

May 31, 1949.

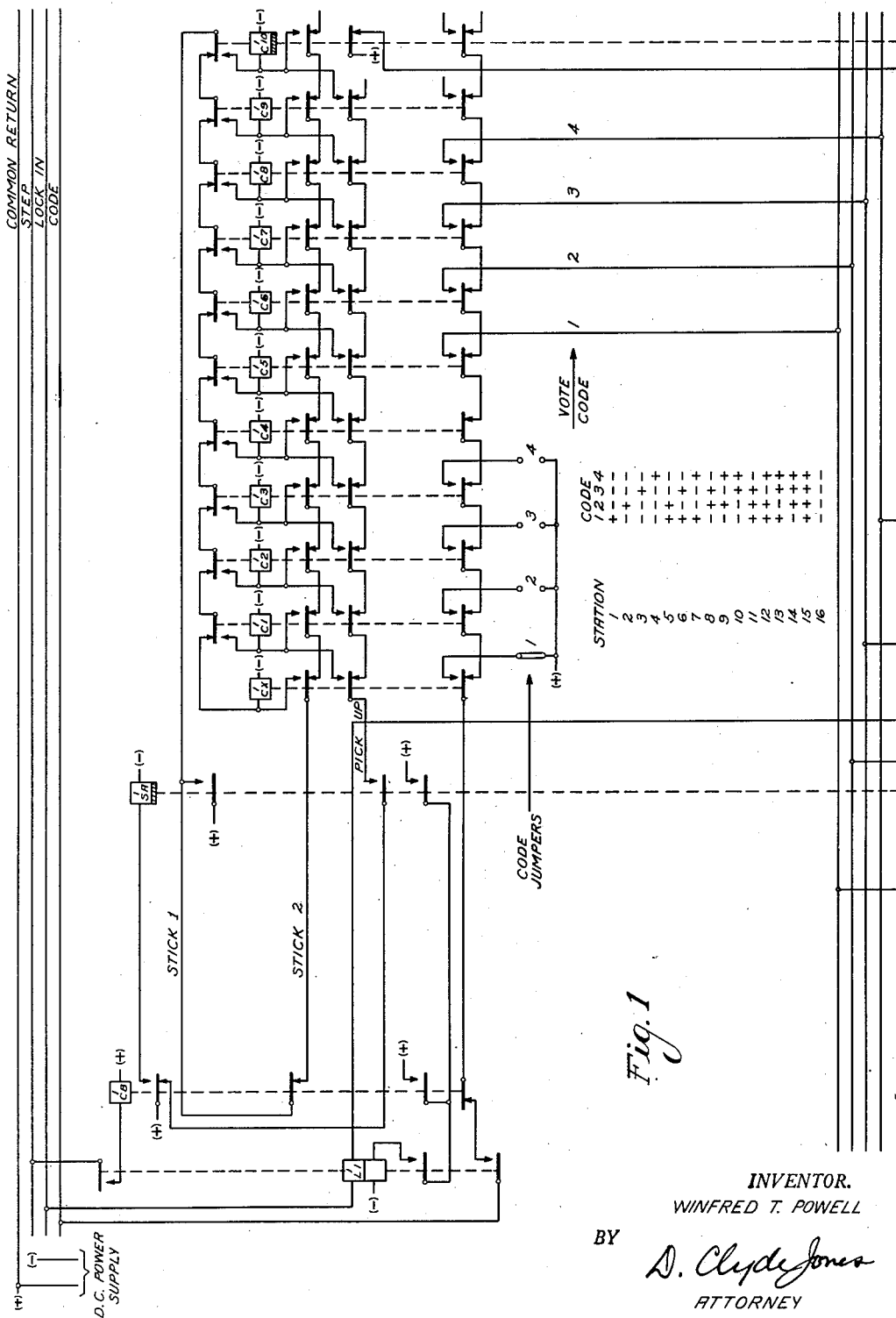
W. T. POWELL

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ELECTRICAL VOTING SYSTEM OR THE LIKE

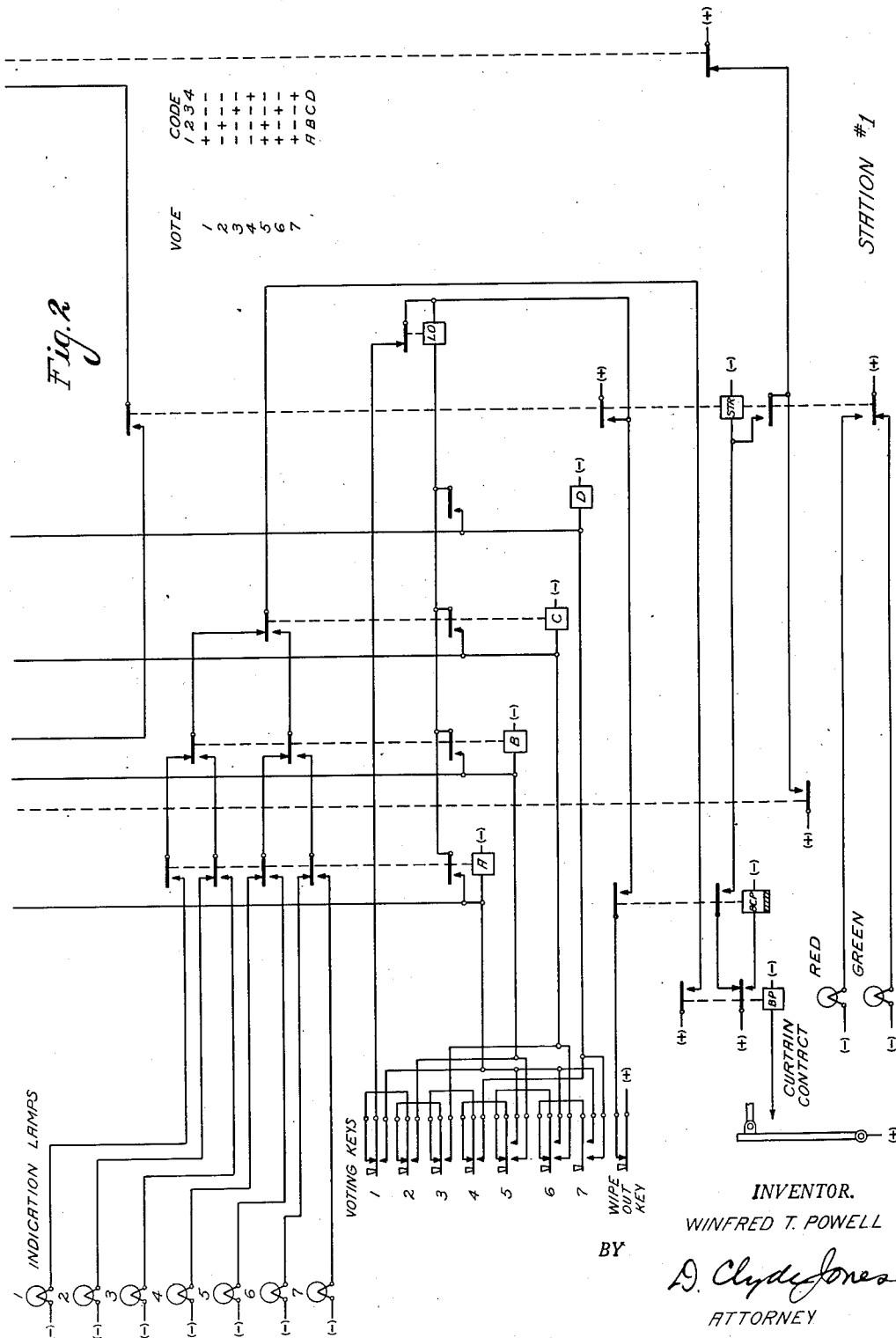
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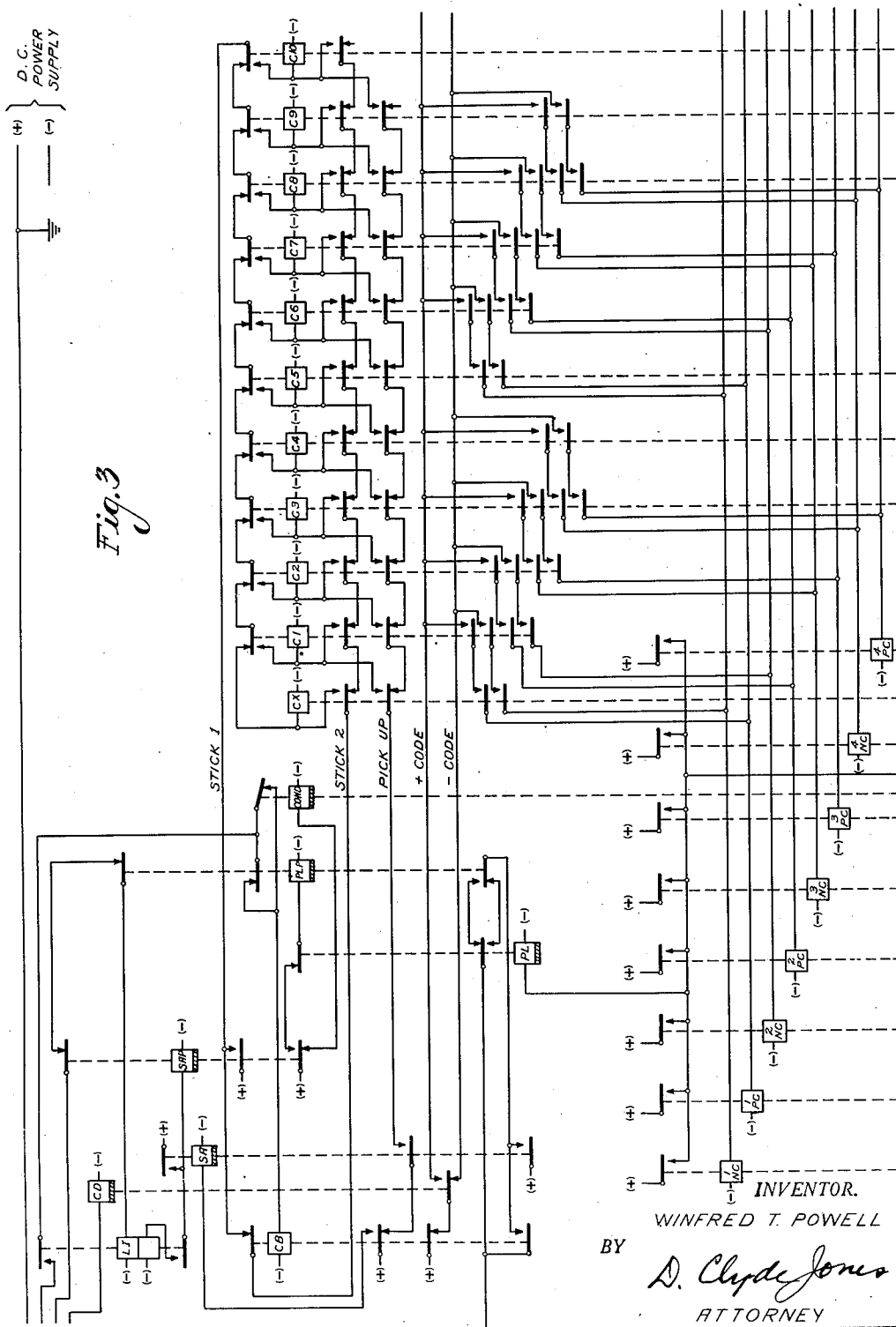
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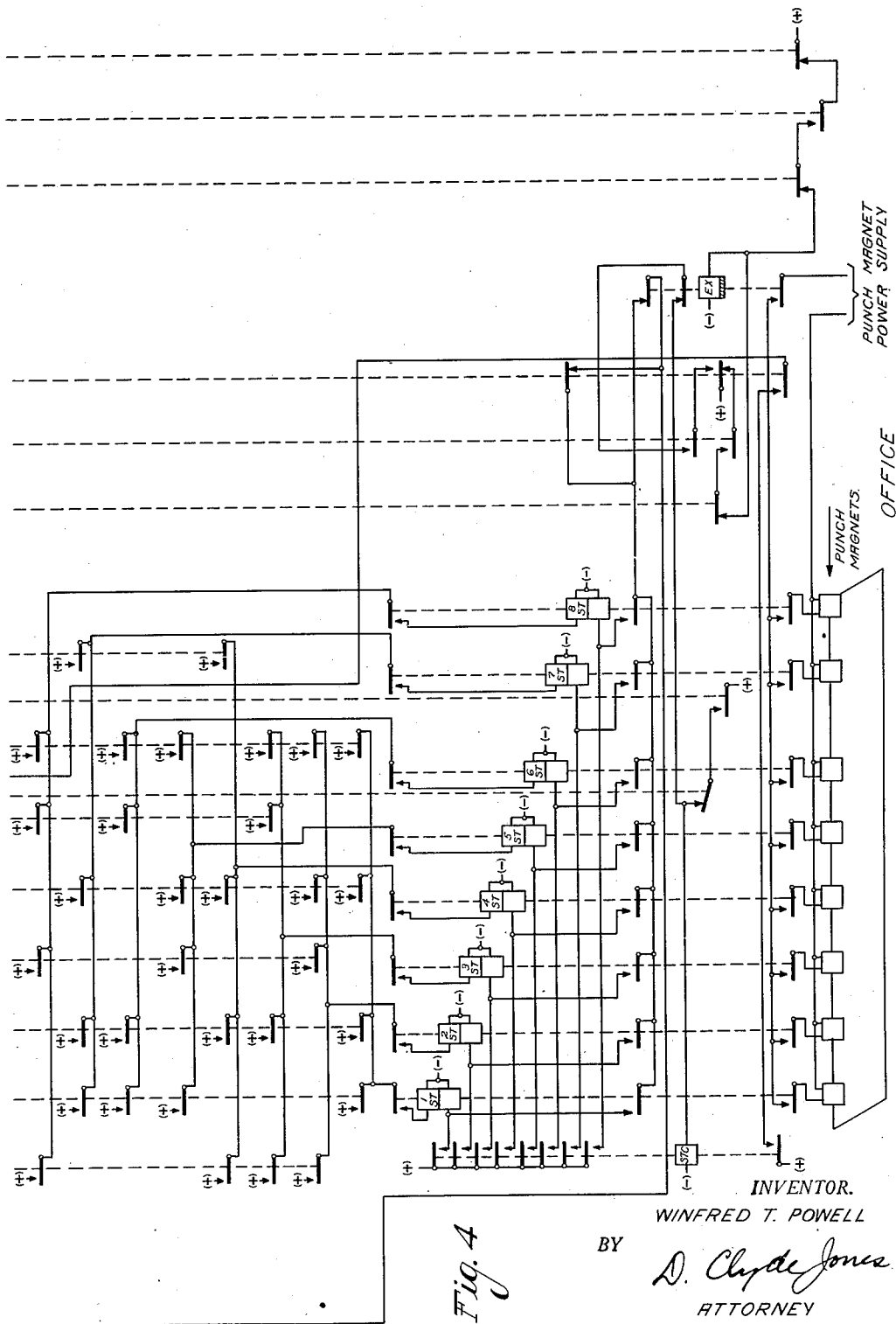
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UNITED STATES PATENT OFFICE

2,471,774

ELECTRICAL VOTING SYSTEM OR THE LIKE

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10 Claims. (Cl. 235—50)

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This invention relates to an electrical voting system or the like.

This system has for its purposes an arrangement in which votes or other choices made at a plurality of scattered voting booths located at outlying stations can be electrically recorded at a central office, over a minimum number of conductors.

The various features and advantages of the invention will appear from the detailed description and claims when taken with the drawings in which the four figures diagrammatically represent the present arrangement. Fig. 1, with Fig. 2 placed therebeneath, indicates that portion of the system located at one outlying station or booth, while Figs. 3 and 4, when placed respectively at the right of Figs. 1 and 2, represent the central office, which is common to a plurality of outlying stations.

The present system is assumed to comprise sixteen voting booths or outlying stations, of which one station is shown in Figs. 1 and 2, all connected to the central office recording mechanism by means of two pairs of conductors common to the whole system. A portion of the system at each station is made up of a channel selecting device comprising a group of counting relays, which step off in synchronization with a similar channel selecting device comprising a group of counting relays in the central office. There is also provided at each station a lockout circuit for preventing more than one station gaining access to the line at any one time, and also selectors for recording the vote or choice.

Although only one such selector is illustrated, comprising a group of seven keys and four registering relays, it will be obvious that additional groups may be provided and selected in the same manner illustrated. Although only seven keys are illustrated, the coding system provides for a maximum of sixteen such keys for each selector, when four registering relays A, B, C and D are provided. For each additional relay provided, the number of keys is doubled. The code jumper arrangement (Fig. 1) for providing station registration shows four such jumpers selected at the first four steps of the cycle. This provides for the registration of any one of sixteen stations during a cycle. More specifically, the counting relays at a transmitting station (Figs. 1 and 2) and the counting relays in the office (Figs. 3 and 4) step through an operating cycle in synchronism when the system is started up by the opening of the curtain contact at the station. During the first four steps

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of the counting relays, the line to the office is coded by energizing (referred to as a + code) or not energizing (referred to as a - code) this line at each step. Therefore, one step provides a choice of two codes, (+ or -). Two steps provides a choice of four codes (+ at the first step and + at the second step, + at the first step and - at the second step, - at the first step and + at the second step, - at the first step and - at the second step). Three steps provides a choice of eight codes (built up in the same manner at each step), four steps provides a choice of 16 codes (built up as above in geometrical progression), the number of available codes equalling two raised to the power of the number of steps. As illustrated, the first four steps are coded to provide for a selective registration of 16 different stations, while four additional steps of a cycle are provided to selectively register the vote at a registered sending station. The number of possible voting choices during an operating cycle is likewise equal to two raised to the power of the number of steps in the voting portion of the cycle. This is because the line is again coded at each step as previously explained. A superiority of code scheme is provided to disconnect all stations except one in the event that more than one station obtains access to the common line circuit at the beginning of a cycle. In other words, more than one station may be waiting when a new cycle begins and the stations will all connect themselves to the common line circuit, but at the step of the cycle when execution takes place (recording the station in the office), all stations will have been dropped off except one and that one will be the one having the superior code.

It is believed that the operation will best be understood by assuming that the station illustrated in Figs. 1 and 2 is station #1 and that a voter enters the booth at this station and operates voting key #1 in order to vote for John Doe or to answer a questionnaire, as the case may be, by means of this particular key.

When the voter enters the booth and closes the curtain, the curtain contact closes a circuit for operating booth curtain relay BP. Relay BP closes a circuit for operating the booth curtain repeater slow-acting relay BCP.

When the voter operates key #1, a circuit is closed through a back contact of the wipe-out key, front contact of relay BCP, back contact of lock-out relay LO, front contact of key #1 and winding of relay A. When the key is released, relay A is locked over a portion of the

circuit just described but now including the winding of relay LO and front contact of relay A. Relay LO operates and opens up the operating circuit of the keys so that the operation of another key in this group will be ineffective.

Relay A completes a circuit, including front contact of relay BP, for lighting lamp #1 as an indication that the #1 key operation has been effective. In the event of an error or a desire to change the vote, the operation of the wipe-out key restores the register relays to normal and extinguishes the lamp as an indication that another vote may be made. This wipe-out key is only effective as long as the booth is occupied and relay STR is not operated, since opening the booth curtain releases relays BP and BCP in sequence, thus operating relay STR which locks itself operated until the cycle is run off. Consequently, when the booth curtain is opened, the registration cannot be changed and the keys are ineffective until the previous recording has been effected in the central office and the system restored to normal.

When relay STR operates, in response to opening the curtain contact, the normally actuated green light is changed to a red light and this red light remains on until the system runs through its cycle which will take approximately two seconds, depending on the size of the system. When relay BP releases in response to opening the booth curtain, the #1 indicator lamp is extinguished.

In this system a lock-in-lock-out scheme is used to permit one or more stations to gain access to the common line circuit at the beginning of each cycle and to prevent any station gaining access to the line circuit during an operating cycle.

This is accomplished by the use of the lock-in conductor which is one of the four common conductors connected to all stations. Assuming the system to be in its normal position when a voting key is operated at station #1, as above explained, the operation of relay STR at the station closes a circuit for operating the station lock-in relay ILI and the office lock-in relay LI in series with the lock-in line conductor.

In order to describe how the system operates, if more than one station comes in on the line at the same time at the start of a cycle, it will be assumed that voting has taken place at eight different stations (stations 1 to 8 inclusive) and that the lock-in relays at all of these stations are operated at the same time. The operation of relays LI and ILI effects the operation of relays ICB at the illustrated station and CB in the office over the step line circuit. Of course, in the present assumed condition, the ICB relays at the other seven stations will also operate. Since there is a limit on the number of ICB relays at the stations which can be impulsed in multiple over the step line circuit, the values of the ILI relays at the stations can be so worked out that only the limited station ILI relays can operate in multiple and in series with relay LI in the office which corresponds to the limited number of relays ICB that can be impulsed. It will be understood that as each relay, such as ICB, is connected to the step line, the current through each of these relays connected in multiple with this step line will be reduced so that a point will be reached where the current will become so low that any additional relay, such as relay ICB, will not operate. The number of

such relays that will be operated at any given time is a matter of choice.

The operation of relay ICB at the station closes an obvious circuit for operating relay ISA and relay ISA closes a circuit for operating relay ICX. It will be understood that similar relays at the other stations operate and that the counting relays at these other stations operate through the cycle in synchronism with the illustrated station. Relays ICB and ISA close a locking circuit for relay ILI to maintain this relay operated throughout the cycle.

Relay CB in the office closes a circuit for operating relay SA and this relay in turn closes a circuit for operating relay SAP which effects the operation of relay CX. Relay SAP opens up the lock-in circuit so that no other station can get in during this cycle. Relay LI is likewise locked operated during the cycle by means of a front contact on relay SA.

The counting relay circuit is the same as disclosed in Powell Patent, No. 2,325,877, granted August 3, 1943, it being understood that the impulsing of the step line provides a number of "on" and "off" periods which correspond to the energized and deenergized conditions of the line respectively. The first energized period of the step line is conveniently referred to as the conditioning "on" period since it effects the operation of all station relays in the office. This is done by operating impulse repeating relay FLP when relay SAP operates for effecting the slow release of conditioning relay COND. The operation of relay CX closes a circuit for operating relay STC (Fig. 4) and this relay in turn closes circuits for operating all station relays, eight of which (1ST to 8ST inclusive) are shown, it being understood that there will be 16 station relays in a system having 16 stations. The release of relay COND effects the release of relay STC but before relay STC releases, certain locking circuits are completed for the station relays as will be pointed out later.

The release of relay COND opens up the step line circuit to terminate the conditioning "on" period which effects the release of relay CB and the operation of relay C1.

The opening up of the step line also effects the release of relay ICB and the operation of relay IC1 over a circuit traceable from the negative pole of battery, winding of relay IC1, middle front contact and armature of relay ICX, through the pick-up lead, front contact and armature of relay ISA, innermost back contact and armature of relay ICB, to the positive pole of battery. The release of relay ICB closes the code line circuit and since station #1 has the #1 code jumper connected as shown, this completes a circuit for operating relay CD in the office. With relay CB down and relay CD up, a circuit is closed for applying positive potential to the positive code conductor. If relay CD is down at this time then this circuit applies positive potential to the negative code conductor. The positive and negative code conductors correspond to the positive and negative codes in the code line, the positive and negative conditions corresponding to the energized and deenergized conditions respectively of the code line.

The energization of the positive code conductor during the first "off" period closes a circuit through front contacts of relays C1 and CX for operating the #1 positive coding relay IPC. If this first code was negative, then relay INC would have been operated.

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The operation of any PC or NC relay closes a circuit for operating impulse relay PL and this relay opens the circuit of relay PLP which releases after a short interval and closes up the step line to terminate the first "off" period.

At the end of the first "off" period, relays CB and ICB are operated. Relay ICB opens up the code line and also effects the release of relay ICX. The operation of relay CB effects the release of relay CX. The operation of relay ICB effects the release of relay CD and the operation of relay CB effects the release of relay IPC.

The release of relay IPC opens up and releases relay PL which closes the circuit for operating relay PLP which in turn opens up the step line to terminate the first "on" period. This releases relays ICB and CB for operating relays IC2 and C2.

The circuit for operating relay IC2 may be traced from (+), break contact of relay ICB, make contact of relay ISA, break contact of relay ICX, make contact of relay IC1 and winding of relay IC2 to (-). The circuit for operating relay C2 may be traced from (+), break contact of relay CB, make contact of relay SA, break contact of relay CX, make contact of relay C1 and winding of relay C2 to (-).

The second code is transmitted during the second "off" period, and since there is no connection of the #2 code jumper, relay CD will not be energized. Consequently, the release of relay CB closes a circuit for applying positive potential to the negative code conductor, which is effective over a circuit including front contacts of relays C2 and C1 for operating the negative code relay 2NC. This closes a circuit for again operating relay PL which releases relay PLP for closing the step line circuit which terminates the #2 "off" period and operates relays CB and ICB.

It is not believed necessary to describe in detail the operation of the counting relays and the impulse relays during the remaining steps of the cycle, since enough has been explained to show that relays PL and PLP cooperate with the counting relays for providing the "off" and "on" periods of the cycle. Since these relays are slow releasing, the impulsing will be at the proper rate for proper stepping control. It will likewise be understood that the PC and NC relays in the office are operated in accordance with whether, or not, there is a code jumper connection at the different steps of the cycle.

The #1 station has code positive, negative, negative, negative and consequently, the code line will be energized at the first step and deenergized at the second, third and fourth steps. The code table shown just below the code jumper arrangements indicates the various code combinations for selectively registering any one of 16 stations during the first four steps of the cycle.

It will now be explained how relay 1ST in the office is maintained operated after the four codes have been transmitted and how all other relays are dropped out by the time the last code is transmitted, so that only one station may be recorded on the punch machine during one cycle.

Referring to the central office circuits, a locking circuit is closed for all ST relays extending from positive battery, front contact of relay SA, front contact of relay PLP, back contact of relay PL, back contact of relay EX and front contacts of all ST relays to their lower windings. Another positive potential is applied to this locking circuit by way of a front contact of relay CB. This

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locking circuit is completed with relays PL and PLP out of correspondence, consequently these ST relays will be locked operated until relay PL is operated during the first "off" period at which time relay CB is deenergized. When relay PLP is released in response to the operation of relay PL, this locking circuit is again completed and when relay CB is next operated during the #1 "on" period, the positive potential is connected to the locking circuit by way of a front contact of relay CB.

From the above, it will be seen that there is an interval after the operation of relay PL and before the release of relay PLP (which is slow releasing) during which the above described locking circuit for the ST relays is open. During this interval the energization of an ST relay is made dependent upon the code at this step. In this particular example, relay CD was operated before this above described locking circuit for the ST relays is opened and remains operated until after it is again closed. This is because relay CD is operated by the release of ICB at the station and is not released until shortly after the operation of relay ICB at the station. With relay IPC operated, as above described for the first code, an additional locking circuit is closed for relay 1ST including its upper winding and this locking circuit is maintained until relay IPC is released which occurs after the above described locking circuit for the lower windings of the ST relays is again closed.

Furthermore, referring to the code table, station relays 5, 6 and 7 are also responsive to a positive code at the first step, it being noted from the circuit that relay IPC completes locking circuits for the upper windings of relays 5ST, 6ST and 7ST as well as for relay 1ST, but at this point there are no locking circuits for relays 2ST, 3ST, 4ST and 8ST, thus resulting in the release of these relays during the transmission of the first code.

The same condition exists during the second "off" period when the second code is transmitted. In the present example, this is a negative code, relay CD will not be operated and consequently relay 2NC will be operated over a circuit including back contacts of relays CB and CD and front contacts of relays C1 and C2. Relay 2NC is released by the operation of relay CB in a manner similar to that described in connection with the release of relay IPC of the first code.

During the interval of the second "off" period when the locking circuits for the lower windings of the ST relays are opened, the energization of one or more ST relays is dependent upon a circuit completed through a front contact of relay 2NC. It will be seen that relay 2NC locks relays 1ST, 6ST and 7ST of those remaining operated from the first code and relay 5ST is released.

At the third code, which is a negative code, relay 3NC is operated and this relay completes locking circuits for the upper windings of relays 1ST and 7ST only of those left operated from the second code, thus effecting the release of relay 6ST.

The fourth code is negative and relay 4NC is operated, this relay completing a locking circuit for relay 1ST only of the relays left operated after the code is transmitted for registering in the central office the #1 station to the exclusion of the other stations. It will be obvious from the code table, the jumper connections and the circuit wiring of the ST, PC and NC relays, how the different code combinations function

to maintain only one relay in its operated position after the transmission of a station code.

With relay C4 operated and relay C3 released, a circuit is closed for operating relay EX and this relay completes a circuit for operating the station punch magnet corresponding to the recorded station. Since this station, in the present example, is station #1, this circuit will extend through front contact of relay IST to the winding of the associated punch magnet for punching the hole in the card at the proper location for recording this station. The station relay IST (or any other station relay left operated) is released when relay C5 operates which is after the operation of relay EX. The release of relay IST opens the circuit of the punch magnet, this magnet restores and the punch machine is advanced for making the next recording. Relay EX is released by the operation of relay C5.

After the transmission of the four codes of the station code, no PC nor NC relay will be operated to operate relay PL for continuing the impulsing of the cycle. This provides a slight delay during the 5th "off" period for again conditioning the circuits and again operating the ST relays. When relay EX releases, a circuit is closed through its back contact and front contacts of relays C4 and C5 for again operating relay STC, which relay again effects the operation of all ST relays. Relay STC closes a circuit for operating relay PL, since relay C5 is operated at this time and relay PL causes the continued impulsing for completing the cycle. The impulsing circuits function as before with relays PL and PLP in combination with the counting relays providing the impulses in the step line.

Relays IC5 to IC8 inclusive select channel circuits leading to the four register relays of the first register and extend these channel circuits in sequence to the code line for providing a code which is similar to the station code previously explained, but in this case dependent upon the energization of the A, B, C and D relays of the first register. Any one or more of these relays operated will have positive potential extended from the left hand terminal of the relay windings to the associated channel circuit and will provide a positive code for operating relay CD in the central office. Any relay not energized will provide a negative code at the corresponding step.

The positive and negative codes are effective to disconnect ST relays in the office in the same manner previously described, leaving only one operated after the ninth "off" period of the cycle. This provides the voting code during the sixth, seventh, eighth and ninth "off" periods and this code in the present example will be effective to operate relay IPC and relays 2, 3 and 4NC since it was assumed that relay A is the only one energized of the first register group.

Executing relay EX is again operated when relay C8 releases after the operation of relay C3 and closes a circuit for again operating a punch magnet corresponding to the ST relay left operated. In the present example, this was assumed to be relay IST, so that the corresponding punch magnet will be again operated to register the vote for John Doe, it being understood that the punch magnet machine advanced the card to the next row corresponding to the first register or selector. Relay EX will be released when relay C10 is operated and will open up the circuit of the punch magnet. From the above explanation, it will be seen that additional register selectors may be provided and connected to

additional channel circuits and these channel circuits may be selected by providing additional counting relays at the stations.

When relay PLP is operated by the release of relay PL to terminate the ninth "on" period, there will be no operation of a PC or NC relay to again operate relay PL, consequently the step line will be maintained open, relays CB and ICB will remain deenergized and relays SA and ISA will release. The release of relay ISA effects the release of relays ILI, STR, IC9 and IC10. Relay IC10 is slow acting to permit relay STR to release before its locking circuit is again closed. The release of relay STR effects the release of relays A and LO and changes the red light to a green light as an indication that the booth may be again used for another voting operation.

In the central office, the release of relay SA effects the release of relays LI and IST (or any other ST relay left operated) as well as effecting the release of relay SAP. Relay SAP causes relays C9 and C10 to release and COND to operate.

Station #1 cannot gain access to the line circuit again until relay IC10 releases because there is no positive potential connected to the upper winding of relay ILI for energizing the lock-in line. However, another station waiting to gain access to the line circuit can get in as soon as relay PLP in the control office releases at the end of the cycle, this being before the release of relay IC10 at the station. This arrangement prevents a station from monopolizing the line circuit and permits other stations to take their turn in transmitting.

It will be understood that the D. C. current supply shown at the office and at the station may be rectified A. C. since this supply is used only for the purpose of operating relays, magnets and lamps. It will also be understood that more than one booth may be provided at a location, each booth being assigned a station code. Furthermore, the station code and/or the voting code can be readily varied by obvious variations in the counting and selector circuits.

What I claim is:

1. In a voting system, a plurality of voting stations, a central office, a set of conductors connecting said office and said stations, said office and said stations being each provided with a chain of relays sequentially operated in a given cycle, means at each station for indicating one of several votes or choices thereat by a distinctive selected code, code-operated means at the office for displaying the votes or choices made at the respective stations, means for effectively associating a given station with said set of conductors to the exclusion of other stations, means controlled over said conductors responsive to said association for causing the relay chain at the associated station and the relay chain at the office to operate sequentially in step with each other, means responsive to the operation of the relay chain at the associated station and to the operation of the relay chain at said office for transmitting the distinctive code at the given station over at least one of said conductors to said code-operated means.

2. In a voting system, a plurality of voting stations, a central office, a set of conductors connecting said office and said stations, each station and said office being provided with a chain of relays sequentially operated in a given cycle, a set of keys at each station, each key being related to a given vote or choice, a plurality of register relays at each station less in number than the number of keys in the set and controlled by said keys, to

establish a group of code conditions individual to each vote, means at said office including a group of code-controlled relays for recording each choice, means for effectively associating a given station with said set of conductors to the exclusion of other stations, means controlled over said conductors responsive to said association for causing the relay chain at the associated station and the relay chain at the office, to operate sequentially in step with each other, and means responsive to the operation of the relay chain at the associated station and to the operation of the relay chain at said office for communicating in sequence over certain of said conductors to said code controlled relays, the code conditions of a given vote for selectively operating said last-mentioned relays.

3. In a voting system, a plurality of voting stations, a central office, a set of conductors connecting said office and said stations, each station and also said office being provided with a chain of relays sequentially operated in a given cycle, a voting position at each station provided with a curtain switch operated prior to the act of voting, a set of keys at each position, each key being related to a given vote or choice, a plurality of register relays at each station less in number than the number of keys in the set and controlled by said keys and by said curtain switch, when operated, to establish a group of code conditions individual to each vote, means at said office including a group of code-controlled relays for recording each choice, means for effectively associating a given station with said set of conductors to the exclusion of other stations, means controlled over said conductors responsive to said association for causing the relay chain at the associated station and the relay chain at the office to operate sequentially in step with each other, and means responsive to the operation of the relay chain at the associated station and to the operation of the relay chain at said office for communicating in sequence over certain of said conductors to said code controlled relays, the code conditions of a given vote for selectively operating said last-mentioned relays.

4. In a voting system, a voting station, a central office, a set of conductors connecting said office and said station, said office and said station being each provided with a chain of relays sequentially operated in a given cycle, means at said station for indicating at least one of several possible votes or choices thereat by a selected multi-unit code, recording relays at said office, means controlled over said conductors responsive to the indication of a choice at said station for causing the relay chain at the associated station and the relay chain at the office to operate sequentially in step with each other, means responsive to the initiating of the operation of the relay chain at said office for operating all of said recording relays, decoding relays at said office, means including the operating relay chain at said station and the operating relay chain at said office for communicating the units of the code at said station over at least one of said conductors to selectively govern said decoding relays, means including said decoding relays for selectively releasing all of said recording relays except the one indicative of said choice, and recording mechanism selectively controlled by said recording relays.

5. In a voting system, a voting station, a central office, a set of conductors including a step conductor and a code conductor connecting said office and said station, said office and said station being

each provided with a chain of relays sequentially operated in a given cycle, means at said station for indicating at least one of several possible votes or choices thereat by a selected multi-unit code, recording relays at said office, means controlled over said step conductor responsive to the indication of a choice at said station for causing the relay chain at the associated station and the relay chain at the office to operate sequentially in step with each other, means responsive to the initiating of the operation of the relay chain at said office for operating all of said recording relays, decoding relays at said office, means including the operating relay chain at said station and the operating relay chain at said office for communicating the units of the code at said station over said code conductor to selectively govern said decoding relays, means including said decoding relays for selectively releasing all of said recording relays except the one indicative of said choice, and recording mechanism selectively controlled by said recording relays.

6. In a voting system, a plurality of voting stations, a central office, a set of conductors connecting said office and said stations, said office and said stations being each provided with a chain of sequentially operated relays, means at each station for individually characterizing the same by a station code, means at each station for selectively registering at least one vote or choice thereat by a distinctive code, code-operated means at the office for displaying the designation of said stations and for displaying the votes or choices made at the respective stations, means for effectively associating a given station with said set of conductors to the exclusion of other stations, means responsive to said association for causing the relay chain at the associated station and the relay chain at the office to operate sequentially in step with each other, and means responsive to the operation of the relay chain at a given station and to the operation of the relay chain at said office for transmitting the stations code of the given station and the distinctive code at the given station over one of said conductors to said code-operated means for operating the same.

7. In a voting system, a plurality of voting stations, a central office, a set of conductors connecting said office and said stations, said office and said stations being each provided with a chain of relays sequentially operated in a cycle, means at each station for individually characterizing the same by a stations code, manually controlled means at each station for selectively registering at least one vote or choice thereat by a distinctive code, code-operated means at the office for displaying the designation of said stations and for displaying the votes or choices made at the respective stations, means for effectively associating a given station with said set of conductors to the exclusion of other stations, means controlled over at least one of said conductors responsive to said association for causing the relay chain at the associated station and the relay chain at the office to operate sequentially in step with each other, and means responsive to the operation of the relay chain at a given station and to the operation of the relay chain at said office for transmitting the stations code of a given station and the distinctive code at the given station over another of said conductors to said code-operated means whereby the same is selectively actuated.

8. In a voting system, a plurality of voting sta-

tions, a central office, a set of conductors including a step conductor and a code conductor connecting said office and said stations, said office and said stations being each provided with a chain of sequentially operated relays, means at each station for individually characterizing the same by a station code, means at each station for selectively registering at least one vote or choice thereat by a distinctive code, code-operated means at the office for displaying the designation of said stations and for displaying the votes or choices made at the respective stations, means for effectively associating a given station with said set of conductors to the exclusion of other stations, means responsive to said association for causing the relay chain at the associated station and the relay chain at the office to operate over the step conductor sequentially in step with each other, and means responsive to the step by step operation of the relay chain at a given station and to the step by step operation of the relay chain at said office for communicating over said code conductor and in the course of successive steps, the stations code of the given station and the distinctive code at the given station over one of said conductors to said code-operated means for operating the same.

9. In a voting system, a plurality of voting stations, a central office, a set of conductors connecting said office and said stations, a voting position at each station provided with a curtain switch operated in the course of the act of voting, a set of keys at each position, each key being related to a given vote or choice, a plurality of register relays at each station less in number than the number of keys in the set and controlled by said keys and by said curtain switch, when operated, to establish a group of code conditions individual to each vote, means at said office including a group of code-controlled relays for recording each choice means for pulsing one of said conductors for transmitting a series

of impulses, means for pulsing or not pulsing another of said conductors during the transmission of said series of impulses to form permutation codes, and means responsive to said permutation codes for selectively operating said code controlled relays.

10. In a voting system, a plurality of stations connected to a central office by a stepping line and a coding line, a channel selecting device at said office and a channel selecting device at each of said stations, means at each station for indicating one of a plurality of votes or choices thereat by a distinctive selective code, a plurality of code responsive relays in said office, a plurality of card punching magnets in said office, means for effectively associating a given station with said stepping and coding lines, means controlled over said stepping line for synchronously operating the channel selecting device at said given station and at said office through a cycle, means controlled over said coding line for selectively operating said code responsive relays during a first portion of said cycle for operating one of said magnets to record the identity of said given station, and means controlled over said coding line for again selectively operating said code responsive relays during a second portion of said cycle for operating one of said magnets to record the indicated vote or choice at said given station.

WINFRED T. POWELL.

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