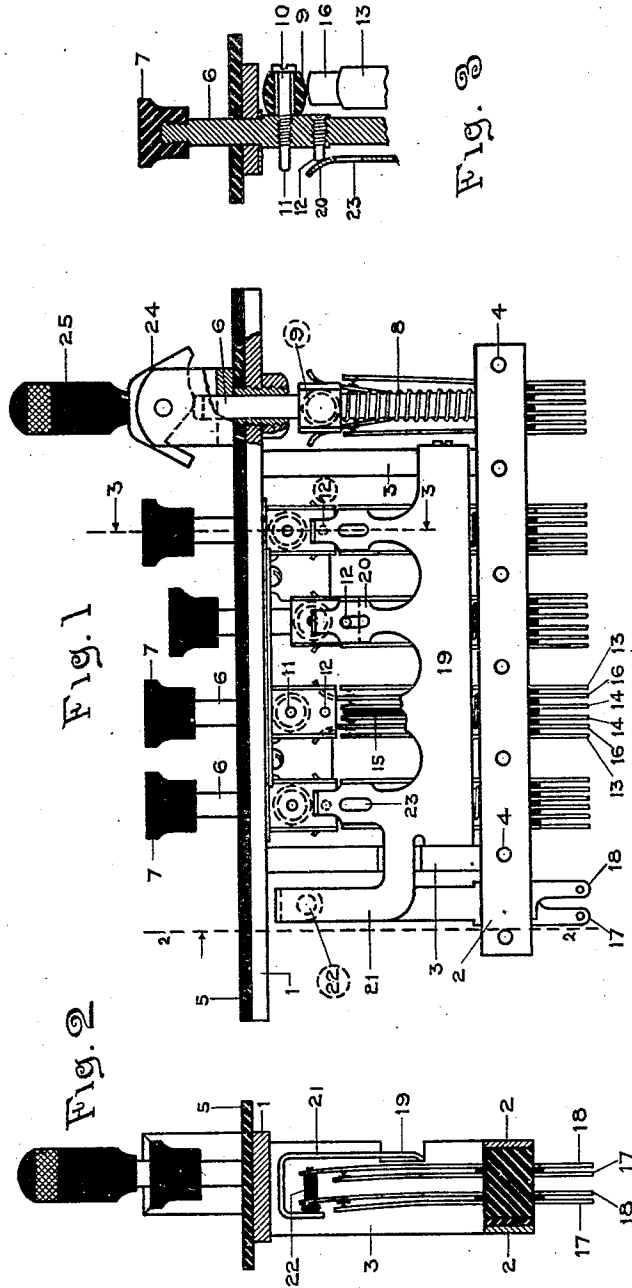
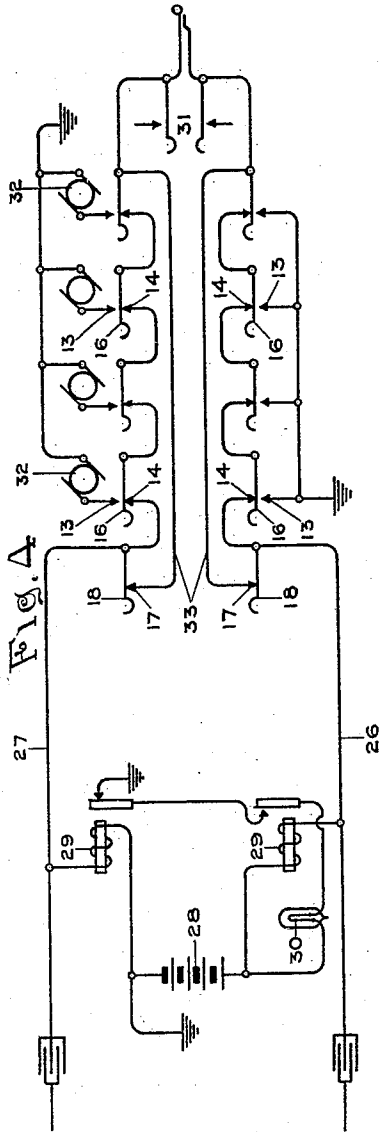


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SELECTIVE RINGING KEY.
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936,373.

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SELECTIVE RINGING-KEY.

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To all whom it may concern:

Be it known that I, CHARLES A. SIMPSON, a citizen of the United States of America, and resident of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Selective Ringing-Keys, of which the following is a specification.

My invention relates to a ringing and listening key for telephone switchboards, the key being especially designed for selective signaling in connection with party line telephone systems. In keys of this class the contacts of the keys are usually connected in series in the line, which arrangement is objectionable for the reason that a poor contact at any of the keys will affect the efficiency of the talking circuit.

It has been proposed to remedy the above objection by removing the contacts of the ringing keys from the talking circuit, and to provide means for opening the circuit back of the ringing keys when any one of the ringing keys is operated to impress ringing current upon the line.

In accordance with my invention the contacts of the ringing keys are connected serially in the talking circuit in accordance with the usual practice, and the above objection is obviated by the provision of a normally-closed shunt around the contacts of said keys, said shunt circuit being adapted to be opened whenever any one of the ringing keys is operated to call a subscriber. Two normally-closed paths are thus provided for the talking currents, one through the normally-closed contacts of the ringing keys in series, and the other through the normally-closed shunt circuit around said key contacts. By this arrangement should any of the ringing key contacts become defective the talking current may take the path provided by the shunt circuit, and should the single set of contacts provided in this shunt circuit become defective, the talking current may take the path containing the contacts of the ringing keys in series. Should all the contacts remain perfect the two parallel paths thus provided afford a path of less resistance to the passage of the talking current than would be afforded by a single path through the ringing key contacts, or by a single path in shunt of said contacts.

Another object of my invention is the provision of a self-indicating key of the

class described, or one that will indicate to the operator the key last operated.

The other objects of my invention will more clearly appear from the following description of the drawings, in which I have illustrated one form of my invention, and in which like reference numerals have been used to indicate like parts in the several figures.

Figure 1 is a side elevation of a combined ringing and listening key embodying my invention; Fig. 2 is a view taken on the line 2—2 of Fig. 1; Fig. 3 is a view taken on the line 3, 3, of Fig. 1, looking in the direction of the arrows; Fig. 4 is a diagrammatic arrangement of the circuits with which my key is adapted to be used.

The key is provided with a frame upon which the different parts thereof are mounted, the frame preferably consisting of a metal strip or plate 1, and a pair of similar plates, 2, 2, said plates being secured together by connecting bars 3, 3, the plate 1 resting upon the upper ends of the bars 3, 3, and the plates 2, 2, being secured, one upon either side thereof, as shown in Fig. 2. Suitably-shaped blocks and strips of insulating material are disposed between the plates 2, 2, the contact springs passing through said insulating material as shown in Fig. 2, said plates, insulating material and springs being securely held in position by means of screws 4, 4, passing through said plates. A strip of insulating material 5, preferably hard rubber, is carried by the plate 1, said strip of insulating material constituting a finishing cover for the key.

Four ringing keys are shown although any desired number may be provided, the keys consisting of plungers or rods 6, 6, passing through the plate 1 and insulating strip 5 and carrying insulating tips or push buttons 7, 7, upon the ends thereof. The opposite ends of the rods 6 pass through suitable apertures in the insulating material carried between the plates 2, 2, coiled springs 8 being adapted to retain the keys in their normal positions. Each of the rods 6 is provided with an insulating roller or button 9 secured thereto by means of a screw 10 or in any suitable manner, the end of the screw 11 projecting from the opposite side of each of the rods as shown in Fig. 3. A small pin 12 is also carried by each of the rods 6, said pin consisting of the end of a

small screw passing through each of said rods.

Each set of contact springs for the ringing keys preferably consists of an outer pair of springs 13, and an inner pair 14, the inner pair of springs being insulated one from the other by a strip of insulating material 15 disposed between said springs as shown in Fig. 1. The pair of springs 13 of each set are adapted to be connected, one with the live pole of a ringing generator, or other source of signaling current, and the other with the negative or grounded pole thereof. A pair of springs 16 is provided, one of each of said pair being disposed between the springs 13 and 14, said springs 16 having flaring upper ends adapted to accommodate the insulating roller 9. The continuity of the line circuit is maintained through the contacts of springs 14 and 16 when the key is in its normal position, the operation of the key serving to deflect the flaring ends of the springs 16, thus breaking the continuity of the circuit by the separation of springs 14 and 16 and connecting the source of ringing current with the line by means of contact springs 13. The contact springs 14 and 16 are connected in series in the line as shown in Fig. 4, and it will be seen that the talking or line circuit is severed by the actuation of said springs in the operation of any one of the ringing keys in the usual manner, to prevent ringing current from passing back through the central office and over the line of the calling subscriber.

Mounted, preferably upon one end of the key, are two pairs of contact springs, one spring 18 of each of said pairs being secured to one side of the line, the other spring 17 of each pair being secured to a conductor 33, adapted to be connected to the line in shunt of the series contacts of the ringing keys. A plate 19 extending longitudinally upon one side of the key is pivoted at its ends to the bars 3, 3, of the key frame as shown in Fig. 1. The plate 19 carries extended portions or tongues 20 disposed opposite each of the keys, the upper end of each of said extended portions being curved outwardly as shown, and being adapted to engage the ends of the pins or screws 11 and 12 carried by the rods 6, when any one of the keys is operated. An extended portion 21 of the plate 19, shown in Fig. 2, is adapted to engage an insulating piece 22 carried by the extended ends of the springs 18, 18. The springs 18, 18 are adapted to normally hold the plate 19 in engagement with the pins 12 as shown in Fig. 3. When any one of the keys is depressed to call a subscriber the pin 12 carried by the rod 6 of said key moves the plate 19 slightly away from the side of the key as shown in Fig. 3, but not sufficiently to cause the extended portion 21 of said plate to break the contacts of springs 17 and 18.

A small longitudinal slot 23 is provided in the extended portions 20 of the plate 19 into which the pin 12 is adapted to rest after its key has been operated, said pin being adapted to engage the upper edge of said slot and hold the key in a slightly depressed position as shown in Fig. 1, thus indicating to the operator which key was last operated. Upon a further depression of the key the pin 11 will engage the flared end of the extended portions 20 of the plate 19, forcing said plate farther from the side of the key, thus releasing the pin 12 of any other key from its slot 23 and allowing said key to assume its normal position, and carrying the portion 21 of said plate to the right as shown in Fig. 2, thus breaking the contacts of springs 17 and 18 and opening the shunt circuit around the contacts of the ringing keys. Immediately after the opening of the contacts of springs 17 and 18, the springs 16 will be deflected by the insulating roller 19 sufficiently to break contact with springs 14, thus opening the line circuit back of the source of ringing current, and to connect the source of ringing current with the line by means of springs 13. It will be noted that the pin 12 of the key last operated always engages the upper edge of the slot 23 and retains the key in a slightly depressed position.

A suitable listening key is provided upon one side of the key frame, said key being constructed similarly to the ringing keys previously described, the rod 6 of said key being adapted to be actuated by a suitable lever 24, having an insulating handle 25. The key is shown in its depressed condition, the cam surfaces adapted to engage the rod 6 being so constructed as to retain the key in its depressed condition when the lever is thrown farther to the right, and to release the rod 6 when the key lever is thrown to the left. Any suitable listening key may be substituted in lieu of that described.

In Fig. 4 I have shown a portion of the circuits with which my key is adapted to be used. The sleeve strand 26, and tip strand 27, of an operator's cord circuit, are bridged by a battery 28 adapted to supply energizing current to the substation transmitters. Said bridge includes the coils of the supervisory relays 29, adapted to control through their normally-closed and normally-open contacts the circuit of the supervisory signal 30. The listening key contacts are indicated at 31. It will be noted that the ringing key contacts are arranged in series in each side of the circuit in the usual manner, and four generators 32 are shown, said generators being intended to typify any suitable source of ringing current. A shunt circuit 33 around the ringing key contacts is provided, one end of said circuit being secured to the line beyond the ringing key contacts and the

opposite end being connected to the line in front of the ringing key contacts by means of contact springs 17 and 18 of the ringing key. It is thus seen that two normally-closed paths for the talking current are provided, one through the contacts of the ringing keys in series and the other through the shunt 33, around said contacts. It will also be noted that when the path containing the ringing key contacts is broken in signaling a subscriber the shunt around said path is also automatically opened by contact springs 17 and 18. Lower resistance is thus provided for the passage of the talking current than would be obtained by the use of a single path therefor, and should the contacts in either path become defective the other path may be depended upon for the transmission of the talking current.

20 What I claim is:

1. In a selective calling device for telephone switchboards, the combination with two parallel paths for the talking current, of a plurality of sets of normally-closed contacts in series in one of said paths, a suitable source of ringing current adapted to be impressed upon the line when any one of said sets of contacts is actuated, a single set of normally-closed contacts in the other path for talking current, and means actuated by the operation of any one of the sets of series contacts in calling a subscriber for opening both of said paths for talking current, a suitable supporting frame for said contacts, and a set of independent contacts also carried by said frame, substantially as described.

2. In a selective calling device for telephone switchboards, the combination with a plurality of contacts connected in series in the line, of a suitable source of ringing current adapted to be impressed upon the line by the actuation of any one of said sets of contacts, a suitable frame upon which said contacts are

mounted in a unitary structure, a push button for actuating each of said sets of contacts, a set of contacts carried by said frame upon either side of said sets of series contacts, means for independently actuating one of said last mentioned sets of contacts, the other of said sets of contacts being connected in a normally-closed shunt of said series contacts, and means actuated in the operation of any of said sets of series contacts for opening the contacts of said normally-closed shunt, substantially as described.

3. In a selective calling device for telephone switchboards, the combination with a suitable frame, of a plurality of sets of contacts adapted to be connected in series in the line carried by said frame, a plurality of push buttons extending above said frame for actuating said contacts, a suitable source of ringing current adapted to be impressed upon the line when any one of said buttons is depressed, a laterally-movable plate pivoted to said frame, a set of contacts carried by said frame and adapted to be included in a normally-closed shunt of said series contacts, the extended end of said plate being adapted to open the contacts of said normally-closed shunt when any of said push buttons are operated, means carried by said push buttons and cooperating with said plate, said means being adapted to retain the push button last operated slightly out of its normal position, and a set of independently-operated contacts carried by said frame, substantially as described.

Signed by me at Chicago, county of Cook and State of Illinois, in the presence of two witnesses.

CHARLES A. SIMPSON.

Witnesses:

C. B. CAMP,
E. F. GRIER.