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G. KINER

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CALL REGISTER

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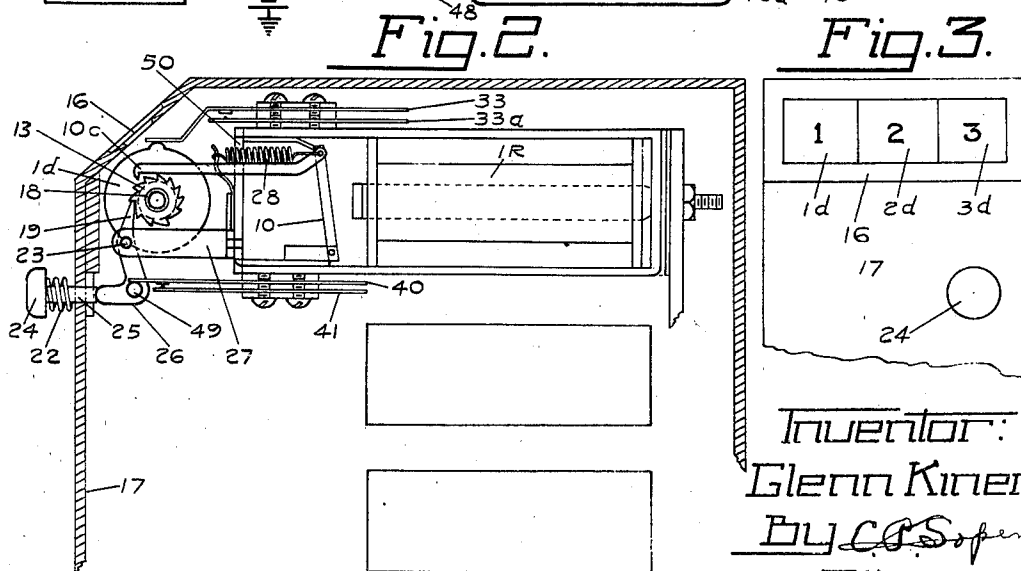
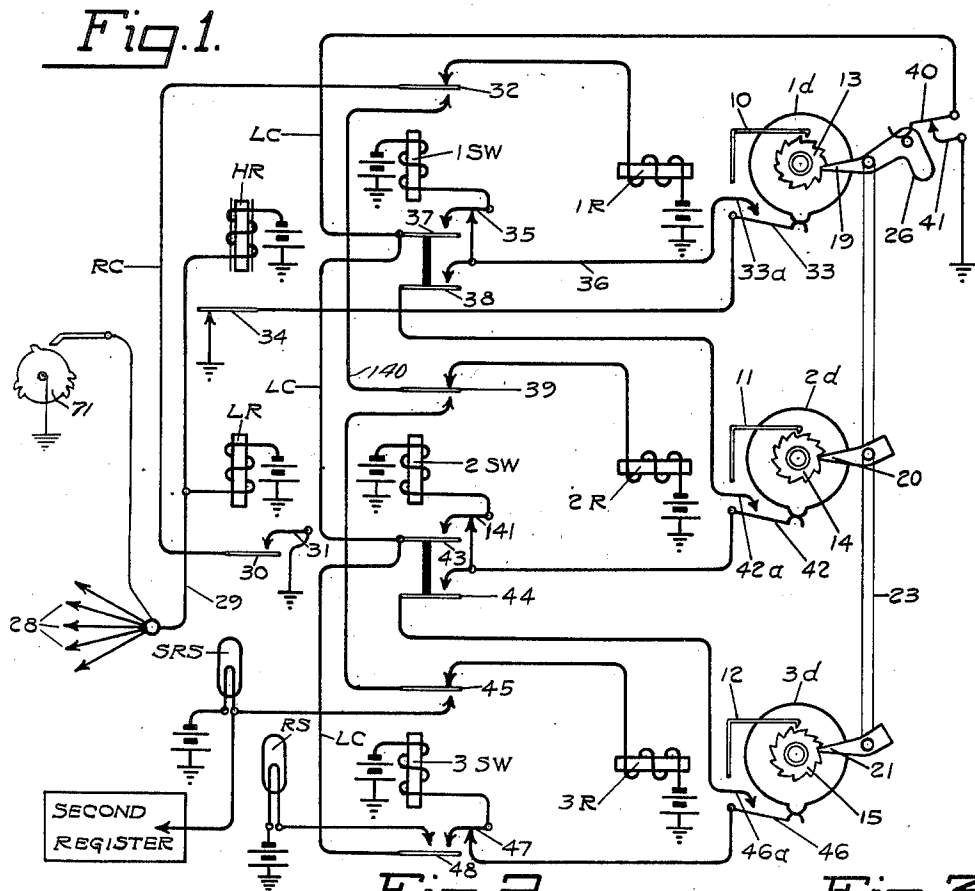
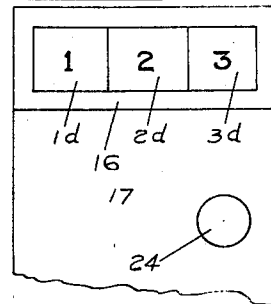


Fig. 3.



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UNITED STATES PATENT OFFICE

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CALL REGISTER

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13 Claims. (Cl. 177—338)

My invention relates to a messenger call system such as used particularly to summon a messenger from a telegraph office. Such a system usually comprises a central office which is the focal point for a number of lines extending to the offices of customers who have subscribed to the service. Some means, such as a switch or key, is provided at the customer's office which, when operated, registers the call at the central office where it is noted by an attendant who dispatches a messenger to the calling customer. The identity of the calling subscriber is ascertained by the registration of a particular code of "dots" and "dashes" which is printed upon a paper tape.

My invention obviates the use of the paper tape and the inking and printing arrangement necessary in such a system, which is always a source of trouble and inconvenience, by providing a register consisting of a plurality of numbered disks adapted to be independently rotated to present the number of the calling subscriber. A second register is provided to permit the indication of a second call prior to the disposition of the first call.

A feature of my invention is the provision of novel means for registering a call.

Another feature is the provision of novel means for releasing the apparatus used.

A further feature is the provision of novel means for transferring a call to a second register if it is made prior to the disposition of the first call.

A still further feature is the provision of suitable means for notifying the attendant that a call is being made.

Other features will be apparent upon a further perusal of the specification and together with the features pointed out, will be explained fully hereinafter, reference being had to the accompanying drawing in which:

Fig. 1 shows the circuit arrangement of my call circuit system;

Fig. 2 shows the arrangement of the mechanical details of a portion of my register in a cabinet, and

Fig. 3 shows the front view of the cabinet.

My call circuit register comprises a plurality of the indicators comprising numbered wheels 1d, 2d and 3d, having a blank space and the numerals 1 to 0 marked on their peripheral edge as shown in Fig. 3. Each of the indicator wheels is controlled by an electromagnet 1R, 2R and 3R, respectively, thru means of armatures 10, 11 and 12 which engage toothed disks 13, 14 and 15 rigidly secured to the wheels 1d, 2d and 3d. Each

time the electromagnet 1R is energized the armature 10 is attracted and rotates the toothed disk 13 one step to cause the next numeral on the periphery of the wheel to appear before a slot or window 16 in a cabinet 17 within which the apparatus is enclosed to display the number of the calling subscriber. A spring 28 yieldingly holds the armature 10 in its retracted position and the end 10c of the armature is normally disengaged from the teeth of disk 13. The electromagnets 2R and 3R and their armatures 11 and 12 are of similar construction. As the toothed disk 13 and numeral indicator wheel 1d are rotated a spring 18 secured to the disk 13 and its supporting shaft is wound up and tends to restore the disks to their normal positions in which the blank space appears before the window 16. The operation of disk 2d and its associated toothed disk 14 is controlled by electromagnet 2R thru armature 11 and the disks 3d and 15 are controlled by electromagnet 3R thru armature 12. Springs similar to 18 tend to restore the disks 2d and 3d to their normal position but pawls 19, 20 and 21 rigidly secured to a rotatable shaft 23 respectively engage the toothed disks 13, 14 and 15 and prevent this restoration. A button 24 is attached to a shaft 25 which slides thru an orifice in the front wall 17 of the cabinet and engages an extension 26 of the pawl 19. A spring 22 surrounds the shaft 25 and normally holds the button 24 away from the wall 17. When pressure is applied to the button 24 the shaft 25 moves the extension 26 and rotates the shaft 23 which is secured in the support 27. The rotation of the shaft 23 causes the pawls 19, 20 and 21 to disengage the tooth of disks 13, 14 and 15 with which it is associated at the time and the disks 1d, 2d and 3d are restored to their normal position under the influence of the coil springs 18.

The transmitter T located at the subscriber's office which is operated by him to call a messenger is shown on the drawing as a code impulse wheel 7 which is provided with groups of conducting teeth for imparting groups of current impulses to the line by connecting the same to ground, but may comprise any well known device such as a telephone dial or the present call circuit switch which alternately makes and breaks an energizing circuit in a predetermined manner.

The operation of the call circuit system of my invention is as follows. The arrows 28 indicate conductors leading to the offices of subscribers for the messenger service where they terminate in a dial or switch of a well known type. The operation of this switch by the subscriber will

cause ground to be connected to conductor 29 in a predetermined code. For instance, if the subscriber's number is 123 the operation of the switch will ground the conductor in the following manner: once, pause, twice, pause, thrice, pause. The initial grounding of conductor 29 causes the energization of line relay LR and holding relay HR at the central office by current flowing from battery thru the winding of HR to conductor 29 and from battery thru the winding of relay LR to conductor 29 to ground at the subscriber's switch. The energization of line relay LR causes it to attract armature 30 to engage a spring 31 to close an energizing circuit for electromagnet 1R which is energized by current flowing from battery, thru the winding of electromagnet 1R, normally closed contact 32 of 1SW, thru closed contacts 30 and 31 to ground. The electromagnet 1R attracts its armature 10 and the pawl 10c engages the toothed disk 13 and moves the disk 13 and number wheel 1d one step to place the numeral 1 in the window 16.

The movement of disk 1d off normal permits spring contact 33 to engage its associated contact 33a to prepare an energizing circuit for switching relay 1SW. Holding relay HR energized as before described and opened its normally closed contact 34 to prevent the premature operation of switching relay 1SW.

Due to the construction of line relay LR and holding relay HR the line relay LR energizes and deenergizes each time conductor 29 is grounded at the subscriber's office but the holding relay HR is slow to release and therefore energizes and deenergizes once during the registration of each digit. Therefore during the pause between the dialing of the first and second digits the holding relay HR deenergizes and the closure of its normal contact 34 establishes an energizing circuit for the switching relay 1SW which is energized by current flowing from battery, thru the winding of relay 1SW, normally closed contact 35, conductor 36, alternate contact 33, normal contact 34 of HR to ground. Switching relay 1SW energizes and attracts its armatures 32, 37 and 38. Contact 32 in its alternate position switches the indicator conductor RC to the next register electromagnet 2R and disconnects the first indicator electromagnet 1R from the register conductor RC to prevent further operation thereof. The closure of make-before-break contact 37 establishes a locking circuit for switching relay 1SW which remains energized by current flowing from battery, thru the winding of relay 1SW, alternate contact 37, locking conductor LC, normally closed contacts 40 and 41 to ground.

The registration of the second digit is effected by the switch at the subscriber's office placing ground on conductor 29 two times. As soon as ground is applied to conductor 29 relays LR and HR energize over circuits previously traced and relay LR closes contacts 30 and 31 to ground the register conductor RC and complete an energizing circuit for the second digit indicator electromagnet 2R, which is energized by current flowing from battery thru the winding of 2R, normal contact 39 of 2SW, conductor 140, alternate contact 32 of 1SW, conductor RC, closed contacts 30 and 31 to ground. Electromagnet 2R attracts its armature 11 to move disks 14 and 2d one step in which position it is held by the pawl 20.

Each interruption of the line 29, at the subscriber's station, causes relay LR to release which

in turn interrupts the circuit of stepping magnet 2R, causing it to release.

The second placing of ground on conductor 29 again energizes relay LR which in turn causes the energization of electromagnet 2R by completing the previously described circuit. Electromagnet 2R again attracts its armature 11 which moves disks 14 and 2d the second time to cause the numeral 2 on the periphery of the second digit disk 2d to appear before the window 16. Relay LR and electromagnet 2R again deenergize and restore their armatures to normal. After a suitable time holding relay HR also deenergizes and closes its normal contact 34 to complete an energizing circuit for switching relay 2SW. Relay 2SW is energized by current flowing from battery, thru the winding of 2SW, normal contact 141, off-normal closed contacts 42 and 42a, which closed on the first off-normal movement of disk 2d, alternate contact 38 of 1SW, closed contacts 33a and 33, and normal contact 34 of HR. Relay 2SW closes a locking circuit for itself through its make-before-break contacts 141 and 43 and locking conductor LC to ground at contact 41 and switches the register conductor RC to the next indicator magnet by closing alternate contact 39.

In the registration of the third digit the conductor 29 is grounded three times by the subscriber's switch. Upon the first grounding the line relay LR and holding relay HR energize as before described. The energization of LR completes an energizing circuit for the third digit indicator electromagnet 3R which may be traced from battery, thru the winding of magnet 3R, normal contact 45 of 3SW, alternate contacts 39 of 2SW and 32 of 1SW to ground thru contacts 30 and 31 of LR. The third digit disk 3d is moved one step by the armature 12 and the off-normal contacts 45 and 46a are closed. The circuits for LR and 3R are interrupted and both deenergize but immediately reenergize to move the disk 3d a second step. The third time the conductor 29 is grounded relay LR and magnet 3R energize for the third time to move the disk 3d another step in which position the number 3 on the periphery of 3d appears in the window 16. The holding relay HR has remained energized during this period but after the relay LR has deenergized the last time the relay HR deenergizes and closes normal contact 34 thereby completing an energizing circuit for the third switching relay 3SW which is operated by current flowing from battery thru the winding of relay 3SW, closed contact 47, closed contacts 46 and 46a, alternate contact 44 of 2SW, closed contacts 42 and 42a, alternate contact 38 of 1SW, closed contacts 33a and 33 and normal contact 34 of HR to ground. Relay 3SW closes a locking circuit for itself thru its contacts 47 and 48 and locking conductor LC to ground at contact 41. An audible or visible register signal shown as a lamp RS is actuated over an obvious circuit when the switching relay 3SW is energized and serves to inform the attendant that a call has been registered. The number 123 appearing in the window 16 is the number of the calling subscriber and the attendant can immediately assign a messenger to respond to the call.

After noting the registered call the attendant pushes the release button 24 which causes the rotation of shaft 23 to release the pawls 19, 20 and 21 from the teeth of disks 1d, 2d and 3d which disks restore to normal under the influence of the coil springs 18, the off-normal contacts

33, 42, and 46 being again opened when the disks reach their normal positions. A stud 49 secured to the end 26 of pawl 19 engages the end of contact spring 40 and when the button 24 is operated the spring 40 is separated from spring 41 and the locking circuit for the switching relays 1SW, 2SW and 3SW is opened and these relays deenergize. The deenergization of relay 3SW causes the restoration of the register signal RS and the entire register call system is at normal and ready for another call. It will be noted that the operation of the release key opens the holding circuit of the relays and also permits the restoration of the mechanical parts of the system.

15 If a second call is made previous to the actuation of the release button 24 by the attendant it will be registered on the second register. This second register is shown in the drawing only as a rectangle marked "Second register" but which is understood to contain similar apparatus and circuits as that disclosed previously. The relays 1SW, 2SW and 3SW are locked in their energized positions and the contacts 32, 39 and 45 are in their alternate positions and extend the register conductor RC thru to the line relay and holding relay of the second register which operate in the same manner as relays LR and HR in the first register to operate the digit indicator electromagnets and the switching relays in the second register. In such a case the conductor extending from contact 45 to the rectangle marked "Second register" acts as the conductor 29 in the first register. As the code transmitter at the second calling station connects the conductor 29 to ground, the relays LR and HR operate as previously explained. The relay LR at contact 30 grounds the register conductor RC to cause the operation of the line relay and holding relay of the second register which in turn establish energizing circuits for the indicating relays of the second register which operate to rotate the numbered wheels to display the proper signal. A second register signal SRS is operated by current flowing from battery thru signal SRS, alternate contacts 45, 39 and 32, conductor RC, closed contacts 30 and 31 to ground. This signal SRS informs the attendant that a second call is being registered and when the same is completed the register signal corresponding to RS of the second register will be operated to show the completion of the registration of the call and the attendant will note the same and then push the buttons 24 on each register to release both registers and restore the same to normal.

Should the second call be made before the registration of the first is completed neither call will be properly registered. The release of the first register by the attendant before the complete registration of the second call will prevent the proper registration of the second call so the attendant does not release the first register when he notices the operation of the second register signal SRS until the second call registration is completed. For these reasons the same procedure by the calling subscriber will be necessary to register calls on my call register device as is now in vogue on the presently used apparatus; namely the twice or thrice repeated operation of his call key or switch at intervals of a minute or thereabouts. Commercial use has proven that all the calls will be properly registered if such a procedure is followed.

Additional registers may be added to the system as the number of incoming calls necessitates

by adding additional units in the same manner as the second register shown is connected to the first register shown.

While I have described my invention in certain particular embodiments, I desire that it be understood that modifications and alterations may be made and that I intend no limitations upon my invention other than those imposed by the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. A messenger call system including a central office, subscribers' stations, an electrical conductor extending between said office and said stations, a source of current at said office, a line relay and a holding relay each having its respective winding connected to said source of current and to said electrical conductor, said relays being energized by current flowing over said conductor and controlled from said subscriber's station, an electromagnet, an energizing circuit therefor controlled by said line relay, an indicator, means for operating said indicator controlled by said electromagnet, operating contacts for said line relay, a normally closed contact for said holding relay, a second conductor extending from a contact of said line relay to said electromagnet, a second electromagnet, a switching relay having normal and alternate contacts, an energizing circuit for said relay including said source of current, the normal contacts of said holding relay completing the energizing circuit for said switching relay to operate the said switching relay, said switching relay closing its alternate contacts to extend said second conductor to said second electromagnet.

2. A messenger call system including a central office, subscribers' stations, an electrical conductor extending between said office and said stations, a source of current at said office, a line relay having operating contacts, a holding relay having a normally closed contact, said relays adapted to be energized by current flowing over said conductor and controlled from said subscribers' stations, a first digit electromagnet, a second digit electromagnet, an energizing circuit for said first digit electromagnet controlled by said line relay, a first digit indicator, means controlled by said first digit electromagnet for operating said indicator, a second conductor extending from a contact of said line relay to said first digit electromagnet, a switching relay having normal contacts, an energizing circuit for said relay including said source of current, the normal contacts of said holding relay completing the energizing circuit of said switching relay to operate the said relay whereby its alternate contacts extend said second conductor to the second digit electromagnet, a third digit electromagnet, a second digit indicator, means controlled by said second digit electromagnet for operating said indicator, a second switching relay having an energizing winding and alternate contacts for extending said second conductor to said third digit electromagnet.

3. A messenger call system including a central office, subscribers' stations, an electrical conductor extending between said office and said stations, a source of current at said office, a line relay having operating contacts, a holding relay having a normal contact and each of said relays having an energizing winding associated with said source of current, means at said stations associated with said conductor completing a circuit

for said windings whereby said relays are energized by current flowing over said conductor, a register unit comprising a first digit electromagnet, a second digit electromagnet, an energizing circuit therefor controlled by said line relay, a first digit indicator, means controlled by said first digit electromagnet to operate said indicator, a second conductor extending from a contact of said line relay to said first digit electromagnet, a switching relay having an energizing circuit, a contact for said relay connected to said second conductor, the normal contacts of said holding relay completing said circuit to cause said contact to extend said second conductor to the second digit electromagnet, a second digit indicator, means controlled by said second digit electromagnet for operating said second digit indicator, a third digit electromagnet, a second switching relay having a contact connected to said second conductor and movable to extend said second conductor to said third digit electromagnet, a third digit indicator, means controlled by said third digit electromagnet for operating said third digit indicator, means for maintaining said indicators in their operated positions, a second register unit, a third switching relay having a contact connected to said second conductor and movable for extending said second conductor to said second register unit, locking circuits for said switching relays, releasing means for said indicators and said switching relays.

4. A messenger call system including a central office, a subscriber's station, an electrical conductor extending between said office and said station, a source of current at said office, a line relay and a holding relay, an energizing winding for each of said relays associated with said conductor, a contact at said subscriber's station for grounding said conductor and thereby completing a circuit for said windings which are energized by current flowing from said source of current over said conductor, an electromagnet, an energizing circuit therefor controlled by said line relay, an indicator, means controlled by said electromagnet for operating said indicator, a second conductor extending from said line relay to said electromagnet, a second electromagnet, a switching relay having contacts movable upon the energization of said relay to switch said second conductor from the said electromagnet to said second electromagnet, a holding circuit for said switching relay, means for maintaining said indicator in its operated position, and a single actuating means for breaking said holding circuit and rendering said maintaining means inoperative.

5. A call register system including a central office, a plurality of subscribers' stations, an electrical conductor extending between said office and a plurality of said stations, transmitting means at said stations, register means at said office including a plurality of indicators, a plurality of electromagnets, one for each of said indicators and connections between the electromagnets and the indicators to operate the indicators each time the associated electromagnet is energized said electromagnets being responsive to the operation of any of said transmitting means to operate said indicators to indicate which particular transmitting means were operated, other register means, and switching means including relays, contacts therefor and electrical connections rendering said other register means contemporaneously responsive to the subsequent operation of any transmitting means on said conductor operated after the complete registra-

tion of the first call to contemporaneously indicate which signaling means were secondly operated.

6. A call register system including a central office, subscribers' stations associated therewith by means of a single conductor, each provided with an identifying number, transmitting means at said stations, and means at said office including a plurality of indicators, a plurality of electromagnets, one for each of said indicators and connections between the electromagnets and the indicators to operate the indicators each time the associated electromagnet is energized, said electromagnets being responsive to said transmitting means to operate said indicators to register the number of a calling station, other registering means at said office, and switching means including relays, contacts therefor, and electrical connections rendering said other registering means contemporaneously responsive to said transmitting means in association with said single conductor for contemporaneously registering the numbers of successive calls initiated after the complete registration of the preceding call calling stations.

7. A call register system including a central office, subscribers' stations, a single conductor connecting said office and said stations, signaling means at said stations for calling said office, a register unit at said office for indicating the calling station, said unit including a plurality of indicators, a plurality of electromagnets, one for each of said indicators and connections between the electromagnets and indicators to operate the indicators each time the associated electromagnet is energized, said electromagnets being responsive to the operation of the signaling means, and a second register unit for contemporaneously indicating a second call initiated after the completion of the registration of the first call.

8. A call register system including a central office, subscribers' stations, a single conductor connecting said office and said stations, signaling means at said stations for calling said office, a register unit at said office for indicating the calling station, said unit including a plurality of indicators, a plurality of electromagnets, one for each of said indicators and connections between the electromagnets and indicators to operate the indicators each time the associated electromagnet is energized, said electromagnets being responsive to the operation of the signaling means, supervisory means at said office indicating the registration of a call, and a second register unit for contemporaneously indicating a contemporaneous call from a station on said same conductor initiated after the registration of the first call and supervisory means for indicating the inception of said second call.

9. A call register system including a central office, subscribers' stations, a single conductor connecting said office and said stations, signaling means at said stations for calling said office, a register unit at said office for indicating the calling station, said unit including a plurality of indicators, a plurality of electromagnets, one for each of said indicators and connections between the electromagnets and indicators to operate the indicators each time the associated electromagnet is energized, said electromagnets being responsive to the operation of the signaling means, and supervisory means at said office indicating the registration of a call, a second register unit for indicating a contemporaneous second call from a station on said same conductor initiated

after the complete registration of the first call and supervisory means for indicating the inception of said contemporaneous second call, and other supervisory means indicating the completion of said contemporaneous second call.

10. An annunciator system comprising a line, two relays each having one of its terminals connected to the line and the other terminal connected to the ungrounded terminal of a grounded source of current, one of said relays being slow to release whereby both relays will be operated upon each grounding of the line and the slow relay will not release during short intervals between successive groundings, an indicating unit comprising a plurality of numeral indicating disks, a stepping magnet and off-normal contacts for each disk, a circuit path completed on each energization of the fast release relay, said path initially completed to the stepping magnet of the first disk, a plurality of switching relays one for each succeeding stepping magnet for switching said circuit path successively to the stepping magnets, means for energizing the first switching relay through a circuit including the back contact of the slow release relay and the off-normal contacts of the first disk and its own back contact and for energizing each succeeding relay through the back contact of the slow release relay, the off-normal contacts of all the preceding disks in series, the operated contacts of all the preceding transfer relays in series and its own back contact, means for locking each transfer relay and means for completing the said circuit path for each stepping magnet except the first through the front contacts of the preceding switching relays, and the back contact of the corresponding switching relay.

11. An annunciator system comprising a line, two relays each connected to the line and to a source of current, one of said relays being slow to release, both relays operating upon each grounding of the line and the slow relay holding over during short intervals between successive groundings, an indicating unit comprising a plurality of indicating disks, a stepping magnet for each disk, a circuit path completed on each energization of the fast release relay, said path initially completed to the stepping magnet of the first disk, a plurality of transfer relays one for each succeeding stepping magnet for switching said circuit path successively to the stepping magnets, means for energizing the first transfer relay, and means for locking each transfer relay and means for completing the said circuit path for each stepping magnet except the first through the front contacts of the preceding switching relays, and the back contact of the switching relay.

lay and for successively energizing each succeeding relay, means for locking each transfer relay and means for completing the said circuit path for each stepping magnet.

12. An annunciator system comprising a line, two relays each connected to the line and to a source of current, one of said relays being slow to release, both relays operating upon each grounding of the line and the slow relay holding over during short intervals between successive groundings, an indicating unit comprising a plurality of indicating disks, a stepping magnet and off-normal contacts for each disk, a circuit path completed on each energization of the fast release relay, said path initially completed to the stepping magnet of the first disk, a plurality of transfer relays one for each succeeding stepping magnet for switching said circuit path successively to the stepping magnets, means for energizing the first transfer relay through a circuit including the back contact of the slow release relay and the off-normal contacts of the first disk and its own back contact and for energizing each succeeding relay through the back contact of the slow release relay, the off-normal contacts of all the preceding disks in series, the operated contacts of all the preceding transfer relays in series and its own back contact.

13. An annunciator system comprising a line, two relays each connected to the line and to a source of current, one of said relays being slow to release, both relays operating upon each grounding of the line and the slow relay holding over during short intervals between successive groundings, an indicating unit comprising a plurality of indicating disks, a stepping magnet and off-normal contacts for each disk, a circuit path completed on each energization of the fast release relay, said path initially completed to the stepping magnet of the first disk, a plurality of transfer relays one for each succeeding stepping magnet for switching said circuit path successively to the stepping magnets, means for energizing the first transfer relay, and for energizing each succeeding relay, means for locking each transfer relay and means for completing the said circuit path for each stepping magnet except the first through the front contacts of the preceding switching relays, and the back contact of the switching relay.

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