Sept. 13, 1932. M. F. THOMPSON 1,877,150

ELECTRICAL VOTING APPARATUS

Original Filed Sept. 11, 1923 2 Sheets-Sheet 1

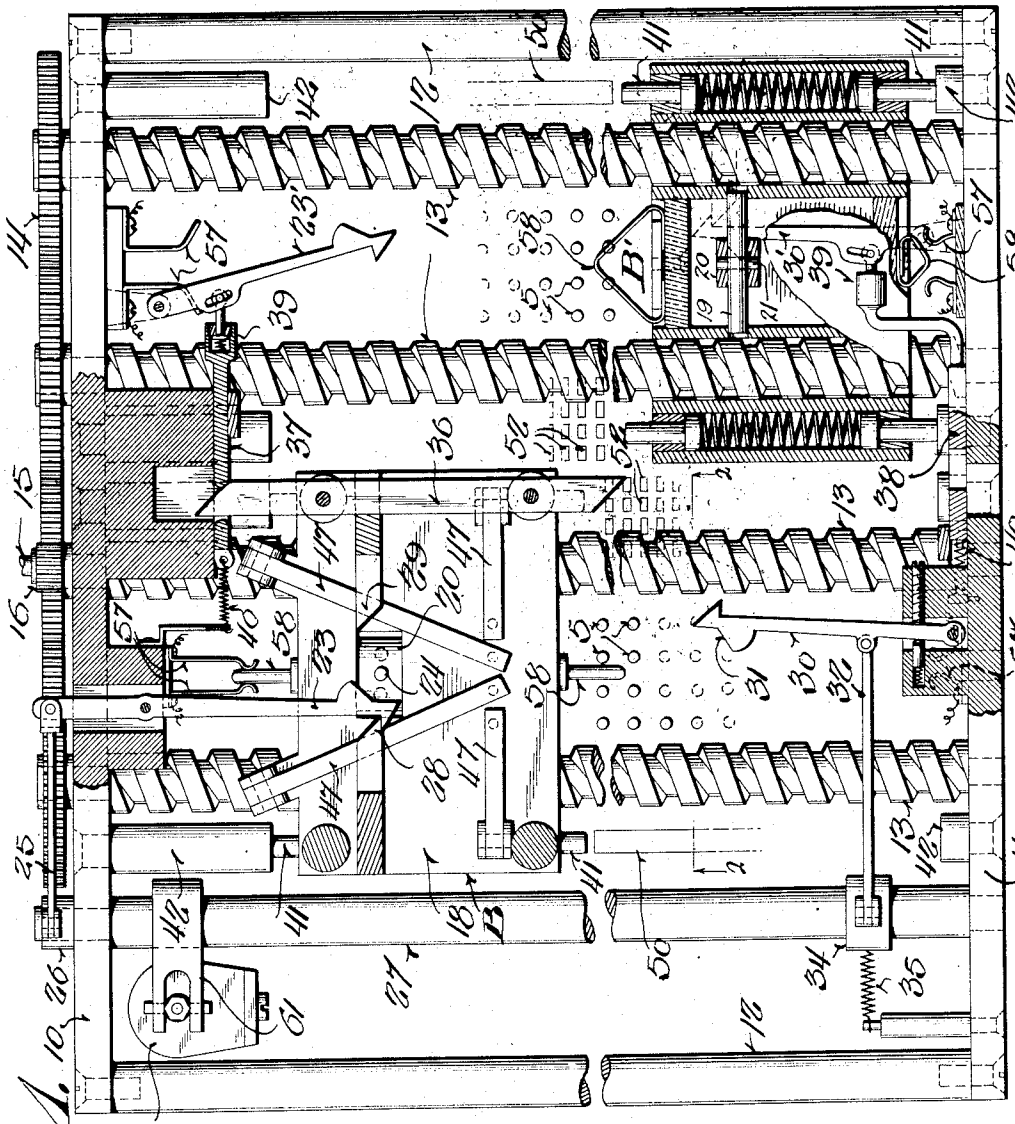


Fig. 1.

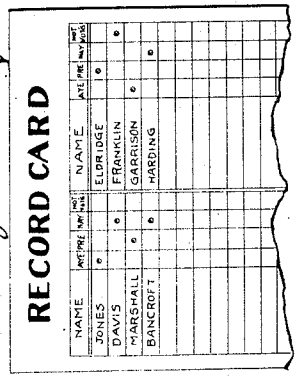


Fig. 2.

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Original Filed Sept. 11, 1923 2 Sheets-Sheet 2

Fig. 2.

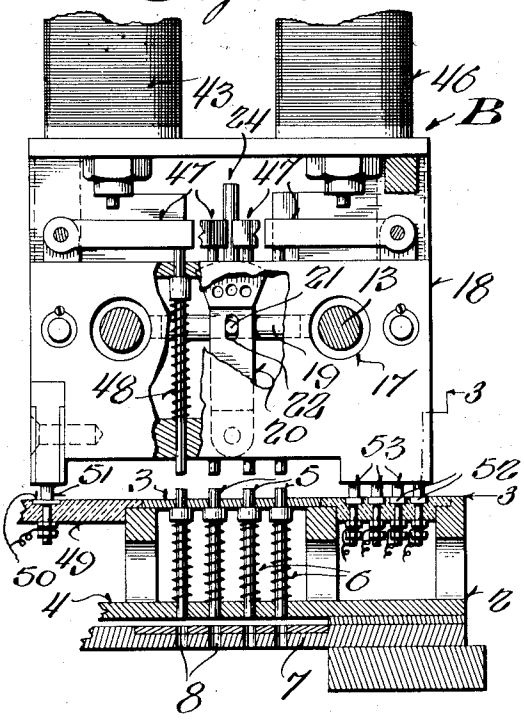
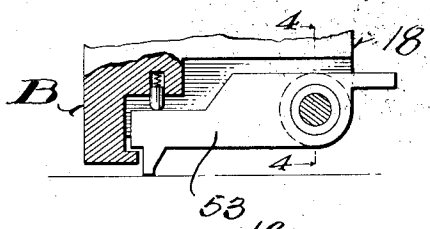


Fig. 3.



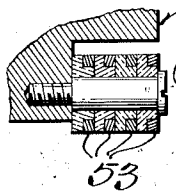
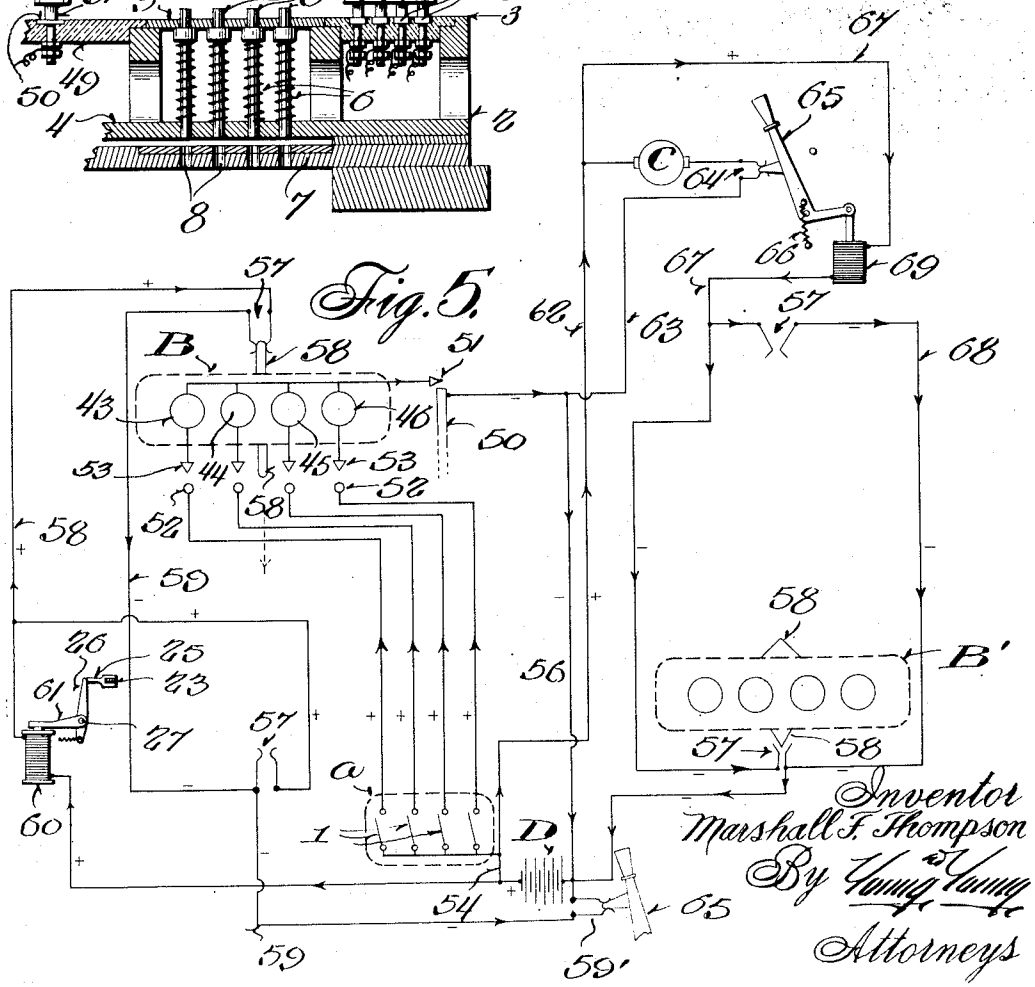


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE

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ELECTRICAL VOTING APPARATUS

Original application filed September 11, 1923, Serial No. 662,115, now Patent No. 1,773,891, dated August 26, 1930. Divided and this application filed August 26, 1930. Serial No. 477,967.

This invention pertains to electrical voting apparatus, and more particularly to the mechanism for recording the individual votes cast.

The present application is a division of the application for patent Serial #662,115, filed September 11, 1923, which has now matured into Patent #1,773,891 bearing the date of August 26th, 1930, and which is directed to the mechanism comprising the individual voting stations through which each member of a legislative or similar body effects his vote.

In conjunction with the individual stations, it is essential in a practical voting apparatus to provide means for recording the nature of the vote cast by each member through the individual stations. Heretofore, this has been accomplished in various ways, such as photographing an indicator board, indicating the nature of the members' votes, or by the provision of means for perforating a card, consisting of a plurality of solenoids for each individual station, such as shown in Letters Patent No. 1,219,053.

The objection to the photographic apparatus resides in the fact that a separate operating room and indicator board is required, which necessitates complicated and costly electrical apparatus and wiring, including a great multiplicity of solenoids, which naturally increases the possibility of error or failure to operate.

The foregoing perforating mechanism has also been found objectionable for the same reasons, namely, because of the great number of solenoids required to operate the individual perforators.

The present invention has primarily for its object to overcome the foregoing objections by the provision of a comparatively simple, compact, and efficient recording mechanism, in which only one solenoid is required for each group or class of votes.

Incidental to the foregoing, a more specific object resides in the provision of a card receiving platen having a plurality of stationary perforating plungers adapted to be actuated by solenoids carried by a traveling carriage passing over said plungers.

For the purpose of compactness, and in order to permit the use of a comparatively small record card, a further object of the invention resides in arranging the perforating plungers in a plurality of groups, each group being actuated by a separate carriage.

Incidental to the foregoing, a further object resides in the provision of automatic means for effecting progressive actuation of the individual carriages.

A still further object is to provide a perforating mechanism in which the carriage or carriages are reciprocated over the perforators and a complete perforating or recording operation is effected upon travel of the carriages in one direction only, thus materially reducing the time required to make a record.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made to come within the scope of the claims.

In the accompanying drawings is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings, Figure 1 is an elevation of a recording mechanism constructed in accordance with the present invention, parts being broken away and in section to more clearly illustrate structural details;

Figure 2 is a transverse section taken on the line 2—2 of Figure 1, parts being broken away and in section;

Figure 3 is a fragmentary detailed section taken on the line 3—3 of Figure 2;

Figure 4 is a similar view taken on the line 4—4 of Figure 3; and

Figure 5 is a diagrammatic showing of one manner in which the electrical circuits may be arranged.

Figure 6 illustrates the record card used in connection with the recording mechanism;

The present application makes no effort to illustrate or describe a complete voting system. Therefore, in connection with a detailed showing and description of the vote recording mechanism, there is merely illustrated diagrammatically a simple wiring circuit for transmitting individual votes to the recording mechanism and actuating the same. For the purpose of explanation, only one voter's station is indicated in Figure 5, the same being designated by the letter A, and which is provided with a plurality of conventional switches 1, which serve to close circuits connected with the recording mechanism, as will be hereinafter described in detail, whereby the different votes of the members, such as "aye", "present", "nay", and "no vote" are transmitted to the recording mechanism.

The travelling carriages which carry the solenoids that actuate the perforating plungers are designated in the diagram by the letters B and B', whereas the motor, which actuates the carriages, is designated as C.

Taking up in detail the construction and operation of the recording mechanism, the numeral 2 designates a base having spaced top and bottom plates 3 and 4, respectively, disposed between which are a plurality of perforating plungers 5 normally projected through the top plate 3 by means of the springs 6. As best shown in Figure 2, the base 2 is positioned above a platen 7 provided with perforations 8 aligned with the plungers 5.

In the operation of the recording mechanism, which will be later described, a record card 9, such as illustrated in Figure 6, is inserted between the plate 4 of the base and the platen 7, the names of the members voting being arranged in vertical columns and having a plurality of spaces after each name arranged in vertical rows and having designations at the top of the rows indicating the nature of the various votes to be cast. The voting columns on the card, when the latter is inserted between the base and platen, are aligned with the plungers 5. Consequently, as the plungers are depressed, the card will be perforated in the space corresponding to the plunger actuated, thus affording a record of the nature of the vote cast by each individual.

Secured to the upper and lower edges of the base are a pair of transverse frames 10 and 11 respectively further connected at their ends by the bars 12. Journalled within the frames are a plurality of worm screws 13 having mounted on their upper ends suitable connecting gearing 14, whereby the worms are rotated during the recording operation. The gear train 14 may be driven in any manner, such as by the motor C, (Figure 5) which may be connected to the drive shaft 15, which carries the pinion 16 engaging the gear train.

As will be noted in Figure 1, the worm screws 13 are arranged in pairs, each pair serving to carry one of the traveling carriages B or B', the worms passing through longitudinal openings 17 formed in the base 18 of both carriages. Obviously, as the worm screws 13 are rotated, and driving connection effected with the carriages, as will be later described, the carriages will be caused to reciprocate.

In general, the construction of the carriages B and B' are similar, particularly as regards actuation of the perforating plungers, and effecting a driving connection with their corresponding worm screws 13. Therefore, for the general purpose of explaining the construction and operation of the carriages, the present description will be confined to carriage B.

In the relative positions of the carriages and the actuating mechanisms, as illustrated in Figures 1 and 2, the carriages are disconnected from the worm screws 13, and assuming that it is desired to take a vote, which necessitates effecting a driving connection between the carriage B and its corresponding worm screws, the same is accomplished by means of the clutch pin 19 journalled within the base 18 and adapted to selectively engage either one of the worm screws 13, it being understood that the worms of each pair are rotated in opposite directions, whereby engagement with each worm causes the carriage to travel in opposite directions.

As best shown in Figure 2, the clutch pin 19 is connected to a pivoted lever 20, carried by the base 18, by means of the pin 21 projecting into the slots 22 formed in the lever. In normal position of the lever 20, as shown in Figure 2, the clutch pin 19 is in neutral position, disengaged from either screw, and upon oscillating the lever 20 to either side, the pin is projected into the threads of the corresponding worm. Oscillation of the lever 20 is accomplished by means of the pivotal dog 23 engaging the pin 24 projecting from the top of the lever. Attention is directed to the fact that carriage B controls punches corresponding to the left column of names on card G while carriage B1 controls punches corresponding to the right hand column of names on said card.

The dog 23 is connected by means of the link 25 to a crank arm 26 mounted on the rocker shaft 27, which shaft is journalled in the frames 10 and 11, as best shown in Figure 1. When the rocker shaft 27 is rotated, the dog 23 will be actuated to engage the pin 24, causing the lever 20 to be rotated and project the clutch pin 19 into the threads of one of the worms 13. At the same time, the end of the dog will be disengaged from the nose 28 carried by the carriage, thus releas-

ing the carriage and permitting the driven worm to impart movement to the same. The carriage will then travel toward the opposite end of the worm until the opposite nose 29, also carried by the carriage, engages the dog 30, pivotally mounted in the frame 11, causing the same to be forced over to a position in which the cam surface 31 engages the pin 24 to return the lever 20 to normal position, thus disengaging the clutch pin 19 from the worm screw 13 to stop the travel of the carriage.

Like the dog 23, the dog 30 is connected to the rocker shaft 26 through a link 32 connected with a crank arm 34 secured to the rocker shaft. As best shown in Figure 1, it will be noted that the rocker shaft is normally held in one position by a spring 35, connected to the crank arm 34, in which position the dogs 23 and 30 are urged to latching position, it being understood that after the clutch pin is disengaged at both ends of traverse of the carriage B, the dogs will engage their respective noses on the carriage to prevent further movement until the recording operation is again initiated.

It will further be seen that upon completion of the traverse of the carriage in one direction, the same will have passed over all of the plungers 5 aligned therewith, thus effecting one complete actuation of said plungers. Therefore, when it is desired to record a subsequent vote, the carriage is caused to travel in the opposite direction, the dog 31 serving to shift the lever 20 to engage the clutch pin 19 with the worm screw opposite to the one previously engaged, and upon return to normal position of the carriage, as illustrated in Figure 1, the dog 23 functions similar to the dog 30 in again effecting disengagement of the clutch pin 19.

In instances where a considerable number of voting stations are required, an exceedingly long record card would be necessary, were all of the indicating and perforating plungers placed in a single row. Therefore, for the purpose of compactness, and to provide for the use of a minimum sized card, the groups of plungers will be positioned in two rows, as illustrated in Figure 1, necessitating an additional carriage B′, in which operative clutching engagement with the worm screws 13 is obtained in the manner as heretofore described. However, inasmuch as actuation of the carriage B′ must be successive to the operation of the carriage B, its actuation is initiated at the conclusion of the traverse of carriage B, by means of a cam strip 36 carried thereby.

As will be noted in Figure 1, a dog 23′, pivotally connected to the frame 10, serves to actuate the lever 20 carried by the carriage B′ at one end of its traverse, while the dog 30′, pivotally connected to the frame 11, serves to actuate the lever 20 at the opposite end of the carriage traverse. Therefore, inasmuch as the operation of the carriage B′ is controlled by the carriage B, the lever 23′ is connected to a sliding bar 37, which bar is engaged by one end of the cam strap 36 at one end of the traverse of the carriage B, while the dog 30′ is pivotally connected to the sliding bar 38, which is engaged by the opposite end of the cam strap 36 at the end of its traverse in the opposite direction.

A yieldable connection 39, between the dogs 23′ and 30′, and their corresponding bars 37 and 38 respectively, allows the dogs to be actuated when the same are respectively engaged by the noses 28 and 29, also provided on the carriage B′, although not shown. Both bars 37 and 38 are urged to hold their respective dogs in normal position by suitable springs 40.

At each end of travel of the carriages B and B′, the same are cushioned by the spring-urged plungers 41 projecting from the ends of the carriage and engaging studs 42. Obviously, until such time as the clutch pins 19 are disengaged, the plungers 41 will be depressed against their respective springs. However, when the clutch pins 19 are disengaged, the plungers will serve to force their respective carriages in the opposite direction to be engaged and locked by their respective dogs. This operation not only insures a uniform starting place for each carriage, but also serves to break the contact made by carriage B′ at the limit of its movement, as will be hereinafter described.

Mounted on each carriage B and B′ are a plurality of solenoids 43, 44, 45, and 46, respectively, each solenoid serving to actuate one vertical group of the plungers 5 by means of rocker arms 47 pivotally mounted on the bases 18 of the carriages B and B′, which arms engage spring-urged plungers 48 also carried by the carriage and aligned with the groups or rows of the plungers 5.

As will be best seen in Figure 2, when anyone of the solenoids 43 to 46 are energized, their armatures will be projected to engage the rockers 47, which in turn engage the plungers 48, causing the same to be depressed to engage and depress the indicating or perforating plunger 5, aligned therewith, thus effecting perforation upon the record card 9 disposed on the platen 7. While perforating plungers have been described, it is to be understood that any type of plunger is contemplated which will make an indication upon the record card.

Mounted upon the base 2 upon opposite sides of the plate 3 are insulation strips 49, one of which is provided with a contact strip 50 adapted to be engaged by a brush or contact finger 51, while the opposite strip carries a plurality of contact points 52 which are engaged by the contact fingers 53, also pivotally carried by the carriages, it being

understood that the contact points are so positioned as to effect closing of the solenoid circuits when the plungers 48 are positioned over their respective perforating plungers 5.

Referring to the diagram Figure 5, it will be noted that the solenoids 43 to 46 are connected in common with the contact finger 51 which has sliding contact with the strip 50 as the carriage is reciprocated. The other sides of the solenoids are connected with the fingers 53 which successively engage the contacts 52.

Tracing the wiring circuits, any suitable source of current supply, designated as D, may be employed, one side of which is connected with the individual voting switches 1, through the line 54, the opposite sides of the switches being connected with the contact points 52 through the circuits 55.

The contact strip 50 is connected with the minus line of the supply circuit through the wires 56.

As shown in Figures 1 and 5, spaced contact members 57 are provided at opposite sides of the base 2, the same being carried by the end frames 10 and 11 in such position as to be engaged by the plugs or circuit closing members 58 carried by the carriages. The contact members are connected in multiple with the current supply through the lines 58 and 59, respectively, in which circuit the solenoid 60 is connected, the armature of which is connected to a lever 61 secured on the rocker shaft 27. It is to be noted that each station A controls a horizontal row of contact points 52, which correspond to a horizontal row of plungers 5.

The actuating motor C, which drives the worm screws 13, is also connected with the source of supply D through the line 62 and the line 63 connected to line 56.

A normally open switch 64 is provided in the motor circuit, the same being closed by a switch lever 65 held in and out of engagement with the contact 64 by means of a spring 66.

In instances where two carriages are employed, the solenoids 43 to 46 of the second carriage B′ are connected in the same manner as those of carriage B, and the solenoids are energized as the contact fingers 53 engage the contacts 52 during the travel of the carriage. Also the contact brushes 57 provided for the second carriage, are connected with opposite sides of the current supply D through the lines 67 and 68. In this circuit, a solenoid 69 is connected and serves to break the motor circuit when energized.

Taking up the operation of the recording mechanism, with the parts in normal position as illustrated in the drawings, the recording operation is initiated by closing the contact brushes 64 with the lever 65, thus closing the motor circuit to rotate the worm screws 13. At the same time that the lever 65 closes the motor circuit, it also serves to close the switch 59′ in the line 59 connected with the contact brushes 57 associated with the carriage B, and inasmuch as the top contact brushes 57 are closed by the plug 58, carried by the carriage, the solenoid 60 is energized to rock the shaft 27 and release the dog 23, which operation of the dog throws the lever 20 to engage the clutch pin 19 with one of the worm screws 13. The carriage B is then caused to travel forwardly on the worm screws 13 until it clears the dog 23, at which time, the plug 58 is withdrawn from the contact brushes, breaking the circuit to the solenoid 60, allowing the dogs 23 and 30 to assume their normal position. As the carriage B travels forwardly the contact finger 51 engages the contact strip 50, thus closing one side of the circuit to the solenoids 43 to 46. Then, as the carriage continues its traverse, the contact fingers 53 successively engage the contact points 52 and complete a circuit to one of the solenoids, depending upon which one of the voting switches 1 that has been previously closed. As the carriage B reaches the opposite end of its travel, the nose 29 will engage the dog 30 to cam the same over against the pin 24, thus rocking the lever 20 to disengage the dog 19. Obviously, at the end of its forward travel, the nose of the cam strip 36 will engage the sliding bar 38 to draw the dog 30′ over against the clutch lever of the carriage B′ to force engagement of the clutch pin 19 with one of the worm screws. This action puts the carriage B′ into motion, and the same travels forwardly until it engages the dog 23, which again effects disengagement of the clutch pin of carriage B′, at which time, the circuit closing plug 58, carried by the carriage B′, engages the switch contacts 57 to complete the circuit to the solenoid 69, thus energizing the same to actuate the switch lever 65 and break both the motor circuit and the circuit to the solenoid 60. In the assembly voting, one member first actuates the desired switches of his voting station, as described above, after which the second member actuates the switch or switches of his voting station. This continues until the entire vote has been cast.

From the foregoing, it will be seen that a complete vote has been recorded and the mechanism left in position to record the next vote, the operation being identical except in that the carriages travel in the opposite direction.

It will thus be seen that a comparatively simple, compact, and efficient recording mechanism has been provided, in which only one solenoid is required to record each group of votes, thus eliminating expensive apparatus comprising a great multiplicity of solenoids and complicated wiring.

It will further be appreciated that by the use of two travelling carriages, an exceed-

ingly compact arrangement of recording plungers is obtained, which permits the use of a record card of minimum size.

I claim:

1. A mechanism for making a permanent record of votes cast through a plurality of individual voting circuits in an electrical voting apparatus comprising a plurality of plungers for making indications on a card, a traveling carriage, and means carried by the carriage and controlled by the individual voting circuits for actuating said plungers.

2. A mechanism for making a permanent record of votes cast through a plurality of individual voting circuits in an electrical voting apparatus comprising a plurality of plungers for making indications on a card, a traveling carriage, solenoids carried by the carriage for actuating said plungers as the carriage moves over the same, and means for successively connecting the individual voting circuits with said solenoids.

3. A mechanism for making a permanent record of votes cast through a plurality of individual voting circuits in an electrical voting apparatus comprising a plurality of plungers for making indications on a card, a traveling carriage, solenoids carried by the carriage for actuating said plungers as the carriage moves over the same, means for successively connecting the individual voting circuits with said solenoids, and means for successively causing said carriage to travel in opposite directions.

4. A mechanism for making a permanent record of votes cast through a plurality of individual voting circuits in an electrical voting apparatus comprising a plurality of plungers for making indications on a card, a traveling carriage, a plurality of solenoids carried by the carriage, one for actuating each set of plungers, and means for successively connecting the individual voting circuits with said solenoids.

5. A mechanism for making a permanent record of votes cast through a plurality of individual voting circuits in an electrical voting apparatus comprising a plurality of plungers for making indications on a card, the plungers being arranged in two or more groups, a traveling carriage for each group of plungers, solenoids carried by the carriage for actuating said plungers as the carriage moves over the same, means for successively connecting the individual voting circuits with said solenoids, and means carried by one carriage for initiating operation of the other carriage.

6. A mechanism for making a permanent record of votes cast through a plurality of individual voting circuits in an electrical voting apparatus comprising a plurality of plungers for making indications upon a card, said plungers being arranged in one or more groups adjacent each other, a carriage for each of said groups of plungers, driving means for said carriages, means for effecting driving connection between said carriages and said driving means, and means for successively connecting the individual voting circuits with said solenoids.

7. A mechanism for making a permanent record of votes cast through a plurality of individual voting circuits in an electrical voting apparatus comprising a base, a pair of oppositely driven worm screws journalled on said base, a plurality of plungers for making indications on a card, means carried by said carriage for actuating said plungers, said means being controlled by the individual voting circuits.

In testimony that I claim the foregoing I have hereunto set my hand at Washington, in the District of Columbia.

MARSHALL F. THOMPSON.