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SELECTIVE RINGING SYSTEM FOR PARTY LINE TELEPHONES.

APPLICATION FILED MAY 2, 1908.

953,082.

Patented Mar. 29, 1910.

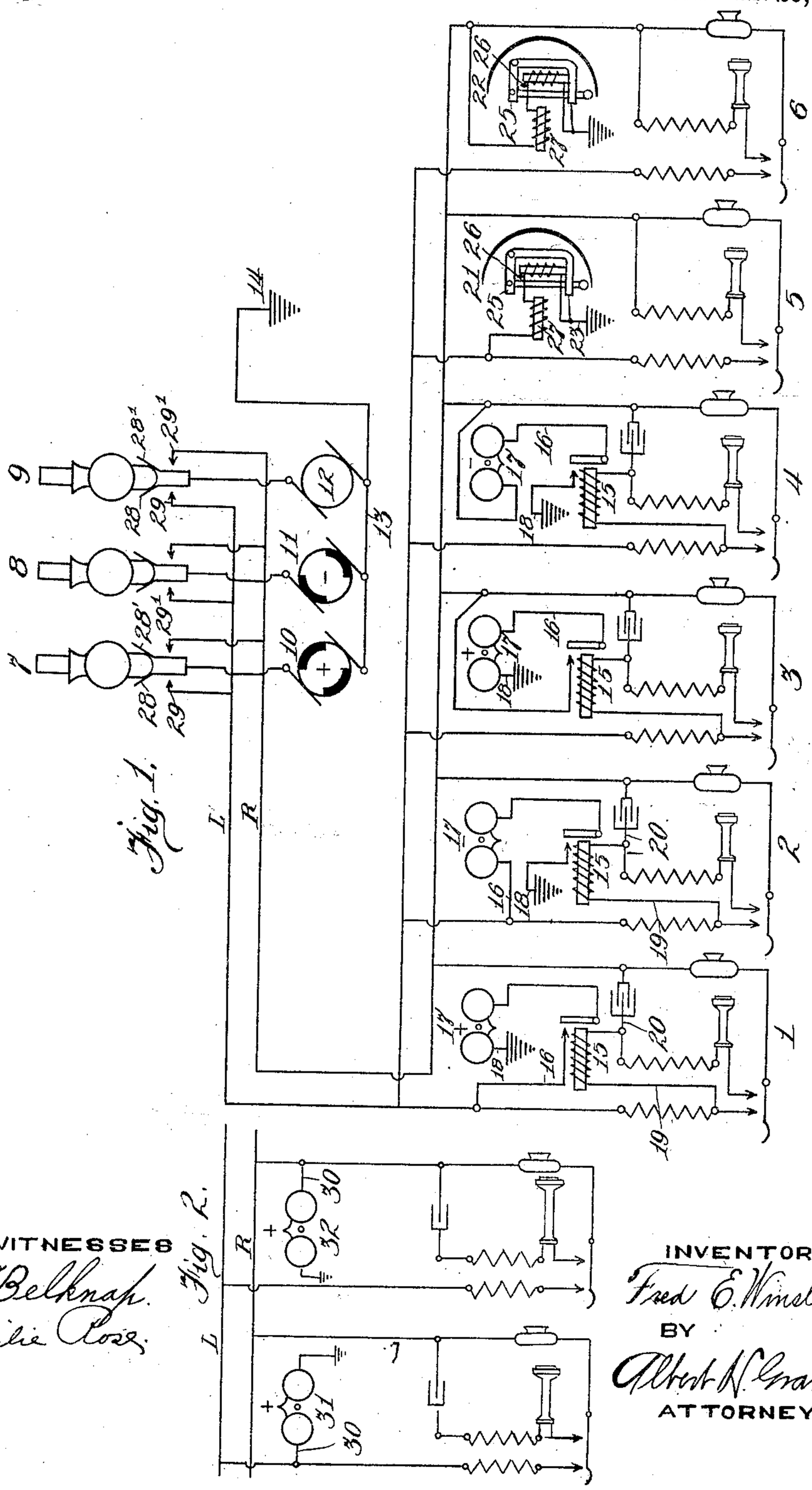

Fig. 1.

Fig. 2.

WITNESSES

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SELECTIVE RINGING SYSTEM FOR PARTY-LINE TELEPHONES.

953,082. Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed May 2, 1908. Serial No. 430,456.

To all whom it may concern:

Be it known that I, FRED E. WINSLOW, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Selective Ringing Systems for Party-Line Telephones, of which the following is a specification.

This invention relates to improvements in selective ringing systems for party-line telephones, and it has for its salient object to provide a system in which the selections are accomplished by means which obviate marginal conditions, and the mechanism employed is of the simplest character and the instruments are of well-understood and developed types, thus insuring a system which is at once simple, practical and reliable.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims.

Figure 1 is a diagrammatic illustration of a preferred embodiment of the invention; Fig. 2 is a similar view of a modification.

In Fig. 1 of the drawing, a practical and preferred embodiment of the system is shown in a manner largely diagrammatic; only so much of the telephone apparatus being shown as is directly concerned in the present invention.

It is well understood that polarized ringers have their clappers spring-biased, *i. e.* held over to one side or the other by means of a spring, can be selectively rung by pulsating current, one for one polarity and another for the opposite polarity. It is also common in the telephone art to use direct current ringers, *i. e.* ringers which will respond to battery or other direct current placed to the line and affording a continuous current flow. It is also known that electromagnetic ringers may be made quick so as to be responsive to current of high frequency, or sluggish and responsive only to current periods of relatively long duration; both the mechanical construction and the character of the winding of the magnets being utilizable factors for securing these results.

Utilizing the foregoing facts and principles, I have devised the selective system herein described, in which I so organize the system that two biased ringers, one for each polarity, are rung from each main line or limb of the circuit, and one direct current ringer operated from each main line or limb, thus affording six different selections.

Referring to the diagram, L and R, respectively, designate the two main limbs of a party-line or external circuit, and 1, 2, 3, 4, 5, 6, a series of party-line stations, shown as connected in the usual bridging relation to the main limbs.

7, 8 and 9 designate three switch-keys at the exchange, and 10, 11 and 12 generators corresponding to the respective keys. Two of these generators, as for example 10 and 11, are so organized as to afford pulsating current of relatively high frequency and of different polarity, the generator 10 being shown in the diagram as affording positive current pulsations, and the generator 11 negative current. The generator 12 affords direct or continuous current. All of the generators are grounded at one side through their respective brushes and the common grounding line 13, extending to ground at 14.

Each of the sub-stations having a biased ringer, is provided with a controlling relay 15, which controls a corresponding interrupted grounding branch, as 16, extending through the ringer 17 of its station to ground at 18. The controlling relay of each station is energized through a bridge connection, as 19, which includes the windings of the relay, and includes also a condenser 20, and these controlling relays are wound high and closely adjusted so as to be extremely quick and sensitive.

It will be noted that the bridge connections of the several controlling relays all connect at one side with the left line L, and at the other side with the right line R, and further that each of the two main limbs is permanently grounded through the respective direct current ringers 21 and 22, as indicated at 23 and 24.

The two direct current ringers are so organized as to be sluggish in their movements and not responsive to that frequency or pulsations afforded by the two generators 10 and 11. Said ringers are of the self-interrupting type, their armatures 25 being arranged to close with short circuiting contacts 26, as shown clearly in the diagram. In order to minimize loss of current by flow to ground through one or the other of these direct current ringers which are permanently connected to ground, the ringers are either wound relatively high or maintained in series with resistance coils, as indicated at 27; the resistances shown being inductive so

that the impedance may aid in preventing the direct current ringers from responding to the pulsating current.

Assuming, now, that key 7 be oscillated to the right, its corresponding contacts 28, 29, will be closed and a circuit established from ground at 14 through the positive generator 10 over the left main line and through each of the several controlling relays 15 in parallel to the opposite main line and to ground through the direct current ringer 22, at 24. All of the controlling relays will thereupon close, and so establish closed circuits through the several branches 16 leading to the respective ringers. The ringer at station 1 will be rung because the polarity of this current is in the right direction. The ringer of station 2 will not be rung because the current is of the wrong polarity. The ringers of stations 3 and 4 will not be rung because they can receive only such current or impulses as reach the right main line after passing through the primary windings and high relay windings of the several stations, so that the ringing branches 16 of the first two stations effectually shunt and prevent operation of the succeeding two stations. In precisely the same manner when key 7 is oscillated in the opposite direction, current from generator 10 will be placed directly on the right main line through the contacts 28′ and 29′, and this will result in operating the ringer at station 3 (after the controlling relays have operated), while the ringers at the first two stations will not be operated because the conditions will be exactly reversed as compared with the conditions first described. In precisely the same manner key 8 will ring either of the two negative, biased ringers at stations 2 and 4, depending upon which direction the key 8 is oscillated. When key 9 is operated in one direction, as for example so as to close circuit between contacts 28 and 29, direct current will flow from ground at 14 through the generator 12, over the left main line to and through the direct current ringer at station 5. This ringer being self-interrupting, it will continue to ring as long as current is maintained on the line. In precisely the same manner the ringer at station 6 is operated by moving key 9 so as to close contact between 28′ and 29′.

As hereinbefore noted, the two direct current ringers are made sluggish, so that they do not respond to the high frequency short pulsations thrown to line from the generators 10 and 11. It is, of course, apparent that the biased ringers will not vibrate under the action of direct continuous current. It is also to be noted that the several controlling relays 15, while they will be closed momentarily when the direct current is placed on the line, will nevertheless promptly return to open position, owing to the condensers interposed in their several bridges, so that the direct current ringers will receive the full effect of the current sent to line.

In Fig. 2 I have shown a modification in which the controlling relays 15 are omitted and the pulsating current ringers arranged in permanently grounded branches 30. In this illustration the two ringers are shown as being both biased to respond to current of one polarity but as connected to different sides of the main line. It will be obvious that when the proper key is closed to send current over the left main line, the first ringer 31 will be operated, but no current will reach the ringer of the other station 32 because the right main line is entirely disconnected from the left at this station. Vice versa, when current is placed on the right main line the ringer 32 will be operated but the other will not, for the same reason. The purpose of the controlling relays 15 shown in the first diagram is to normally maintain the grounded branches at their stations open and thus prevent loss of current flow to ground in those systems where the battery is maintained on the line continuously. It is true that there will be a slight loss due to the current flow to ground at one or the other of the direct current ringers, depending upon which line is kept to battery, but this loss will be slight because the direct current ringers are purposely wound high or included in series with high resistances to minimize this current loss.

From the foregoing it will be seen that the system is practically free from marginal conditions; that the circuits are so arranged that the several ringers are not sensitive to unbalanced conditions or resistances in the line, and that this system of selective ringing may be adopted in connection with any ordinary bridging system.

I claim as my invention:

1. In a selective ringing system, the combination with a pair of main wires forming a metallic telephone circuit extending from an exchange station through a plurality of sub-stations, of means for supplying both direct current and high frequency pulsating current of either polarity to said main lines, a direct continuous current ringer connected with each of said main lines in grounded branches at different sub-stations, two pairs of pulsating current ringers connected to said main lines at different sub-stations, each pair of said latter ringers being responsive to current of different polarity, and means for ringing either member of each pair independently of the other.

2. In a selective ringing system, the combination with an exchange and a plurality of sub-stations, of a pair of line wires connected to the various sub-stations, means for

supplying both direct current and pulsating current of either polarity to said line wires, a direct continuous current ringer connected with each of said main lines in grounded branches at different sub-stations, four pulsating current ringers connected to said main line at different sub-stations, one pair of said pulsating current ringers being responsive to current of one polarity, and the other pair responsive to current of opposite polarity, and means for shunting out either member of each pair in order to independently ring the other member of said pair.

3. In a selective ringing system, the combination with a main line circuit extending from an exchange station through a plurality of sub-stations, means for supplying both direct continuous and pulsating current to said line, a direct continuous current ringer included in a grounded branch connected to the main line at one sub-station, a pulsating current ringer included in a grounded branch connected to the main line at another sub-station, and an impedance coil interposed in the grounded branch which includes the direct current ringer.

4. In a selective ringing system, the combination with a main line circuit extending from an exchange station through a plurality of sub-stations, means for supplying both pulsating current of either polarity and direct continuous current to said main line, a direct continuous current ringer included in a grounded branch circuit connected with the main line at one sub-station, an impedance coil included in said grounded branch, pulsating current ringers responsive to current of opposite polarity, and each included in a grounded branch connected to said main line at different sub-stations.

5. In a selective ringing system, the combination with a line circuit extending from an exchange station through a plurality of sub-stations and means for supplying direct continuous and intermittent current to the line at the exchange, of a direct continuous current ringer connected to the line at one sub-station, an intermittent current ringer connected to the line at another sub-station, a condenser interposed in the branch line which leads through the intermittent current ringer, and an impedance device associated with the branch circuit which extends through the direct current ringer.

6. In a selective ringing system, the combination with a pair of main wires forming a metallic telephone circuit extending from an exchange station through a plurality of sub-stations, of means for supplying both direct continuous current and high frequency pulsating current of either polarity to said main lines, a direct continuous current ringer connected with each of said main lines at different sub-stations, a bridging wire connecting said main lines at four different sub-stations, a pulsating current ringer connected to each of said bridging wires at said four sub-stations, one pair of said pulsating current ringers being responsive to current of one polarity and the other pair responsive to current of opposite polarity, and means for ringing either member of each pair independently of the other.

7. In a selective ringing system, the combination with an exchange and a plurality of sub-stations, of a pair of line wires connected to the various sub-stations, means for supplying both direct continuous current and pulsating current of either polarity to said line wires, a direct continuous current ringer connected with each of said main lines in grounded branches at different sub-stations, a bridging branch wire connecting said main lines at each sub-station, four pulsating current ringers each connected to said bridging branch wire at different sub-stations, one pair of said pulsating current ringers being responsive to current of one polarity, and the other responsive to current of opposite polarity, and means for shunting out either member of each pair in order to independently ring the other member of said pair.

8. In a selective ringing system, the combination with an exchange and a plurality of sub-stations, of a pair of line wires connected to the various sub-stations, means for supplying both direct continuous current and pulsating current of either polarity to said line wires, a direct continuous current ringer connected with each of said main lines at different sub-stations, bridging wires connecting said main lines at each sub-station, four pulsating current ringers connected to said bridging wires at the different sub-stations, one pair of said pulsating current ringers being responsive to current of one polarity, and the other ringer responsive to current of opposite polarity and means for shunting out either member of each pair in order to independently ring the other member of each pair comprising a relay and a condenser interposed in each of said bridging wires.

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Witnesses:
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