

Oct. 29, 1940.

C. F. THOMPSON

2,219,347

APPARATUS FOR ELECTRICALLY REGISTERING VOTES

Filed May 4, 1936

4 Sheets-Sheet 1

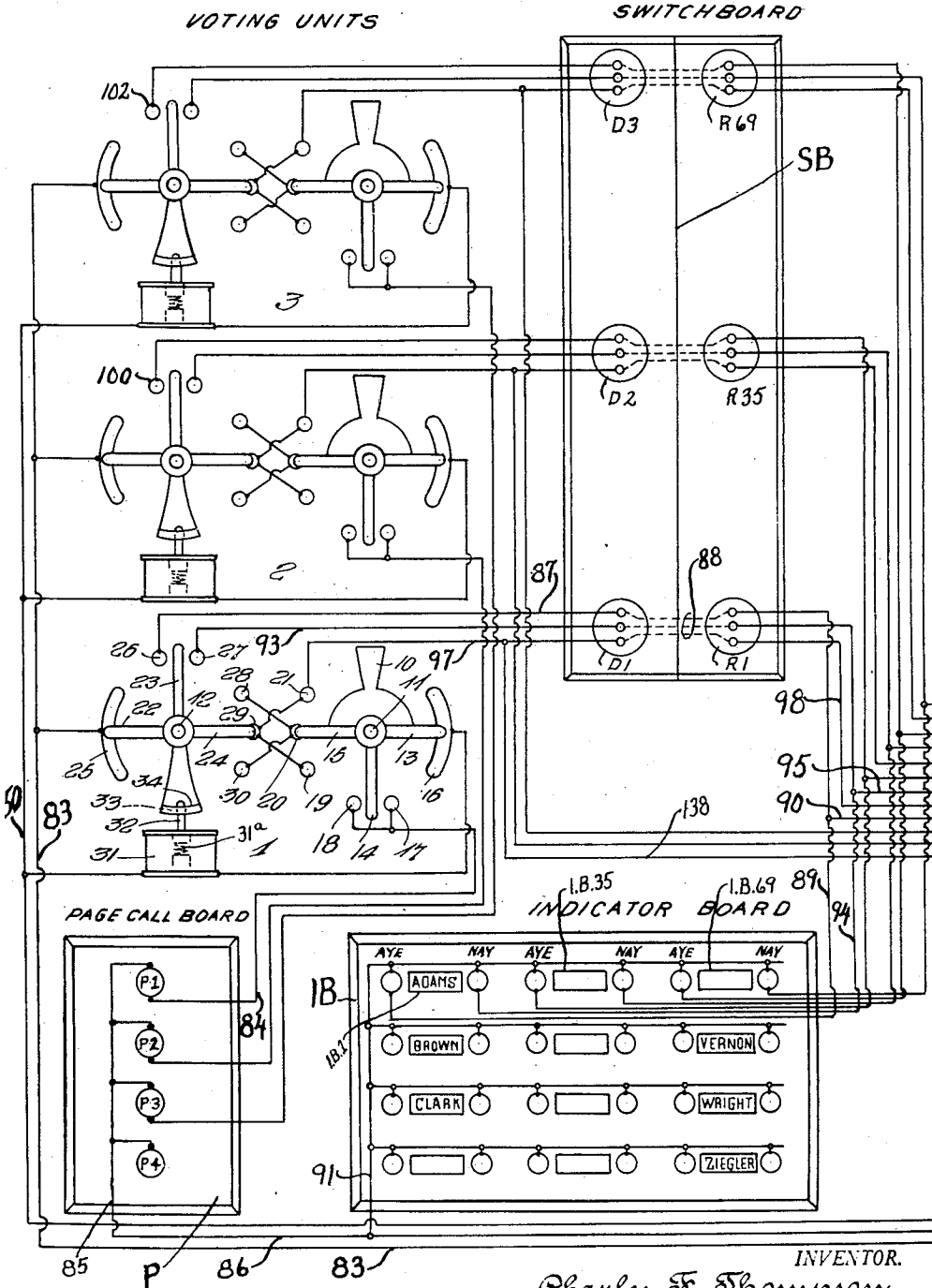


FIG. 1A

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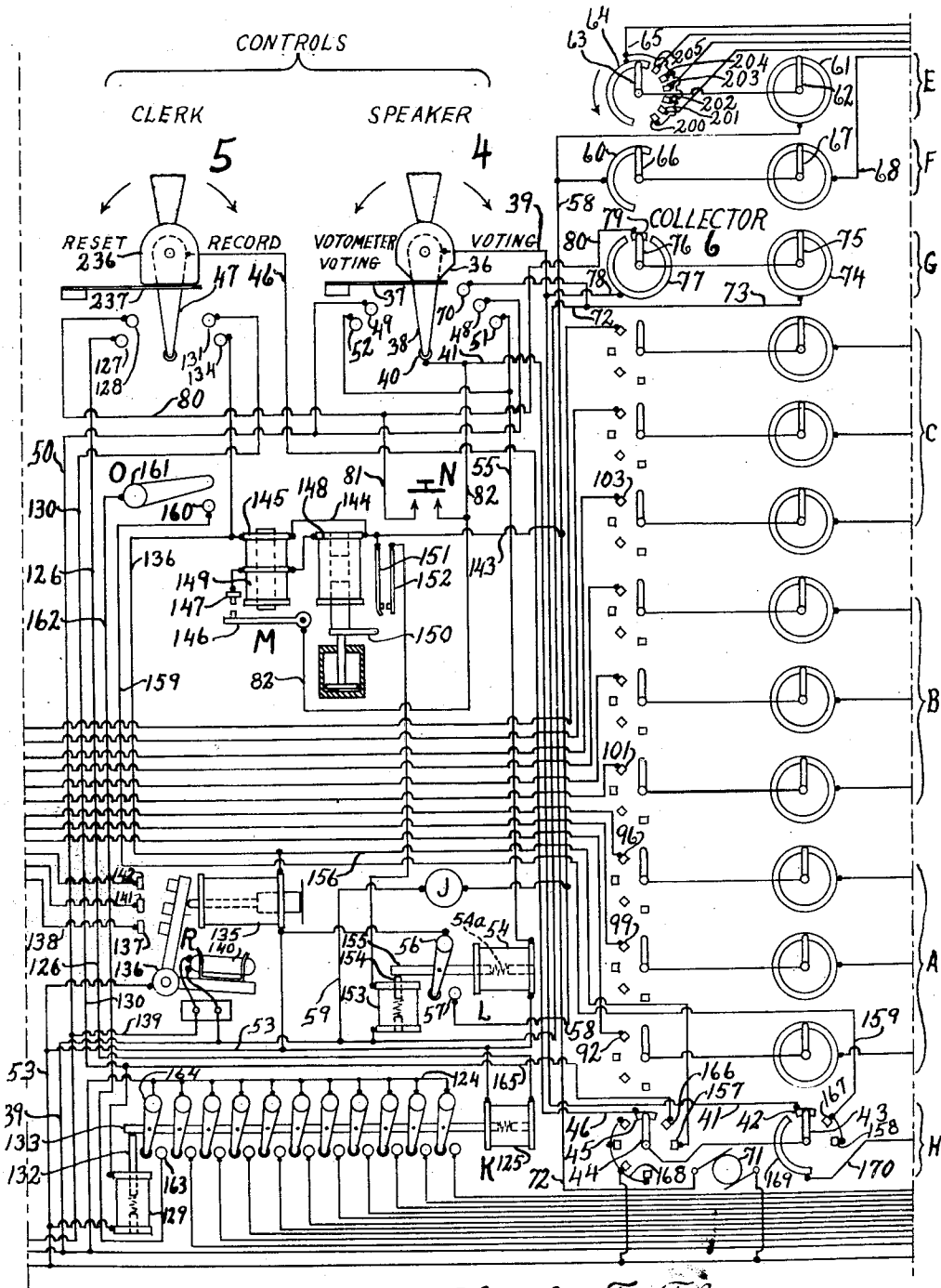
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APPARATUS FOR ELECTRICALLY REGISTERING VOTES

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4 Sheets-Sheet 2



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Fig. 1B

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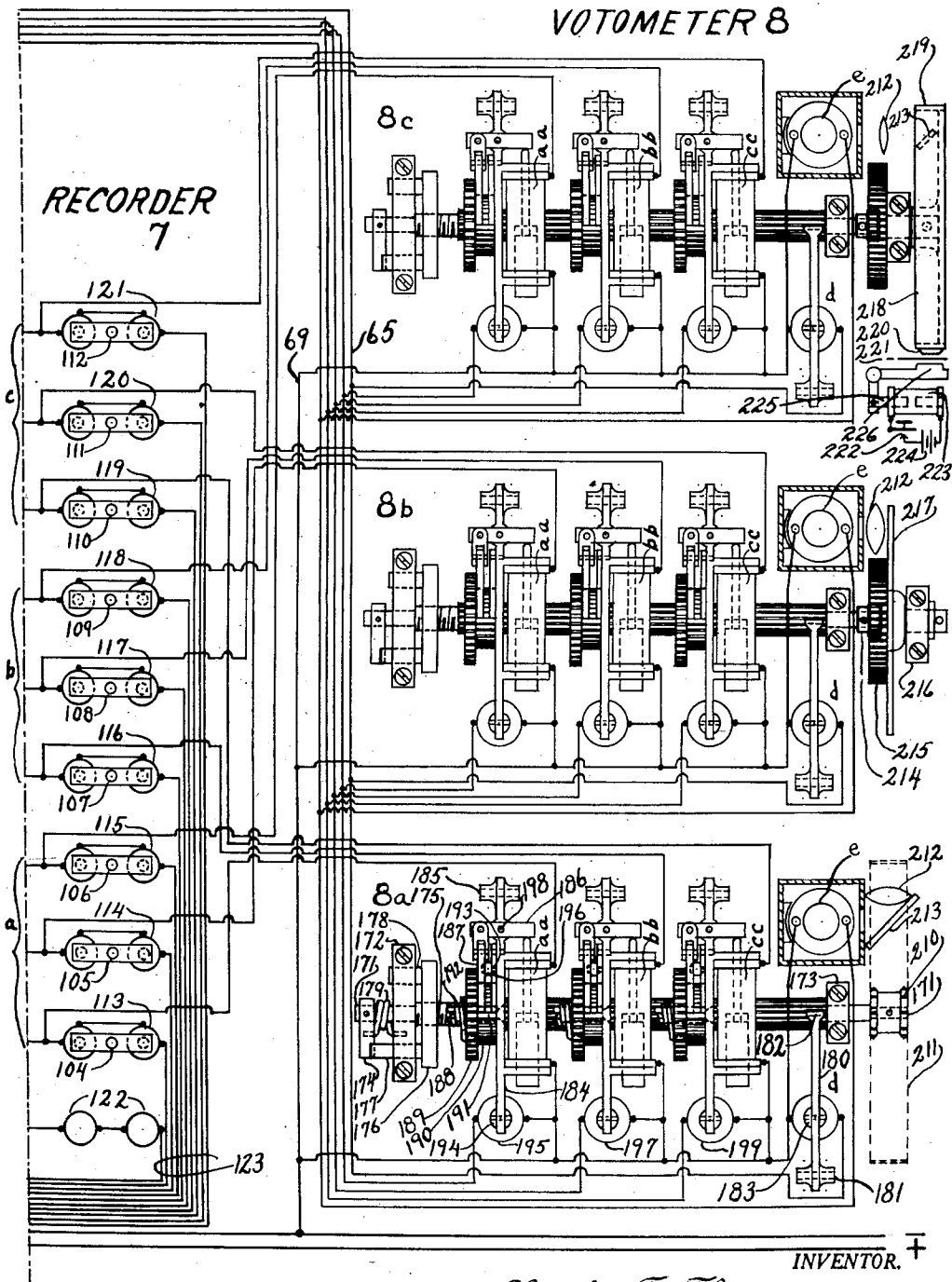
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APPARATUS FOR ELECTRICALLY REGISTERING VOTES

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FIG. 1 C

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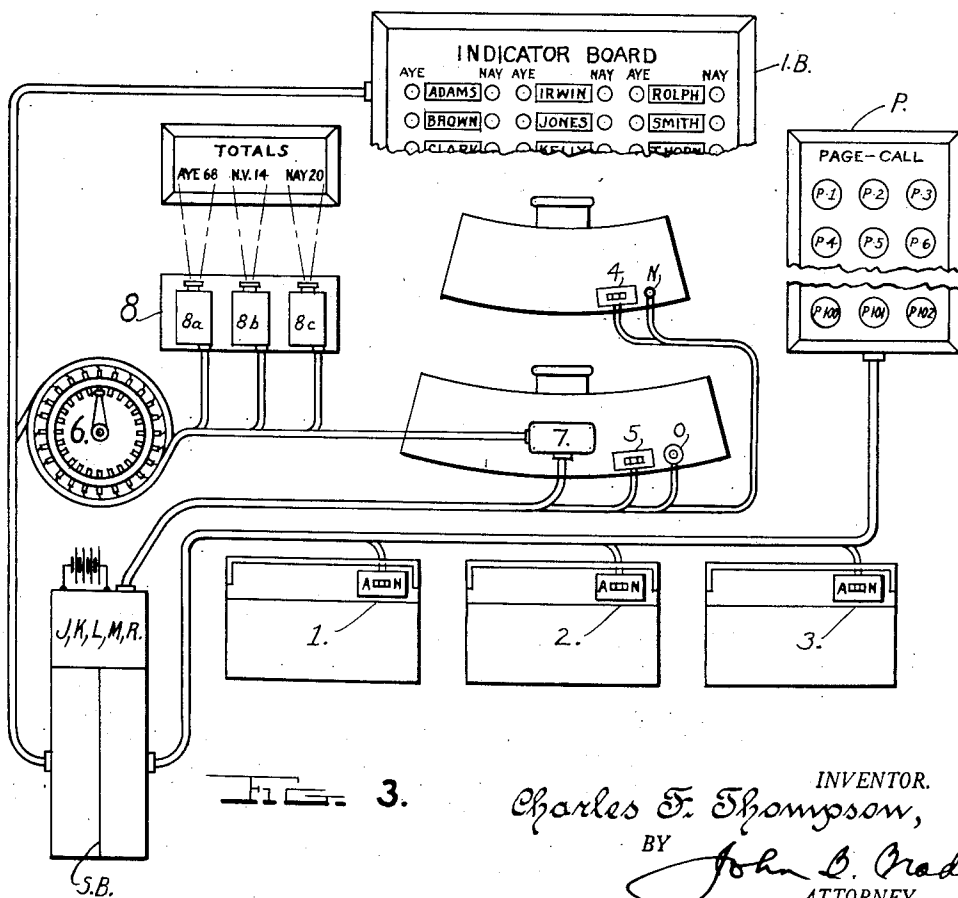
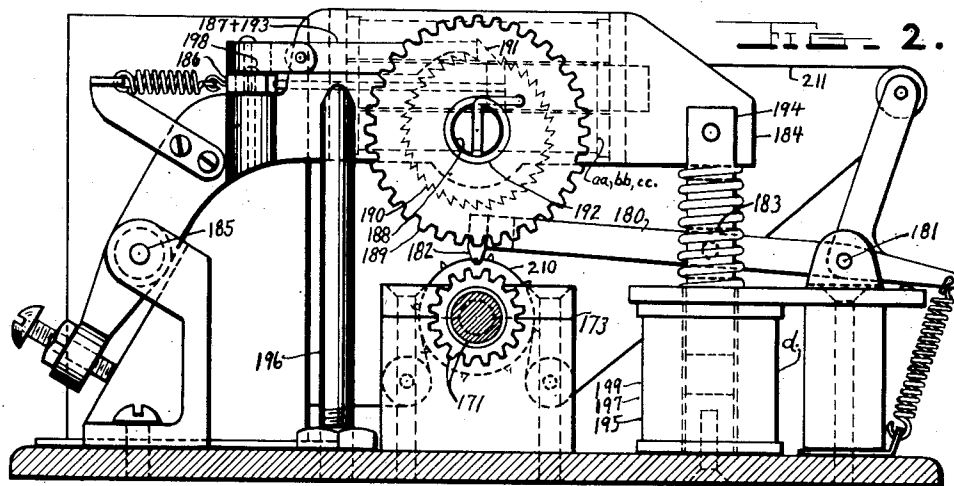
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APPARATUS FOR ELECTRICALLY REGISTERING VOTES

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APPARATUS FOR ELECTRICALLY REGISTER-
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Application May 4, 1936, Serial No. 77,839

10 Claims. (Cl. 235—52)

My invention relates to electrical roll-call or voting systems, such as are used by legislative and other deliberative bodies. Systems of this nature have heretofore been too expensive for general adoption, and have been too slow in operation, and inapplicable in certain instances, and have failed to provide various desirable functions. My invention is designed to overcome these deficiencies, and to provide voting bodies with equipment of universal application, and of the greatest simplicity and reliability at low sales and operating costs, capable of performing all desirable functions, and operating at far faster speed than prior systems in the art.

The individual units of mechanism employed to form this system, are disclosed in detail in several copending applications as follows: Serial No. 77,039, filed April 29, 1936, Electrical roll call or voting apparatus; Serial No. 83,334, filed June 3, 1936, Selector mechanism for electrical roll call or voting apparatus, now Patent 2,168,373, granted August 8, 1939; Serial No. 87,273, filed June 25, 1936, Recorder mechanism for electrical roll call or voting apparatus; Serial No. 93,684, filed July 31, 1936, Totalizing mechanism for voting apparatus. This application is designed to cover the relationship and electrical connections between the various devices, and the methods of controlling them when they are assembled and wired to form a complete roll-call or voting system.

Among the objects of my invention, shown in this and co-related applications, are:

To provide a new type of voting unit for the members' use in casting their votes, designed to fit standard switch boxes and switch plates, and to be composed of the fewest possible parts, and those parts of stamped or die cast construction.

To completely abandon the principle used by earlier inventors of placing all votes in consecutive order by means of a commutator, and registering and recording them consecutively, and to provide a new principle in vote registering and recording known to me as the division and storage principle, whereby registering and recording speeds several times greater than heretofore has been thought possible, are obtained.

To completely separate the commutator device from the recording mechanism, as earlier inventors have combined them, so the recording mechanism can be omitted in foreign installations where it would seldom be required, and in certain domestic installations, or wherever permanent voting records were not required, and to provide a new form of commutator device, hereinafter known as the collector, which will divide the total

membership into a predetermined number of small divisions for high speed registering and recording purposes;

To provide a new type of registering mechanism capable of simultaneously storing the votes in each division, then moving the registering mechanism proper forward one step for each division of votes instead of one step forward for each single vote, all of which greatly multiplies registering speed;

To provide said new type of registering mechanism with means for displaying the totals on a screen in view of the speaker, or in view of all members of the assembly, if preferred.

To provide said collector and new type of registering mechanism with means for continuous operation, so as to repeatedly register the totals, on a screen or otherwise until enough votes have been registered for a quorum or bill passage, before the system is locked for recording purposes. To provide said collector and new type of registering mechanism with means for displaying one total to the speaker or members, while storing the votes in the several divisions in preparation for the next total, thereby further increasing the operating speed of this mechanism;

To provide a new type of recording mechanism, so small, simple and inexpensive, and controlled by so few wires, that a plurality of interchangeable recorders might be used for each installation, thus permitting party leaders and press representatives to secure copies of the record without tying up the whole assembly while a single recorder was making duplicate copies, and also overcoming the possibility of failure of the single recorder tying up the whole assembly while being repaired;

To provide said new type of recording mechanism with means to simultaneously record a vote from each collector division, instead of recording but one vote at a time, thus greatly multiplying operating speed.

To provide for the addition of suitable switchboards, indicator boards, page boards, etc., to the above devices, and for the proper relationship and electrical circuits between them, and to provide for suitable pushbuttons, switches, relays, and other control means for securing the desired operation of the entire assembled electrical roll-call or voting system.

The complete system of my invention has been illustrated in Figs. 1A, 1B and 1C, which, when considered together, show the circuit arrangement diagrammatically and the associated mechanism schematically. Fig. 1A shows the arrange-

ment of voting units, switchboard, page call board and indicator board. Fig. 1B shows the arrangement of control apparatus and collector. Fig. 1C shows the arrangement of recorder and vote registering mechanism. Fig. 2 shows a side view of the counting mechanism, and Fig. 3 illustrates the general plan or lay-out of the system.

This application covers what I believe to be a valuable improvement in the art, in displaying to the speaker, and if desired to the members, continuous registration while the members are voting, so that it is known at once when sufficient votes have been registered to form a quorum or pass a bill; and this application covers what I believe to be a still more valuable improvement in the art, and that is the idea of dividing the membership into a predetermined number of small divisions by a collector designed for that purpose, which in turn operates a recording mechanism capable of recording one vote from each division simultaneously, and which also operates a high speed register known as the votometer, in which the votes in all collector divisions are simultaneously stored and the total displaying mechanism advanced forward one step for each division, rather than one step forward for each vote cast.

To show the value of this arrangement let us consider for example a 500-member installation, such as would probably be required for the Federal house of representatives. Assuming that a step by step registering mechanism could operate at the rate of ten counts per second, it is apparent that with the old style of commutator heretofore used, in which all like votes are placed in one continuous sequence and counted one by one, fifty seconds would be required to count five hundred votes, and perhaps another five seconds would be required for the totals to be announced or displayed and comprehended by the membership. By abandoning the old commutator principle, and adopting the novel principle of division and storage described herein, the 500-member installation would be supplied with a collector dividing the membership into, for instance, ten divisions of fifty members each, and the votometer supplied would be provided with ten storage divisions or storage units, so that all ten storage units would store their fifty votes, in simultaneous operation, at the rate of ten votes a second—which means the 500 votes would be stored in five seconds. The total-displaying mechanism of the votometer would thereupon be moved forward consecutively by each storage unit, so that each division of votes would be counted by one movement. If each forward movement of the total-displaying mechanism, when actuated by a storage unit, consumed one half a second, the ten forward movements would consume five seconds, so a total of ten seconds would be required to display the 500-vote total. In the Federal house, and in other large bodies, continuous registration would very likely be demanded, so that no unnecessary loss of time would be consumed in securing a quorum, or securing sufficient votes for bill passage, and with continuous registration the advantages of the system shown in the present application are even more pronounced. The votometer, built for operation on the division and storage principle, is so constructed that its vote-displaying mechanism can be showing one total, while its vote-storage mechanism is storing another total. If the votometer displayed its totals on a screen, as it would do in one of its principal forms, that screen would be lighted for five sec-

onds and dark for five seconds, lighted for five seconds and dark for five seconds, etc., during continuous registration. The five seconds for displaying the totals would be just about sufficient time for a large membership to see and digest them, and the members would thereupon have to wait but five seconds for a new total to be displayed. Displaying a new 500-member total after a five second wait, would seem almost miraculous, when compared with the 50 seconds or more required by the old commutator principle of counting, and closer analysis shows the discrepancy between the old and new principles to be even more pronounced than heretofore outlined. 1st, considerably less than an even half of second is required for each votometer storage unit to advance the total displaying mechanism, so the period of screen darkness between totals would probably not be more than three or four seconds. 2nd, the old commutator and counter principle would not permit the display of one total while storing or counting another total, nor the resetting of one total while counting or storing another, so resetting and displaying time periods would have to be added to the fifty seconds required for the straight counting of five hundred votes at ten votes a second. 3rd, if ten votes a second is the fastest practicable speed for operating the votometer storage units, whose moving parts consist principally of small light wheels operating in air and moving or driving nothing at all during the vote-storing operation, then ten votes a second could not be achieved by old style units-tens-and-hundreds-wheels types of counters, nor could that speed be achieved by any simple form of screen-display counter in which a film or disc was driven forward by a ratchet one step or count for each vote cast. The direct driven film or disc would have far more inertia and far less speed than the unincumbered wheel of each votometer storage unit.

It appears that members would have to wait a minute or longer for successive totals under the old commutator principle, as against three to five seconds under the new division and storage principle.

The principle of dividing the membership into several divisions for high speed recording and registration, also permits use of a very simple and fast recording mechanism. If, in a 500-member assembly, the record card were divided into ten columns, and could be fed through a recording machine perforating or otherwise marking said ten columns simultaneously, the recording would be completed in a tenth of the time required by the old method of commutation. Heretofore it has never been possible to do this because no vote-counting mechanism had ever been perfected that would take care of several divisions of votes simultaneously, and both counter and recorder operated from the same commutator. With collector and votometer especially designed to operate on the division principle, the recorder is automatically capable of recording as many columns simultaneously as the votometer has storage units. Furthermore the capability of the recorder to record several columns simultaneously, means the structure of the recorder is reduced to a single line of solenoids under which a paper card is fed, and that all of the hundreds of perforating pins, and traveling carriages, and worms and clutches, etc., heretofore used for vote recorders are automatically eliminated.

Separation of the commutator, or collector, from the recorder, has several advantages. 1st,

it permits installations without recorders where permanent records are not required. 2nd, it removes hundreds of wires from the recorder, rendering the recorder a simple plug-in mechanism.

3rd, it permits use of a rotary type of collector ideally suited to the needs of continuous registration and votometer operation. 4th, it allows use of switch blades that wipe wide substantial contactors to pick up the current, which are far more reliable than the miniature contactors that would necessarily have to be used if the commutator were part of the recorder.

While this application shows a single collector controlling both votometer and recorder, it is just as feasible and in some cases it would be quite desirable to use two collectors, one for controlling the votometer, and one for controlling the recorder. In this application a multiple contact switch is automatically operated to break the recording machine circuits during continuous registration, and at such other times when the votometer alone is operated. With individual collectors this switch would not be required, differing speeds could be applied to recorder and votometer operation, and the number of columns on the record card would not have to correspond to the number of storage units on the votometer. However for the purposes of this application a single collector is sufficient to disclose all of the operating principles, but it should be remembered that individual collectors could be used.

To the novel recording and registering mechanism above referred to, I have added as the voting means, an entirely new type of voting unit. This new voting unit possesses the outstanding advantage of operating on open circuit, and therefore not able to heat itself or provide a fire risk in the desk and chamber in which it is used. For the first time a single magnet is used to control all the functions of the voting device, and aside from the magnet plunger, the voting unit contains no moving parts except the switch blade assemblies. This voting unit is designed for economical commercial production, and to fit standard switch plates and switch boxes. It may be fitted with a lock and key type of cover if desired.

An indicator board, a switchboard, and a recognition board or page call board or both, are connected with the voting unit, collector, recorder and votometer, so as to form a complete system, and all of these devices are controlled by a suitable system of switches and relays preferably operated by the speaker and clerk.

The votometer may register its totals differently for different uses and locations. If the totals were required by the speaker alone, a numbered, translucent and illuminated dial or drum could be used. For displaying the totals to the membership a numbered disc or film or equivalent would be used between suitable condensing and projecting lenses. For the clerk's use the votometer may be arranged to print the totals on the record card.

For the purpose of explaining my system in the simplest manner I shall describe a smaller system than one of five hundred member capacity. Mechanical details of the individual units may be found in the correlated applications above referred to. The individual units can be shown only in simplified form in this application, where they are combined and wired together. This application therefore describes a system composed of one hundred and two voting units, such as shown at 1, 2 and 3. A collector, such as shown

at 6, contains three vote controlling divisions, A, B and C, and each said collector division controls one third of the voting units. Impulses picked up by collector division A operate first column recording magnets *a* of recorder 7, and first storing unit magnets *aa* of votometer 8. Impulses from collector division B operate second column recording magnets *b* of recorder 7, and second storing unit magnets *bb* of votometer 8. Impulses from collector division C operate third column recorder magnets *c* of recorder 7, and third storing unit magnets *cc* of votometer 8. The collector 6 contains various other commutator sections. E controls balance of votometer magnets, which cause the total displaying mechanism to be advanced forward and locked at appropriate times. F controls, in part at least, operation of the projection lamps of the votometer. G controls driving motor for the collector itself. H controls principally, the paper feed mechanism of the recorder 7.

K represents the switch for disconnecting the recorder 7 for continuous registration and other purposes. L represents what is known as the votometer switch, for timing certain operations of that device. M is a relay and dashpot combination designed to allow the votometer to display its totals for a certain fixed length of time after the balance of the equipment has been reset or restored to neutral. N is a pushbutton switch permitting a total to be secured with all voting units locked and recorder disconnected. O is a switch which can be closed and thereby cause all voting units to be reset automatically by the collector. J is a gong designed to be rung when the system is turned on for voting. R is a reset switch capable of resetting all voting units. P is the customary page board, IB the indicator board and SB the switchboard. The page board P is assumed to contain 102 signals; the indicator board IB is assumed to contain 34 names or positions in each column or 102 in all; and each of the two panels or sections of the switchboard SB is assumed to contain 102 jacks. Divisions A, B and C of collector 6 are each assumed to contain 34 individual voting contactors for each class of votes; and section H of collector 6 is assumed to contain at least 34 individual paper feed contactors and preferably several more so as to feed the card entirely out of the recorder 7, in addition to the several control contactors found in section H. Speaker's switch 4 controls the voting of the members. Clerk's switch 5 controls the record making and resetting.

Speaker's switch 4 is held normally in neutral position illustrated, by cam 36 and spring 37, and can be moved to either right or left. It will stay in either operated position by means of cam 36 and spring 37 until manually restored to neutral by the speaker. Switch blade 38 of speaker's switch 4 is connected to negative battery by conductor 39, and in its neutral position makes contact with contactor 40. Contactor 40 is connected through conductor 41, contactor 42 of collector division H, wipers 43 and 44, contactor 45 and conductor 46 to switch blade 47 of clerk's switch 5, which means that switch 5 can be electrically operative only when speaker's switch 4 and collector 6 are in their neutral positions. When speaker's switch 4 is moved to either right or left a path for the flow of current is established from negative battery through switch blade 38, contactor 48 or 49, and conductor 50, to the operating magnets 31 of all voting units such as 1, 2

and 3, permitting these voting units to become operative for voting purposes. Switch blade 38, when contacting contactors 48 or 49, will likewise contact contactors 51 or 52, thereby completing a circuit from positive battery through conductor 53 and magnet 54 of votometer switch L, and conductor 55, to negative battery.

Closing of votometer switch L by operation of solenoid 54 against action of spring 54a, sends positive current from conductor 53, through switch blade 56 and contactor 57, to conductor 58. The single stroke gong J is connected to positive battery by conductor 58, and to negative battery by conductor 59, and therefore rings. The positive battery on conductor 58 is also supplied to time delay relay M, which cannot operate however until a later operation takes place. The positive battery on conductor 58 is connected with contactor 60 of collector section F, and contactor 61 of collector section E. Positive battery from contactor 61 passes through wipers 62 and 63, and contactor 64, and conductor 65, to all locking magnets d of votometer 8; and positive battery from contactor 60 passes through wipers 66 and 67, and conductor 68 to all projection lamps e of votometer 8. Both locking magnets d and projection lamps e of votometer 8 are connected with negative battery through conductor 69, and therefore operate when the gong J strikes or rings, and with the votometer registering zero.

Movement of the handle of speaker's switch 4 to left causes all contact wipers of collector 6 to rotate continuously, in an anti-clockwise direction, which in turn causes votometer 8 to register a new total every revolution. This circuit is established when switch blade 38 makes contact with contactor 70, permitting positive battery to flow through collector driving motor 71, and conductor 72, contactor 70, switch blade 38 and to negative conductor 39. When speaker moves switch 4 to neutral, collector motor 71 is still kept running by current from positive battery, through motor 71, conductors 72 and 73, contactor 74, wipers 75 and 76, contactor 77, and conductor 78 to negative 39. All contact wipers in the collector 6 are mounted on a single shaft rotated by motor 71. Motor 71 continues to operate until wiper 76 leaves contactor 77, whereupon all wipers will be in the neutral position illustrated. Locked total switch N may also be used to start the collector motor 71 running for one revolution of the wipers. This switch is electrically operative only when speaker's switch 4 is in the neutral position and all voting units such as 1, 2 and 3 locked; and this switch is operative also only when motor 71 is stopped and all contact wipers are in their neutral position, with wiper 76 contacting contactor 79. If the speaker wishes to have the votometer indicate by one collector revolution the number of votes he has locked in the system, closing of switch N will permit motor 71 to start by current passing through said motor, conductors 72 and 73, contactor 74, wipers 75 and 76, contactor 79, conductors 80, 81 and 82, contactor 40, and switch blade 38, to negative conductor 39. Motor 71 will continue to run for the duration of that collector revolution, by current through conductors 72 and 73, contactor 74, wipers 75 and 76, contactor 77, conductor 78, to negative 39.

The voting units are indicated generally by reference characters 1, 2 and 3, which also represent the desk numbers where these voting units

are located. Referring to the voting unit 1, which is located at desk number 1, it will be seen that a switch is provided having a pivoted arm 10 adapted to be angularly shifted through an angle of approximately 30 degrees on each side of a vertical axis passing through the journal for the switch on center 11. There are two movable portions in the switch, one of which is shiftable about a journal indicated at 11, and the other of which is shiftable about a journal indicated at 12. The arm 10 controls the movement of three switch blades indicated at 13, 14 and 15 movable over contact members shown at 16, 17, 18, 19, 20 and 21. These switch blades are moved by the manual shifting of arm 10. The switch blades pivoted about journal 12 may or may not follow the movement of the switch blades pivoted about journal 11, depending upon the locked or unlocked condition of the switch. I have shown the switch blades pivoted about journal 12, at 22, 23 and 24, movable in coaction with contact members 25, 26, 27, 28, 29 and 30. The locked or unlocked condition of switch blades 22, 23 and 24 is controlled by solenoid 31, operating reciprocating plunger member 32, adapted to be projected through or withdrawn from an aperture 33 in arm 34. The plunger 32 is operative to lock the group of switch blades indicated at 22, 23 and 24 in the "not voting" position as illustrated in the drawing, or in the voting position for the vote "nay," or in the voting position for the vote "aye," respectively, by projection of plunger 32 through aperture 33 in arm 34, or by abutment of plunger 32 with the opposite sides of arm 34 when plunger 32 is projected into the path of arm 34.

When arm 34 and blades 22, 23 and 24 are locked in the normal or "not voting" position illustrated at 1, as they will be between votes, when the speaker's switch 4 is in the neutral position illustrated, the voting unit may be used for calling a page or operating almost any kind of signaling device. The switch assembly journaled at 11 is connected by springs (not shown) with the switch assembly journaled at 12, and these springs have two tendencies: first, to keep the switch blades in axial alignment or bring them back to alignment if separated, and second, to restore either or both assemblies to the neutral position illustrated.

Between votes therefore, when the speaker's switch 4 is in the neutral position, and each voting unit assembly pivoted about journal 12 is locked by plunger member 32 of solenoid 31, the handle 10 is still free to move to either side position, causing battery current to flow from conductor 83, through contactor 25, switch blades 22 and 24, contactors 29 and 19 or 21, switch blades 14 and 15, to contactor 17 or 18, and over conductor 84 through page call signal P1 of page board P and common return wire 85 to negative battery feeder 86. The handle 10 with its switch blades 13, 14 and 15 will return to neutral by spring action when pressure is removed therefrom, releasing page call signal P1. If desired, one of the contactors 17 or 18 can be used alone to operate page call signal P1, and the other contactor 17 or 18 can be used to operate a signal on another signal board, similar electrically to page board P but preferably smaller, and installed at the speaker's desk, so any member seeking recognition by the speaker, may signal for it electrically. Such a board would be called a recognition board,

and might be if desired, incorporated as part of a miniature indicator board on the speaker's desk. Or contactor 17 or 18 may be used to ring a bell at the page call board if the page is slow in answering page signal P1, or it may be used for calling a stenographer, or for any other desired purpose.

When the speaker wishes to take a vote and throws his switch handle 4 to right or left, thereby connecting negative battery from conductor 39, through switch blade 38, contactors 48 or 49, and conductor 50, to all voting unit solenoids 31, the voting unit 1 and all other voting units connected with the system, become operative as such, and cannot operate page signals P1, P2, etc., because the current thereto is broken as soon as it starts to flow.

With speaker's switch 4 on one side or the other closing circuit to negative conductor 50 and thus permitting voting, movement of handle 10 to left causes battery current from positive conductor 83 to pass through contactor 25, switch blades 22, 23 and 24, contactors 29, 21, 19, switch blades 13, 14 and 15, and contactor 16, to magnet 31 and negative conductor 50, energizing magnet 31, withdrawing plunger member 32 from aperture 33 of arm 34. With handle 10 pushed to left, spring action causes the assembly pivoted at journal 12 to follow the movement of handle 10, as soon as plunger member 32 is withdrawn from aperture 33. And since switch blade 15 is in contact with contactor 19, the circuit through magnet 31 is opened as soon as switch blade 24 leaves contactor 29. As the assembly continues to swing to left on journal 12, switch blade 23 establishes contact with contactor 26, sending current over conductor 87, through switchboard plug and jack D1, switchboard cord 88, switchboard plug and jack R1, to conductors 89 and 90. Conductor 89 thereby supplies current to the "aye" lamp of indicator board position I. B. 1, which is connected to negative battery by common wire 91; and conductor 90 supplies current to contactor 92 of division A of collector 6. This "aye" circuit closed at contactor 26 is held closed by the plunger member 32, actuated by spring 31a, abutting one side of arm 34. This "aye" circuit held closed at contactor 26 may be released at any time before speaker's switch 4 is restored to neutral, by movement of handle 10 to its neutral position, establishing circuit from positive conductor 83, through contactor 25, switch blades 22, 23 and 24, contactors 28 and 20, switch blades 13, 14 and 15, and contactor 16, to magnet 31 and negative conductor 50, withdrawing plunger member 32 from side of arm 34, permitting springs to restore the opposite assembly to neutral position.

Movement of handle 10 to right causes magnet 31 to operate by current through contactors 29 and 21, switch blades 13, 14 and 15, and contactor 16, releasing cradle arm 34, breaking magnet circuit at contactor 29, and establishing contact between switch blade 23 and contactor 27, which remains closed by action of plunger member 32 abutting opposite side of arm 34. Current thereupon flows from contactor 27, through conductor 93, plug and jack D1, switch-board cord 88, plug and jack R1, to conductors 94 and 95. Conductor 94 sends current through "nay" lamp of indicator board position I. B. 1 to negative 91; and conductor 95 sends current to contactor 96 of division A of collector 6. This "nay" vote may also be released by moving handle 10 to neutral, provided speaker's switch 4 is in one of the voting positions. Of course when speaker's switch 4 is in

the neutral position no vote can be registered from the voting units 1, 2 and 3, because the circuit to solenoids 31 thereof is broken; nor can any vote be released from voting units 1, 2 and 3 when speaker's switch 4 is in the neutral position, for the same reason.

If a member does not vote, current from positive conductor 83, through contactor 25, switch blades 22, 23 and 24, and contactors 29 and 21, will be fed over conductor 97, through plug and jack D1, switch-board cord 88, plug and jack R1, and conductor 98, to contactor 99 of division A of collector 6.

The switch-board SB is used for the purpose of permitting the members to sit where they wish and yet be recorded alphabetically. One panel thereof contains jacks connected with the voting units on all desks, and the other panel thereof contains jacks connected with all recording equipment. Of the jacks on the recording-equipment side of switch-board, jacks R1 to R34 (not shown) are connected to the voting contactors in division A of collector 6; jacks R35 to R68 (not shown) are connected to the voting contactors in division B of collector 6; and jacks R69 to R102 (not shown) are connected to the voting contactors in division C of collector 6. In this application voting unit jacks D1, D2 and D3 are shown connected by suitable switchboard cords such as 88, to recording jacks R1, R35 and R69 respectively, so that voting unit 1 becomes connected with the first voting contactors in division A of collector 6; so that voting unit 2 becomes connected with the first voting contactors in division B of collector 6; and so that voting unit 3 becomes connected with the first voting contactors in division C of collector 6. This means also, in the system illustrated, votes from voting units 1, 2 and 3, will be indicated at the top of each indicator board column, and recorded at the top of each record card column.

The recording mechanism illustrated generally at 7 is designed to simultaneously record three votes at a time, one from each of divisions A, B and C of collector 6. The recording may be done by perforating a hole, or embossing, printing or otherwise marking a character or symbol in a proper position to indicate each member's vote on the record card. A line of perforating or marking pins 104 to 112, inclusively, each operated by a pair of solenoids 113 to 121 inclusively, and respectively, forms the basis for the recorder structure. Beneath this row of electrically operated perforating or marking pins, a record card is fed by sprocket or friction wheels, actuated by a step by step motion obtained from a ratchet wheel. The pawl that operates said ratchet wheel may be actuated directly by the feed magnets 122, but I prefer to operate the pawl by the spring which necessarily must be used to restore the solenoids 122 to their original or neutral position. Feeding the record card by spring action, permits feed solenoids 122 to operate at approximately the same time the other recorder solenoids 113 to 121 inclusively, are operating; and also permits contact wipers 43 and 44 to have approximately the same position on the collector shaft as the other contact wipers on said shaft. I would preferably make contact wipers 43 and 44 adjustable as to their position on collector shaft with respect to other contact wipers thereon, so that they could be adjusted to feed the record card through the recorder at the highest practical operating speed, moving said record card between recording impulses of recording solenoids 113 to 121 in-

clusively. The electrical impulses used to feed the record card, are secured from the collector 6 contactors in section H that are joined together by the buss wire 168, which is connected to positive battery. Sufficient contactors should be connected by buss wire 168 to feed the record card past last perforations or recording marks, and preferably entirely out of the recorder 7. The paper feeding impulses picked up by wipers 44 and 43 are carried to the paper feed solenoids 122 by contactor 169 and conductor 170.

All conductors from the negative sides of recording magnets 113 to 121 inclusively, and the paper feed magnets 122, which are indicated generally by number 123, pass through the multiple point contact switch K to a common negative lead 124. Switch K therefore controls operation of recorder 7. Switch K is closed only by action of the clerk, in moving handle 5 to the right for the purpose of recording the vote.

If speaker's switch 4, and collector 6, are in their neutral positions, switch blade 47 of clerk's switch 5 will be connected to negative battery through conductor 46. Movement of clerk's handle 5 to right closes switch K by means of current flowing from positive conductor 53 through solenoid 125, conductor 126, contactor 127 and switch blade 47, to negative 46. When switch blade 47 contacts contactor 127, it will also contact contactor 128, permitting selector motor 71 to start rotating for one collector revolution, by means of current passing from positive battery through said motor 71, conductors 72 and 73, contactor 74, wipers 75 and 76, contactor 79 and conductor 80, to switch blade 47 and negative 46. Motor 71 will continue running until wiper 76 leaves contactor 77 as previously described; and when collector motor 71 is started from clerk's switch 5, it is seen that recorder 7 is operative.

Resetting of voting units 1, 2 and 3, etc., and other equipment of the system, is manually controlled by the clerk in moving the handle of switch 5 to left. Said resetting may be automatically controlled by collector 6 if switch O is closed. With switch O open, movement of clerk's switch handle 5 to left causes recorder switch K to open, by positive current passing through solenoid 129 thereof, conductor 130, and contactor 131, to switch blade 47 and negative 46, which causes plunger member 132 to be withdrawn from its position of locking switch bar 133 closed and allows the bar movement under spring action to open position, thereby breaking all circuits indicated at 123 to recorder 7, disconnecting recorder 7.

At the same time switch blade 47 contacts contactor 131, it also contacts contactor 134. Switch blade 47, by connecting contactor 134 to negative 46, causes all voting units such as 1, 2 and 3, etc., to be reset, by battery current from conductor 53 flowing through solenoid 135, and conductor 136, to contactor 134, which momentarily actuates armature 136 of switch R. Current from the battery will then flow from conductor 53, through switch armature 136, contactor 137, and conductors 138 and 97 to voting unit contactor 19 or 21, through switch blades 13 and 15, contactor 16, solenoid 31 and conductors 50 and 139, and through mercury switch 140 to negative conductor 39. This momentary impulse of current created by mercury switch 140 closing at same time individual reset circuits are established at contactors 137, 141 and 142, etc., causes withdrawal of each plunger 32 from abutment with one side of arm 34 in the voting units from which votes

have been registered. If some voting units had been in the "not voting" position when switch R is closed, the resetting impulse would not have passed through them, since said impulse could not get from conductor 97 to solenoid 31, unless switch blade 15 was contacting contactor 19 or 21.

While considering the actions caused by operation of clerk's switch 5, it should be noted that this switch is equipped with a cam 236 and spring 237, which cause said switch to automatically restore itself to its neutral position, which is the only stable position of the cam 236 with respect to the spring 237.

When clerk's handle 5 is moved to left, another action taking place is that the time delay relay M is started operating, by circuit from positive conductor 53, through switch blade 56 and contactor 57 (which were closed when speaker started the vote by movement of his switch 4 to either side), conductors 58, 143 and 144, relay operating coil 145, contactor 134, switch blade 47, to negative 46; whereupon armature 146 contacts contactor 147, permitting current on conductor 143 to pass through the dash-pot solenoid 148, relay holding coil 149, contactor 147, armature 146, conductor 82, and contactor 40 of speaker's switch 4, and switch blade 38 to negative 39.

Clerk's switch 5, it will be recalled, is electrically operative only when speaker's switch 4 is in its neutral position. Closing of armature 146 with contactor 147 locks closed the relay M and starts the dashpot plunger 150 in motion. Dashpot contactors 151 and 152 are designed to control solenoid 153 of votometer switch L. When dashpot contactors 151 and 152 are closed, current passes through them from conductor 143, and through solenoid 153 to negative battery, withdrawing plunger 154 from its position of locking switch arm 155 closed. Solenoid 153 however does not operate until dashpot plunger 150 has reached the end of its stroke. The purpose of this time delay is to allow the votometer switch L to remain closed, and consequently to allow all projection lamps *e* of votometer 8 to remain burning and all locking magnets *d* of votometer 8 to remain energized, for a fixed period of time after the balance of the equipment has been reset, so that all members will have ample time to see the totals if screen projection be used, and so that the clerk will have ample time to record the totals. All equipment except votometer locking magnets *d* and projection lamps *e*, is reset when dashpot plunger 150 starts to rise, but votometer locking magnets *d* and projection lamps *e* are not released until dashpot plunger 150 completes its stroke. However if the speaker starts a new vote before the dashpot plunger 150 completes its stroke, the circuit from switch blade 38 to relay armature 146 is immediately broken at contactor 40 and the dashpot drops. If permitted to operate through its full stroke so that magnet 153 is energized, the breaking of contact between switch blade 56 and contactor 57 will arrest the flow of current over conductor 143 and hence release armature 146 and dashpot plunger 150, and in addition will disconnect the sections E and F of the collector which are required to be kept energized during the new voting operation.

The resetting functions just described as being performed manually by the clerk moving handle 5 to left, can be likewise automatically performed by the collector 6 if switch O is placed in the closed position. In this case magnet 135 of relay R will operate to reset voting units 1, 2, 3, etc.,

by current from positive conductor 53 passing through it, and through conductor 156 to contactor 157 of section H of collector 6. After collector wipers 43 and 44 have passed all paper feeding contactors they bridge contactor 157 to contactor 158 so that the circuit through magnet 135 and conductor 156 is momentarily established through conductor 159, contactor 160, switch blade 161, conductor 162, contactor 163, switch blade 164, to negative conductor 124, operating magnet 135 momentarily and resetting voting units 1, 2, 3, etc.

The dashpot relay M is at the same time operated by current from conductors 143 and 144 passing through winding 145, and conductors 136 and 156, and contactors 157 and 158, conductor 159, contactor 160, switch blade 161, conductor 162, contactor 163 and switch blade 164 to negative conductor 124, closing dashpot relay M.

An instant after relay M is closed, the switch K is automatically disconnected by current from positive battery flowing through solenoid 129, and conductor 165 to contactor 166, which is bridged momentarily to contactor 167, causing current to pass over conductor 159, through contactor 160, switch blade 161, conductor 162, contactor 163, switch blade 164, to negative conductor 124, opening switch K and recorder 7.

The votometer 8 consists of three sections, 8a for registering the "aye" totals, 8b for registering the "not voting" totals, and 8c for registering the "nay" totals. The mechanism for storing the votes, and then moving the registering shaft forward is the same in 8a, 8b and 8c. 8a however is drawn in somewhat greater detail than 8b or 8c, and hence will be used to explain mechanical operation.

A registering shaft 171 runs entirely through the votometer 8a, and is supported by bearings 172 and 173. Pinned to one end of shaft 171 is a stop arm 174, which revolves with the shaft 171. A portion of the shaft 171 adjacent to bearing 172 is threaded at 175, and a traveling nut 176 is engaged with these threads, and moves stop pin 177 out of the path of stop arm 174 when shaft 171 commences to rotate. Steadying pin 178 is also attached to the nut 176 and moves through bearing 172 as stop pin 177 does, when shaft 171 rotates, but steadying pin 178 does not act as a stop. Spring 179 causes stop arm 174 to abut stop pin 177, when shaft 171 is in its normal or zero-registering position; which means spring 179 is wound up when shaft 171 is rotated for registering a total. Spring 179 is capable of permitting shaft 171 to rotate against its pressure for several revolutions, and spring 179 is then capable of driving shaft 171 back to its normal zero-registering position where stop arm 174 abuts stop pin 177. Stop pin 177 is withdrawn from the path of stop arm 174 by nut 176 during the first revolution of shaft 171; and stop pin 177 returns into the path of stop arm 174 only after spring 179 has driven shaft 171 back to a position within one revolution of its normal position. Thus shaft 171 can rotate several revolutions from its normal position, and then can be returned to that normal position by action of spring 179. Except for the small portion of shaft 171 that is shown threaded at 175, all the rest of the shaft 171 that lies between the bearing blocks 172 and 173, contains gear teeth in the nature of a pinion rod. The magnet *d* is designed to center and lock shaft 171 in any desired position, by means of a lever 180, journaled at 181, and a gear tooth attached thereto at 182. Lever tooth 182 is normally disengaged from gear

teeth of shaft 171, but is capable of being engaged with gear teeth of shaft 171, when lever 180 is pulled down by plunger 183 of solenoid *d*.

Above the portion of shaft 171 that is equipped with gear teeth, and normally totally disengaged therefrom, are three storage units of identical mechanical construction. Each unit consists of a frame 184 journaled at 185 and carrying a solenoid *aa*, or *bb* or *cc*, adapted to actuate lever 186, which is pivoted at 198 to frame 184, and which is adapted to actuate pawl 187 in a reciprocative manner. A stud 188 is riveted to frame 184 and upon this stud is journaled a gear wheel 189 and ratchet wheel 190, both having the same number of teeth, and pinned together so as to be immovable with respect to each other. Ratchet wheel 190 contains a long tooth 191 which serves to arrest the motion of gear and ratchet wheel combination 189—190 at the normal position of this combination. Spring 192 mounted on stud 188 causes long tooth 191 to be held against pawl 193, which is pivoted on frame 184. Thus spring 192 holds gear 189 in its normal position wherein long ratchet tooth 191 contacts pawl 193; but when the solenoid *aa*, or *bb* or *cc* is consecutively energized by the collector 6, moving pawl 187 in a reciprocative manner, gear wheel 189 is advanced one tooth for each impulse so received. The gear and ratchet wheel combination 189—190 is held in each new position it assumes, by pawl 193.

Storage unit frame 184 is capable of being depressed by plunger 194 of registering magnet 195, until gear wheel 189 meshes with gear toothed portion of registering shaft 171. As frame 184 is being so depressed, and after the gear teeth are partly in mesh, pawls 187 and 193 strike projection 196, causing them to be lifted clear of all teeth on the ratchet wheel 190 except the long tooth 191; whereupon spring 192 causes gear and ratchet wheel combination 189—190 to rotate back to its normal position, where long tooth 191 abuts pawl 193. In moving back to its normal position storage gear 189 advances the registering shaft 171. Shaft 171 is thus moved as many teeth forward as there were votes stored in the storage gear 189.

Under control of collector section E, locking magnet *d* is de-energized while storage gear 189 is advancing the shaft 171, but is again energized before teeth on storage gear 189 break mesh with teeth on shaft 171. Thus shaft 171 is locked in position every time it moves forward. The solenoids which control the release of energy from the storage units to drive the shaft 171 forward, 195 of the first storage unit, 197 of the second storage unit, and 199 of the third storage unit, are consecutively energized by section E of collector 6.

It will be noticed that total registering magnet 195 of 8a is in parallel with corresponding magnets of 8b and 8c; total registering magnet 197 is in parallel with corresponding magnets of 8b and 8c; total registering magnet 199 is in parallel with corresponding magnets of 8b and 8c; and that locking magnets *d* of 8a, 8b and 8c are also in parallel.

Contactor 61 of section E of collector 6 is supplied with positive battery over conductor 58, from switch blade 56 and contactor 57 of votometer switch L. From contactor 61 this current is picked up by wiper 62 and conveyed to wiper 63, which is normally resting on contactor 64, and thereby causes all locking magnets *d* to be energized upon operation of speaker's handle 4.

When the collector 6 is started, for the purpose of operating the votometer 8, with or without re-

corder 7 being connected therewith as has been previously described, wiper 63 begins rotating in an anticlockwise direction.

While traveling in open space after leaving contactor 64, the wiper 63 is not of course making any electrical connection whatever, and all locking magnets *d* are in that period de-energized, and all registering shafts 171 are in that period unlocked, and if any of the shafts 171 had been registering a total when wiper 63 left contactor 64, they would be restored to their normal zero-registering positions by their respective springs 179, during the period wiper 63 is travelling through open air after leaving contactor 64. This open space through which wiper 63 travels after leaving contactor 64 is responsible for the automatic releasing of votometer totals during continuous registration. Between votes votometer totals are released automatically by opening of switch L, but switch L does not open during continuous registration.

After leaving contactor 64 and traveling through the total release space just mentioned, wiper 63 then makes successive contact with contactors 200, 201, 202, 203, 204, 205 and 64. Wiper 63 is arranged to bridge these contacts as it contacts them, so that before one contact is broken the next contact is made. Circuit established at contactor 200 operates magnet *d* of 8a, 8b and 8c; centering and locking shaft 171 of 8a, corresponding shaft of 8b, and corresponding shaft of 8c, in the zero registering position. Circuit established at contactor 201 operates solenoid 195 of 8a, corresponding solenoid of 8b, and corresponding solenoid of 8c; causing shaft 171 of 8a, corresponding shaft of 8b, and corresponding shaft of 8c, to advance for the first registering movement, wherein said shafts set up the vote controlled by division A of collector 6. Circuit established at contactor 202 operates magnet *d* of 8a, 8b and 8c, centering and locking shaft 171 of 8a, corresponding shaft of 8b, and corresponding shaft of 8c with the division A totals. Circuit established at contactor 203 operates solenoid 197 of 8a, corresponding solenoid of 8b, and corresponding solenoid of 8c; causing shaft 171 of 8a, corresponding shaft of 8b, and corresponding shaft of 8c, to advance for the second registering movement, wherein said shafts add the collector division B votes to those already set up. Circuit established at contactor 204 operates magnet *d* of 8a, 8b and 8c, centering and locking shaft 171 of 8a, corresponding shaft of 8b, and corresponding shaft of 8c, with division A and B totals. Circuit established at contactor 205 operates solenoid 199 of 8a, corresponding solenoid of 8b, and corresponding solenoid of 8c; causing shaft 171 of 8a, corresponding shaft of 8b, and corresponding shaft of 8c, to advance for the third registering movement, wherein said shafts add the collector division C votes to those already set up. Circuit established at contactor 64 operates magnets *d* of 8a, 8b and 8c, centering and locking shaft 171 of 8a, corresponding shaft of 8b, and corresponding shaft of 8c, with division A, B and C totals.

Meanwhile, when speaker started vote by operating handle 4, which among other things closed switch L, current from positive battery passed through switch blade 56, contactor 57, conductor 58, to contactor 60 of section F of collector 6, and as wiper 66 was resting thereon, current proceeded through conductor 68 to light all projection lamps, *e* of 8a, *e* of 8b and *e* of 8c, which displayed a zero total, in each case, because at

that time magnet *d* of 8a locked shaft 171 in the zero-registering position in which its stop arm 174 was abutting stop pin 177, and magnet *d* of 8b and magnet *d* of 8c likewise performed the same function. When the collector was placed in operation and all wipers thereof commenced their anti-clockwise rotation, votes in its division A were stored by votometer storage magnets *aa*, votes in its division B were stored by votometer storage magnets *bb*, and votes in its division C were stored by votometer storage magnets *cc*. Approximately during the period in which the votes were being stored, wiper 63, riding on contactor 64, held all registering shafts locked at zero; and wiper 66, riding on contactor 60 held all projection lamps burning. When wiper 66 ran off contactor 60 all projection lamps would be extinguished, and at this same time wiper 63 ran off contactor 64, releasing any old totals that shaft 171 of 8a, or corresponding shaft of 8b, or corresponding shaft of 8c might have been holding, and doing so in darkness. After wiper 63 has caused the new totals to be set up by shaft 171 of 8a, and corresponding shaft of 8b, and corresponding shaft of 8c; and at the same time said new totals are locked in position by wiper 63 contacting contactor 64, the projection lamps *e* are again lighted by wiper 66 contacting contactor 60. With continuous registration these totals remain in position and projection lamps *e* remain lighted until wipers 63 and 66 again leave contactors 64 and 60; but when only a single record is made, that is: without continuous registration, then the totals remain set up, and the votometer lamps *e* remain burning, only until votometer switch L is released by the rising dashpot plunger 150.

In summary: For routine voting, when the presence or absence of a quorum, or the passage or defeat of a bill, is practically assured before the vote is taken, and the vote hardly more than a formality, the speaker would throw handle 4 to the right to open the voting, thereby rendering the voting units, such as 1, 2, 3, etc., operative for voting purposes instead of signalling purposes, and since switch L would be closed by movement of handle 4, gong J would ring, and votometer lamps *e* would light and register zero totals. On special occasions when it was doubtful whether a quorum was present, or whether sufficient members were present to properly decide the fate of a measure, the speaker would open the voting units by throwing his handle 4 to the left, which action would, in addition to performing the functions just stated, also start the collector 6 wipers to revolve continuously, thus causing votometer 8 to register successive totals as the members indicated their presence by operating the voting units. In either case the speaker could lock the voting units such as 1, 2, 3, etc., against further operation; and arrest continuous registration if that feature were operating by stopping the collector 6; and render operative the clerk's switch 5, by simply moving handle of his switch 4 back to its neutral position. If, at this period, the speaker was still doubtful if he had sufficient votes locked in the machine, he could, by pressing pushbutton switch N, operate the collector and votometer for one cycle, and thereupon announce the results if sufficient votes were present, and then order the clerk to make the record; and if the speaker thereby found sufficient votes were not present, he could operate his switch 4 again for further voting. When ordered to by the speaker, the clerk would record the vote by

moving handle of his switch 5 to the right after placing a record card in the recorder. This action would close switch K connecting the recorder with the system, and start the collector.

5 The collector in turn, would cause the record card to be fed through the recorder 7 in a step by step manner, perforating a line of holes, or recording a line of characters, between each feed movement; and the collector would at the same time cause the votometer to display the final totals. The clerk could then reset all mechanism manually by moving the handle of his switch 5 to left, or if he had switch O closed, the collector would automatically reset the equipment, but in either case the resetting impulse would immediately reset all voting units and permit them to be used as signalling devices, and disconnect recorder 7 from the system, and close time delay relay M. The votometer lamps e and other votometer total displaying mechanism, would not be released however, until dashpot plunger 150 finished rising and opened switch L.

Under the old form of oral roll call the speaker and members could make their private record of the vote as the clerk called the names, and were therefore in position to receive or make appropriate motions before the results were announced. The inability of earlier voting systems to preserve this right and privilege, has been one reason such systems have not found a ready market. This right and privilege has been preserved in the system herein disclosed.

It will also be noted that the recorder 7 of this system is ideally adapted to the use of a roll of tape, if that form of recording be preferred to the use of individual record cards, and is the first vote recorder adapted to the use of a roll of tape that would simultaneously record a plurality of votes. It will also be noted that this system is the first that can be installed in sections,—due to separation of the collector or commutator from other devices. For instance the original installation might consist of only the voting units and votometer, with its collector drive. Later, if visual indication and permanent records were desired, the indicator board and recorder could be added.

The votometer herein described is capable of displaying its totals in a great variety of fashions. The three similar views on Fig. 1C are used to illustrate several of the most desirable methods. In 8a a sprocket wheel 210 is pinned to shaft 171, and feeds film 211, bearing consecutive vote numbers, in front of lens 212 and mirror 213. In 8b a pinion 214 on shaft 171 drives gear 215 journaled at 216, and a transparent number bearing disc 217, attached to gear 215, is thus rotated in front of condensing lens. In 8c a similar gear drive is used to rotate drum 218. Number bearing flange or ring 219 may be translucent and illuminated, or transparent for projecting totals, or solid with numbers impressed thereon, or solid with raised numbers, as at 220, for printing totals on a card 221, as soon as registration has become completed, by the clerk manually closing, or the collector 6 automatically closing, the contacts 222, which will cause solenoids 223 to become energized by battery 224, thereby moving plunger 225, and causing striker arm 226 to press paper card 221 against the raised number 220. Permanent record is made from ink provided by a suitable ribbon or roller. For projecting totals suitable projection lenses would be used.

In Fig. 2 I have shown a side view of the reg-

istering mechanism shown at 8a in Fig. 1C taken adjacent the right side of nut 176.

The relationship of the parts already designated in Fig. 1C will be clear by following similar reference character designations applied in both Fig. 1C and Fig. 2.

The schematic arrangement of the system of my invention has been shown more clearly in Fig. 3 in which the several parts of the system heretofore explained are shown in their relative positions. I have illustrated by voting units 1, 2 and 3 mounted on the members' desks and connected through the switchboard SB with the page-call P, the collector 6, the indicator board IB, the votometer 8, and the recorder 7. I have illustrated the clerk's desk on which the recorder 7 may be mounted, and in a convenient position thereto, the clerk's switch 5 and the automatic resetting control switch O. I have also shown the speaker's desk on which there is mounted the speaker's switch 4 and the push-button switch N which permits the total to be secured with the voting units 1, 2, and 3, etc., locked and the recorder 7 disconnected.

While I have described my invention in one of its preferred embodiments, I realize that modifications may be made, and no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

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

1. In a voting system, a multiplicity of voting means divided into separate pluralities, a source of energy connected with each of said voting means, a commutator device for each plurality of said voting means having a series of contacts individually connected with each of said means in the respective plurality, vote totaling and registering means having energy storage devices individual to each said commutator device and simultaneously operable by energy impulses delivered therefrom, electromechanical releasing means cooperative with each of said storage devices, and separate commutator means having a series of contacts connected with said releasing means for controlling the release of quantities of stored impulses successively from said storage devices, said totaling and registering means including a single numerical device mechanically engageable with and actuated successively by said storage devices upon the operation of said releasing means.

2. In a voting system, a multiplicity of voting means divided into separate pluralities, a source of energy connected with each of said voting means, a commutator device for each plurality of said voting means having a series of contacts individually connected with each of said means in the respective plurality, vote totaling means comprising energy storage devices individual to each said commutator device and simultaneously operable by energy impulses delivered therefrom for storing the energy impulses in the respective pluralities, electromechanical releasing means cooperative with each of said storage devices, separate commutator means having a series of contacts connected with said releasing means for controlling the release of stored impulses successively from said storage devices, and registering means mechanically engageable with and actuated successively by said storage devices upon the operation of said releasing means for registering additively in votes the total of energy impulses delivered from each storage device.

3. In a voting system as set forth in claim 2, electromechanical holding means engaged with said registering means intermediate the actuation of said registering means by said storage devices, said separate commutator means having contacts, intermediate the said series of contacts thereon, connected with said holding means for controlling the operation thereof in timed relation to the operation of said releasing means.

4. In a voting system as set forth in claim 2, total displaying means cooperative with said registering means, and additional commutator means connected with said displaying means for controlling the operation of said displaying means to display the full total of votes on said registering means, said displaying means being maintained inoperative for the successive totals from the separate storage devices and during the periods of actuation of said registering means.

5. In a voting system including a register having total display means and a reset control device, a control system for restoring said register to normal condition comprising a switch in series with said display means and said reset control device; means for opening said switch including an electromagnet, contacts in circuit with said electromagnet, and retarded electromagnetic means for operating said contacts; and means for energizing the last said means at the conclusion of the operation of said voting system, said retarded electromagnetic means permitting continued operation of said register for displaying totals for a predetermined subsequent period before the opening of said switch and restoration of said register to normal condition by deenergization of said display means and said reset control device.

6. In a roll call system, a plurality of voting devices, individual means for locking each of said devices in not voting positions, control means having normal and actuated positions connected in common with said individual means when in actuated position for simultaneously unlocking said devices for movement by the voters to voting positions, said devices being retained in voting positions by said individual means, and separate means connected through said control means for releasing said devices from voting positions when said control means is restored to normal position with said devices retained in voting positions.

7. In a roll call system, a plurality of voting devices, commutator means connected with said devices for controlling the totalization of votes

cast through said devices, motor means for driving said commutator means, means controlled by said commutator means for operating said motor means, individual means for locking each of said voting devices in voting position, means for releasing said devices from voting positions, and auxiliary commutator means driven by said motor means for automatically controlling said releasing means to restore the system to normal condition.

8. In a roll call system as set forth in claim 6, a register, commutator means for controlling the operation of said register from said voting devices, motor means for driving said commutator means, switch means in circuit with said motor means for controlling said motor means, and manually actuated means in circuit with said releasing means for operating said releasing means at the termination of the operation of said commutator means for restoring the system to normal condition.

9. In a voting system, a plurality of voting means, a source of energy connected with each of said voting means, a register including energy storage means and vote registering means, a commutator for controlling the operation of said energy storage means from said source of energy through said voting means, and means synchronized with said commutator and cyclically operable for controlling the operation of said energy storage means with respect to said vote registering means for showing various total indications relative to a given subject, a previous total indication being shown during periods in which additional energy is stored, and stored energy being registered in votes during intermediate periods, whereby said various totals are obtained.

10. In a voting system including voting means for conditioning a circuit, locking means for said voting means, indicating means, and vote totalling and registering means: manual control means operable in one of two actuated positions for controlling the unlocking of the voting means for operation with respect to said indicating means, and in the other actuated position for controlling the operation of said vote totalling and registering means and for controlling the unlocking of the voting means for also closing the circuit to said vote totalling and registering means, and means for individually manually actuating said voting means.

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