, the casting of one vote having a variable value and preferential vote.

The operation of the machine in connection with the casting of one vote having a unit value.—It will be assumed that the spindle f is coupled to the toothed segment j^{12} and therefore to arm j^{10} , thence through

link m^{11} , arm m^3 , spindle m , to stepped segment m^2 and spring m' ; arm p' coupled to arm p and therefore to spindle g ; arm m^{14} locked at quadrant k^3 in first position so that arm m^{12} will engage with the first step on the segment m^2 ; arm k^4 held by pin k^5 , thereby retaining pawl k^3 and arm k^6 in the first position, *i. e.* so that pawl k^3 engages with the first step on the cam k' and therefore allows one vote only. It will be assumed that a voter has just left the machine and another is about to enter to cast his vote. The officer in charge of the booth presses the sleeve t^7 inwardly through the medium of the spindle x , thereby rotating the spindle t and bringing the arm t^9 and roller t^{10} outward through the gap in the annular ring on disk q^3 , thus lifting the pawl r^{12} and allowing the gate to be closed by the spring q^8 . As the gate closes the arm r^7 first returns to its in position, the arm s' is drawn inward, thus withdrawing the bar s^2 and simultaneously rotating the quadrant t' on the spindle t , thus rotating the spindle g by means of the connecting link t^3 , arm p' and arm p . This rotation of the spindle g brings the cam disk q^{12} into such position that the pawls q^9 are held out of engagement with the ratchet wheels q^2 . Finally just before the gate closes, the arm r^7 is operated by the cam surface q^6 thereby rotating the spindle l and thus withdrawing the arm l' out of engagement with the stepped segment k' and unlocking the pull bars. The voter can now pull one bar a out. When the bar a is locked out it causes the rotation of the wheel e^3 through a unit distance thereby lifting the arm j^2 and freeing the segment j^{12} and arm j^{10} since the arm j^6 is set in the first position. The spring m' then rotates the spindle m through a unit angle since the segment m^2 comes into contact with the arm m^{12} . The rotation of the spindle m shifts the arm j^{10} through the medium of the arm m^3 and link m^{11} . The spindle f is thus rotated through a unit angle since it is coupled to the arms j^{12} and j^{10} . The rotation of the spindle f actuates the arm f^2 which corresponds with the pull bar which has been turned out as previously described. Therefore by means of the link q^8 the corresponding pawl q^9 is drawn back over one tooth of the ratchet wheel q^2 and also the wheel segment h is shifted by the link k^3 thereby exposing the indicating number "1" to the voter through the window. It being impossible to draw out a second pull bar, the voter leaves the machine and as he opens the gate the following operations take place:

The rotation of the gate first allows the return of the arm r^7 thereby throwing the arm l' against the periphery of the segment k' . The arm s' is next moved outward thereby sliding the bar s^2 through the frame

c^3 , thus withdrawing the particular frame c^3 which corresponds to the pull bar that has been drawn out and allows that bar to be returned to its initial position by the chain d and chain wheels d' and spring d^3 . When the chain wheel d' is back to its initial position the arm l' springs into place and locks chain wheel d' so that the pull bar cannot be drawn out. The movement of the arm s' also rotates the spindle g by means of the link t^2 , loose quadrant t' , link t^3 , arm p' and arm p . Such rotation of the spindle g throws the pawls g^3 into engagement with the wheels g^2 . A further opening of the gate shifts the arm r' thereby re-setting the arm m^3 and spindle m by means of the link m^{18} and arm m^{17} as previously described. Such action shifts the arm j^{10} and segment j^{12} back, thereby returning the spindle f to its initial position and this also returns the arm f^2 corresponding with the bar a that has been pulled and hence also shifts the arm g^6 coupled thereto, which in turn moves the corresponding counter forward one unit by means of the pawl g^9 and wheels g^2 , g^3 and g^4 , and thus registers the vote. The machine is now in the same condition as it was when the voter entered and is then set ready for the next voter.

The operation of the machine when casting two votes each having a unit value as follows:—The machine is set in the same manner as that referred to in connection with the casting of a single vote, except that the pin h^5 is set to hold the arm h , and hence the pawl h^3 and arm j^6 are moved to the second position, thus allowing the pull bars to be drawn out and registering an incomplete vote if the voter leaves the machine without pulling two bars. In such case since the arm j^6 is not released until both bars have been pulled out, the spindle f is not rotated and therefore no indication shows in the front of the machine until the full voting power has been exercised. When both bars have been pulled out a number indicating "1" shows above each of the two bars. Similarly the mechanism may be set for allowing three, four or more to be voted for out of any number of candidates. By such an arrangement failure to exercise the full voting power results in the registering of an informal vote since, unless the required number of pull bars is drawn out in each case, the arm j^6 is not released. In such cases, therefore, nothing is registered by the bars that may have been drawn out. In certain places failure to exercise the full voting power does not render the incomplete vote legally informal and in such cases the machine can be so set that for each bar pulled the vote is registered whether the whole number of pull bars are pulled or not.

The operation of the machine in connec-

tion with the casting of a vote having a variable value.—The machine is set in the same manner as that referred to for the casting of a single vote having a unit value with the exception that the thumb pin m^{16} is set so as to couple the arms m^{20} and m^{14} . The officer in charge of the booth by means of the flexible shaft x , the squared end of which fits the opening in the boss of the arm m^{20} , can therefore set the arms m^{20} and m^{14} , and consequently the arm m^{12} in any position, thus allowing the segment m^2 and spindle m to be rotated to any desired extent and thereby give each vote a value of 1, 2, 3 or 4, as required. To prevent fraud on the part of the officer in charge of the polling booth, the setting of the arm m^{20} by the rotation of the flexible shaft can only be performed prior to the freeing of the gate after the entering voter. Thus, if a voter is entitled to a vote having a value of 3, the officer in charge of the polling booth sets his handle to "3" in the presence of the voter and the examiners at the booth and thus frees the gate by pressing the sleeve t' inwardly through the medium of the flexible shaft x . By moving the sleeve t' in the manner as stated it locks the shaft x from turning in its handle and thereby prevents alteration of the vote value while the voter is in the voting booth. Further as the gate closes the rotation of the spindle r centers and locks the bar m^{21} in its proper position by means of the lock bar v and its wedge-shaped projection. Unless the gate is again opened it is not possible for the officer in charge of the booth to alter the voting value, and furthermore the voter by means of the windows h^2 in the front of the machine, is able to see the value of the vote registered, thus checking the setting of the machine. The arm m^{11} with locking bars m^{21} and v are required only in those systems of voting in which the voting value of a voter is variable.

The operation of the machine as applied to preferential voting.—In this connection one candidate is to be elected of a number standing and a voter is allowed to express, say by way of example three preferences, which would be registered as follows: The first preference is determined by the first handle pulled out and will receive a vote having a value of "3", a second preference on the second bar being pulled at a value of "2", and the third preference on the third bar pulled at a value of "1". Having pulled out the three bars it is impossible to draw out any other and failure to pull the required number of handles in this case thus registers an incomplete vote and does not add anything to any candidate's total. The machine is set as follows: A thumb pin j^5 in the outer opening of arm j^4 , couples the spindle f to the cam roller j^2 and thereby

also to the pawl k^2 . The thumb pin is so set that the arm p^2 is coupled to the arm p and thereby to the spindle g . The thumb pin m^{10} is so set as to lock the arm m^{14} in the last position of the quadrant k^6 thereby allowing the stepped segment m^2 to be rotated to the maximum angle and the spring pin k^5 is set to hold the arm k^4 and which retains the pawl k^3 and arm j^5 in the required position to allow the necessary number of preferences, *i. e.* in the third opening to meet the example above quoted for three preferences—that is to say to allow only three bars a to be pulled outwardly. It will be assumed that a voter has just left the machine and that another is about to enter in order to cast his vote. The officer in charge of the booth frees the gate w by pressing the sleeve t^7 inwardly thereby rotating the spindle t . In addition to the operation before described as accompanying the rotation of the spindle t the spindle g is simultaneously rotated by means of the arm t^8 , link p^8 , arm p^5 , slotted link p^4 , arm p' and arm p . This rotation of the spindle g lifts all the operating pawls g^9 out of engagement with the corresponding ratchet wheels g^2 by means of the cam disk g^{12} . The movements of the arms s' , v' and v^7 occur in the same manner as that set forth in connection with the operation of the machine when casting a single vote and during the closing of the gate. The voter now exercises a first preference by pulling the first bar a . As the bar a is pulled out it throws into engagement the corresponding pawl f^6 and toothed segment f'' ; and when the bar is locked by the frames c^3 the consequent unit rotation of the wheel e^3 and also the arm j^2 causes the actuation of the spindle f thereby shifting the arm f^2 corresponding to the pull bar a that has been pulled through the unit angle. This operates the pawl g^9 attached thereto and also registers "one" on the indicator segment h . The second preference is now exercised by pulling the second bar a . The consequent further unit rotation of the spindle f moves the second preference arm f^2 and pawl g^9 through a unit angle, and the first preference arm f^2 and pawl g^9 through another unit angle. Hence the wheel segments h will now show the number "2" for the first preference and the number "1" for the second preference. The third bar a is now pulled out and the first preference will show "3", the second "2" and the third "1". Assuming that the machine is set to allow of the pulling outwardly of three bars a only. The pawl j^7 will have been lifted, thereby releasing the arm j^{12} and allowing the spring m' to rotate the spindle m to the extent allowed by the segment m^2 . This also rotates the spindle g by means of the link p^4 , arm p^2 and

arm p attached thereto and thereby throws all the pawls g^9 into engagement with the corresponding ratchet wheels g^2 . The pawl k^3 prevents further bars being pulled outwardly. The voter now leaves the machine and as he opens the gate the following operations occur:

First. The arm r^7 is released, thereby allowing the spring r^{14} to rotate the spindle l and shift the arm l' until it comes into contact with the periphery of the segment k' and by means of the toggle movement of the arm b^4 locks the segment m^8 in the position at which it is then standing, as well as locking the pawl k^2 , cam roller j^2 and spindle f .

Second. The movement of the arm s' releases such pull bars a as may have been drawn and allows them to be returned to the in position by the rotation of the wheel d' caused by the spring d^3 . As soon as all of the bars are in their initial positions, as well as the wheel d' the point of the arm l' is released by the segment k' and the said arm is actuated by the spring r^{14} , arm r^7 and link r^{10} . This withdraws the toothed arm v^4 out of engagement with the segment m^8 and allows the spring m' to rotate the arm m^9 and hence also the pawl k^2 , arm j^2 and spindle f , back to the initial position. The rotation of the spindle f operates the arms f^2 and pawls g^9 and registers the required vote on the counters. Third. The further opening of the gate w rotates the spindle m and arm j^2 as hereinbefore described. The machine is now in the same condition as when the voter entered.

What we claim is—

1. In a voting machine the combination with a pull bar provided with a pair of pins and a locking strip, of a locking mechanism for the bar, said mechanism comprising a slide frame, a lever connected therewith, a pivoted locking arm adapted to engage the locking strip when the bar is pulled outwardly, and a lever engaging said arm for maintaining it out of engagement with the locking strip when the bar is pulled inwardly, said last-mentioned lever adapted to be shifted in alternate directions by said pins, when the bar is pulled outwardly and forced inwardly.

2. In a voting machine, the combination with a pull bar provided with a pair of pins and a locking strip, of a lock mechanism for the bar, said mechanism comprising a slide frame, a lever connected therewith, a pivoted locking arm adapted to engage the locking strip when the bar is pulled outwardly, and a lever engaging said arm for maintaining it out of engagement with the locking strip when the bar is pulled inwardly, said last-mentioned lever adapted to be shifted in alternate directions by said pins, when the bar is pulled outwardly and

forced inwardly, combined with means for shifting said frame, causing thereby the oscillating of the lever connected therewith and the shifting of the locking arm.

3. A voting machine comprising the combination with a pull bar, of means for locking said bar when pulled outwardly, said means comprising a locking arm engaging with the bar for retaining it in out position, a slide frame connected with and adapted to shift said bar, a flexible member engaging with the frame for shifting it, and means for drawing the flexible member, causing thereby the shifting of the frame.

4. In a voting machine, the combination with a pull bar carrying a locking strip, of a locking arm adapted to engage with said strip to lock the bar in an out position, a retaining arm for maintaining said locking arm in an inoperative position until said strip has cleared the locking arm, means for shifting said retaining arm, said shifting means being arranged in such relation with respect to said retaining arm that the said arm will not be actuated until the strip has cleared the locking arm, and means for actuating the locking arm when released.

5. In a voting machine, the combination with a voter's actuating pull bar, of means for determining the number of votes registered on the pull of said bar, said means comprising a spindle, a cam carried thereby and provided with an arm, a pin and slot connection between said arm and said bar, a slotted pawl-carrying member mounted upon the spindle, a pawl connected to said member and provided with rollers adapted to engage with the periphery of the cam, and a toothed segment supported by the spindle and adapted to be engaged by the pawl.

6. A voting machine comprising a pull bar and means for determining the selected value of the vote recorded on the actuation of the bar, said means comprising a toothed segment, a pawl provided with a roller at each end, and a cam of variable ratio upon which travels the rollers carried by the pawl.

7. A voting machine comprising a counter selecting mechanism for the purpose set forth, and a counter operating mechanism operatively connected with said counter selecting mechanism, said counter operating mechanism comprising a shaft, a cam and a ratchet wheel, and a toothed wheel mounted upon said shaft, said toothed wheel being adapted to engage with and operate the spindle of a counter, a double-armed lever mounted upon the shaft and carrying a pawl provided with a pair of rollers adapted to engage the periphery of the cam, means for limiting the movement of said double-armed lever, and means for controlling the movement of said ratchet wheel.

8. A voting machine comprising the com-

bination with a counter selecting mechanism for the purpose set forth, of means whereby the value of the vote cast is indicated to the voter, said means being operatively connected with said counter selecting means and consisting of a shiftable segment provided with figures adapted to be exposed, and a link connected with said segment for actuating it, said link operatively connected with the counter selecting mechanism.

9. A voting machine comprising a vote registering controlling mechanism, said mechanism embodying means whereby a vote is not registered until the voter has complied with all requirements, said means embodying a spindle, a second spindle arranged coaxially therewith, an arm carried by the first mentioned spindle and provided with a roller, a rotative element carrying a cam adapted to be engaged by said roller, a cam mounted upon said first mentioned spindle and carrying a pawl provided with a roller, a toothed segment mounted upon the first mentioned spindle and adapted to be engaged by said pawl, and a shiftable arm mounted upon said first mentioned spindle.

10. A voting machine comprising a voter's actuating pull bar, a counter selecting mechanism operatively connected therewith, a counter operating mechanism operatively connected with said selecting mechanism, a vote counter controlling mechanism operatively connected with said selecting mechanism, and a counter mechanism for incomplete votes operatively connected with said controlling mechanism.

11. A voting machine comprising a voter's actuating pull bar, a counter selecting mechanism operatively connected to the bar, a counter operating mechanism operatively connected with said selecting mechanism, and a mechanism for indicating to the individual voter the value of the vote cast and operative connections between said indicating mechanism and said selecting mechanism.

12. A voting machine comprising a formal vote registering and controlling mechanism, a registering mechanism operatively connected with said controlling mechanism for registering incomplete votes, and an incomplete vote-indicating mechanism connected with said registering mechanism for incomplete votes.

13. A voting machine comprising a plurality of voter-actuating pull bars, a counter selecting mechanism operatively connected with each of said bars, a counter operating mechanism operatively connected with each of said selecting mechanisms, and a vote registering and controlling mechanism embodying means for controlling the number of bars to be actuated by the voter.

14. A voting machine comprising an en-

trance gate, registering mechanism, mechanism for locking the gate in open position, mechanism for releasing the gate from the locking mechanism, mechanism for moving the gate to closed position and mechanism for resetting the registering mechanism when the gate is moved to closed position.

15. A voting machine comprising registering counters, a plurality of pull bars operatively connected with the counters, means for controlling the number of bars to be actuated, means for preventing the registering by the counters unless the predetermined number of pull bars has been actuated and means operative upon the actuation of the predetermined number of pull bars for automatically actuating the counters.

16. A voting machine comprising registering counters, a plurality of pull bars operatively connected with the counters, means for controlling the number of bars to be actuated, means for preventing the registering by the counters unless the predetermined number of pull bars has been actuated, an incomplete vote registering mechanism, and means for operating said incomplete vote registering mechanism when the predetermined number of pull bars has not been actuated.

17. A voting machine comprising a pull bar, means engaging therewith for locking it in an out position, a counter selecting mechanism operatively connected to the bar, a counter operating mechanism operatively connected with said selecting mechanism, a vote registering controlling mechanism operatively connected with said selecting mechanism, a gate operated controlling mechanism operatively connected with said vote registering controlling mechanism, and mechanism operatively connected with the gate operated controlling mechanism for releasing the gate from open position and for re-setting the machine when the gate is moved to closed position.

18. A voting machine comprising a pull bar, means engaging therewith for locking it in an out position, a counter selecting mechanism operatively connected to the bar, a counter operating mechanism operatively connected with said selecting mechanism, a vote registering controlling mechanism operatively connected with said selecting mechanism, a gate operated controlling mechanism operatively connected with said vote registering controlling mechanism, mechanism operatively connected with the gate operated controlling mechanism for releasing the gate from open position and for re-setting the machine when the gate is moved to closed position, and mechanism connected with the gate operated controlling mechanism for operating the total counter of the machine.

19. A voting machine comprising a pull bar, means engaging therewith for locking it in an out position, a counter selecting mechanism operatively connected to the bar, a counter operating mechanism operatively connected with said selecting mechanism, a vote registering controlling mechanism operatively connected with said selecting mechanism, a gate operated controlling mechanism operatively connected with said vote registering controlling mechanism, mechanism operatively connected with the gate operated controlling mechanism for releasing the gate from open position and for resetting the machine when the gate is moved to closed position, and mechanism for varying the value of a vote.

20. A voting machine comprising a pull bar, means engaging therewith for locking it in an out position, a counter selecting mechanism operatively connected to the bar, a counter operating mechanism operatively connected with said selecting mechanism, a vote registering controlling mechanism operatively connected with said selecting mechanism, a gate operated controlling mechanism operatively connected with said vote registering controlling mechanism, mechanism operatively connected with the gate operated controlling mechanism for releasing the gate from open position and for re-setting the machine when the gate is moved to closed position, and means operatively connected with said selecting mechanism for indicating to the individual voter the value of the vote cast.

21. A voting machine comprising a pull bar, means engaging therewith for locking it in an out position, a counter selecting mechanism operatively connected to the bar, a counter operating mechanism operatively connected with said selecting mechanism, a vote registering controlling mechanism operatively connected with said selecting mechanism, a gate operated controlling mechanism operatively connected with said vote registering controlling mechanism, mechanism operatively connected with the gate operated controlling mechanism for releasing the gate from open position and for re-setting the machine when the gate is moved to closed position, and means actuated prior to the entrance of the voter for varying the value of the vote to be registered by the voter.

22. A voting machine comprising means for registering votes, pull bars for actuating said means, a gate operated controlling mechanism operatively connected with said means, a gate, and mechanism operatively connected with the gate operated controlling mechanism for releasing the gate from open position and for re-setting said means when the gate is moved to closed position.

23. A voting machine comprising means for registering votes, pull bars for actuating said means, a gate operated controlling mechanism operatively connected with said means, 5 a gate, mechanism operatively connected with the gate operated controlling mechanism for releasing the gate from open position and for re-setting said means when the gate is moved to closed position, and mechanism operated prior to the closing of the 10 gate for varying the value of a vote to be registered.

24. A voter's actuating pull bar having at its forward end a surrounding flanged sleeve 15 provided with a handle and a coiled tension spring surrounding the bar and confined between the ends of the sleeve.

25. A voting machine comprising the combination with a counter selecting mechanism 20 for the purpose set forth, of means whereby the value of the vote cast is indicated to the voter and operative connections between said means and said counter selecting mechanism.

26. A voting machine comprising a plurality of pull bars, a counter mechanism connected with each pull bar, means for regulating the number of pull bars to be operated, means for preventing the operation of 25 said counter mechanism until all of said pull bars have been operated, and means operable to register an incomplete vote when all of 30 said pull bars are not operated.

27. A voting machine comprising a plurality of operating means, a complete vote 35 registering and controlling mechanism operable upon the actuation of the required number of said operating means, mechanism for registering incomplete votes and means for

operating said incomplete vote registering mechanism upon the failure of a voter to 40 operate all of said actuating means.

28. A voting machine comprising a plurality of voter actuated pull bars, a counter selecting mechanism operatively connected 45 with each of said bars, a counter operating mechanism operatively connected with each of said selecting mechanisms, a vote registering and controlling mechanism embodying means for controlling the number of bars to 50 be actuated by the voter, and a registering mechanism for incomplete votes, operative connections between said controlling mechanism and said incomplete vote registering mechanism for causing operation of the latter upon non-operation of the former, means 55 for locking said controlling mechanism against operation until the determined number of bars have been pulled, and means operable upon operation of said controlling mechanism for rendering said incomplete 60 vote registering mechanism inoperative.

29. A voting machine comprising a gate, means for varying the value of a vote as registered, vote registering means, operating 65 means, operative connections between said operating means and said registering means, and means whereby the variation of the vote value can only be effected when the gate is 70 fully opened.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

GEORGE STACY.

GEORGE ALFRED JULIUS.

Witnesses:

RICHARD SPARROW,
ROSS EAST.