

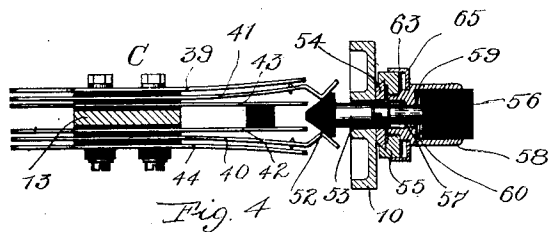
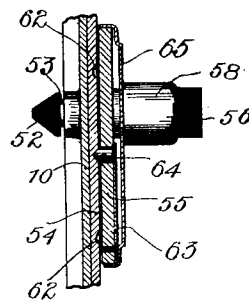
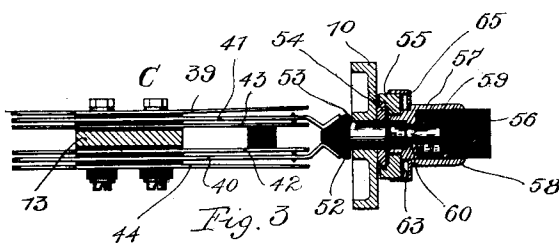
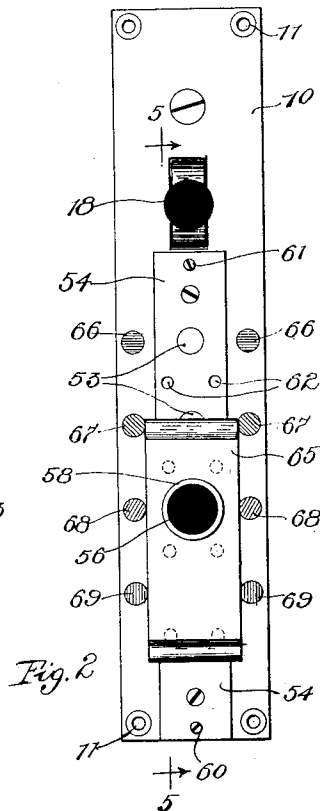
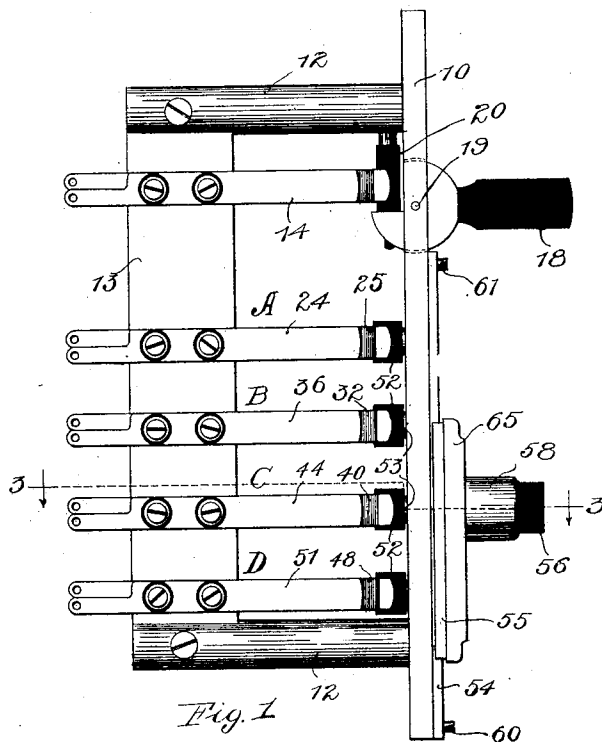
No. 746,095.

PATENTED DEC. 8, 1903.

W. KAISLING.
SWITCHING APPARATUS.
APPLICATION FILED MAY 7, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses,

Leonard W. Hooper.

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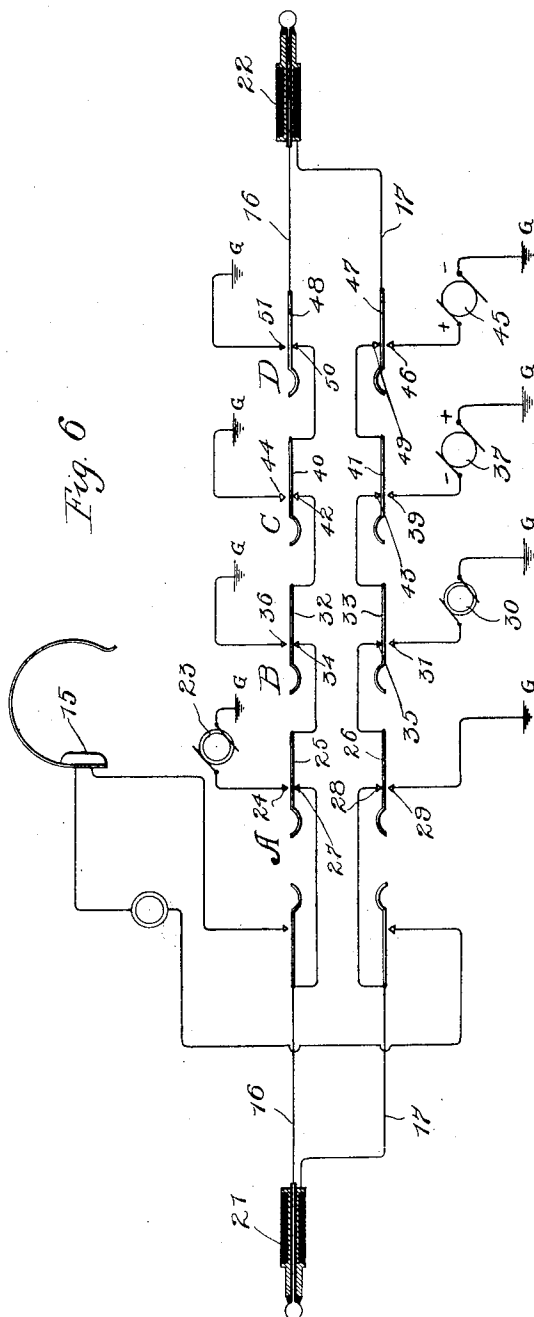
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W. KAISLING.
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NO MODEL.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

SWITCHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 746,095, dated December 8, 1903.

Application filed May 7, 1903. Serial No. 156,081. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Switching Apparatus, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to switching apparatus, and is particularly adapted for use in connection with telephone systems.

So-called "party-line" telephone systems have heretofore been devised in which it has been proposed to connect the telephone instruments at a number of substations with a single telephone-line. The signaling devices at these various substations connected with any one line have frequently been constructed in such a manner as to be responsive to signaling-currents of a certain peculiar character impressed upon the telephone-line and irresponsive to signaling-currents of other characters which may be impressed upon the line. It has heretofore been the practice to provide at the central station a series of keys each provided with an operating-lever, each of which keys serves when actuated to cause the connection of the terminals of a source of current of a given definite character with the telephone-line. Thus the actuation of one key may serve to connect the terminals of a source of pulsating direct current with the line, the actuation of a second key may serve to cause the connection of the terminals of a source of alternating current of one frequency with the line, and the manipulation of a third key may serve to cause the connection of a source of alternating current of a different frequency with the line. These various keys as heretofore installed in a central-operator's switchboard have occupied a large amount of space. Furthermore, the provision of a number of keys, any or all of which may be operated at one and the same time, has frequently given rise to confusion and difficulties due to the fact that two or more keys have been manipulated at the same time

when it was the operator's intention to manipulate only one of them. Furthermore, such keys have been provided with no means whereby the operator could definitely ascertain which of the keys had been last manipulated, as is sometimes desirable.

Prominent objects of my invention are to provide a so-called "ringing and listening key" for the use of a telephone-exchange operator which shall overcome the difficulties in keys of the prior art hereinbefore pointed out.

Means are provided by my invention whereby but one of the keys associated with a given cord-circuit may be operated at a time. Means are provided whereby there is a permanent indication at all times of the key which may have last been manipulated. Furthermore, my invention combines the necessary parts into a neat and compact structure occupying very little space on the operator's keyboard.

A preferred embodiment of my invention will be made clear by reference to the accompanying drawings, in which—

Figure 1 is a side elevation thereof. Fig. 2 is a top plan view. Fig. 3 is a cross-sectional view taken on line 3 3 of Fig. 1. Fig. 4 is a similar view showing certain parts in their alternate position. Fig. 5 is a partial cross-sectional view taken on line 5 5 of Fig. 2; and Fig. 6 is a diagrammatic view of an operator's cord-circuit to which my invention has been applied.

In the drawings I have illustrated a top or escutcheon plate 10, adapted to be fastened by screws passing through the holes 11 11 to the keyboard of a telephone-operator's switchboard-section. Projecting downwardly from the top plate 10 and rigidly secured thereto are the cylindrical pillars 12 12, which support the center plate 13, to which the spring-contacts may be secured. Insulated from the center plate 13 and rigidly secured thereto are the contact-springs 14 14, which comprise an operator's listening-key adapted for the purpose of connecting the operator's telephone set 15 (diagrammatically illustrated in Fig. 6) in bridge of the cord-strands 16 and 17. The actuating-lever 18 is pivoted at 19

in the frame 10 and carries beneath the top plate 10 a roller 20, of hard rubber, adapted upon a manipulation of the lever 18 to be forced between the main contact-springs of the listening-key to connect the operator's telephone set in bridge of the cord-strands. In addition to the spring-contacts 14 of the operator's listening-key there are secured to the center plate 13 four sets of contact-springs adapted when suitably operated to connect sources of signaling-currents of various characters in bridge of the cord-strands leading to the calling-plug of an operator's cord-circuit.

In Fig. 6 I have diagrammatically illustrated an operator's cord-circuit in which the strands 16 and 17 connect the tip-sleeve contacts of the answering-plug 21 with those of the listening-key 22. The spring-contacts of the listening-keys are diagrammatically illustrated in Fig. 6 and are provided with reference characters corresponding with the reference characters on Figs. 1, 3, and 4. In Fig. 6 I have illustrated an alternating-current generator 23, one of whose terminals is connected with the ground G and the other terminal of which is connected with the contact 24. The main contact-springs 25 and 26 normally make contact with the contacts 27 and 28, thereby providing for the continuity of the cord-circuit between the answering and calling plugs. When the springs 25 and 26 are wedged apart, spring 25 makes connection with the contact 24, while spring 26 makes connection with the contact 29, thereby connecting one terminal of the generator 23 with the tip-strand leading to the calling-plug 22, while the sleeve-strand of the cord-circuit is connected to ground through the contact 29. A second alternating-current generator 30 is provided, having one terminal connected with the ground G, as shown, and the other terminal connected with a contact 31 of a second ringing-key. This ringing-key comprises in addition to the contact 31 the main contact-springs 32 and 33, which normally make connection with contacts 34 and 35 and which when manipulated make connection with the contacts 31 and 36, thereby serving to connect the tip-strand leading to the tip of the calling-plug with the ground G and to connect the sleeve-strand leading to the calling-plug with one terminal of the alternating-current generator 30. At 37 is diagrammatically represented a generator or other source of pulsating or intermittent direct currents of one polarity. The negative terminal of this generator is desirably connected with the contact 39, the other terminal being connected with the ground G. The main contact-springs 40 and 41 normally make electrical connection with the contacts 42 and 43, but when wedged apart make electrical connection with the contacts 39 and 44, thus serving to connect the negative terminal of the generator 37 with the sleeve-strand leading to the calling-plug and to connect the

tip-strand leading to the calling-plug with the ground G. At 45 is illustrated a second pulsating-direct-current generator, whose positive pole is connected with the contact 46 and whose negative pole is connected with the ground G. The main contact-springs 47 and 48 normally make connection with the contacts 49 and 50 and when spread apart serve to connect the sleeve-strand leading to the calling-plug 22 with the positive pole of the pulsating-current generator 45 and the tip-strand leading to the calling-plug, through the contact 51, with the ground G. The sets of springs, each comprising a ringing-key, are designated as a whole by the reference characters A, B, C, and D. As mounted upon the center plate 13, each pair of main contact-springs of the ringing-keys is provided with a hard-rubber wedge 52, carried upon a stud 53, projecting through a suitable opening in the top plate 10. The elasticity of the main contact-springs serves to retain the wedge 52 and its stud 53 within the opening in the top plate 10. There is secured to the top plate 10 a dovetailed track or slide 54, upon which is fitted for sliding engagement a slider 55. This slider carries a push-button 56, to which is secured an actuating-stem 57. A retaining-cap 58 incloses a spring 59, which retains the push-button 56 in its upper normal position, the head of the stem 57 engaging the shoulder 60 to prevent the push-button from being forced from the retaining-cap 58. It will be seen that by moving the slider upon the track 54 the stem 57 may be brought into register with the stud 53, whereupon a depression of the button 56 forces the wedge 52 between the main contact-springs of a ringing-key to wedge the same apart, thereby connecting the terminal of a source of signaling-current with a strand of the cord-circuit, as best illustrated in the diagrammatic Fig. 6. By moving the slider on the track it will be seen that the push-button may be brought into position to actuate any one of the four ringing-keys shown. The top screws 60 and 61 in addition to retaining the track 54 in position upon the top plate 10 also serve to limit the longitudinal movement of the slider 55. In order that the stem 57 may be quickly and accurately brought into register with any desired stud 53, there are provided a series of depressions 62 in the track 54. Secured to the upper side of the slider 55 there is a flat spring 63, exerting a downward pressure upon the detent-pins 64, accommodated in suitable holes in the slider 55. The lower ends of these detent-pins are rounded, as shown, whereupon the detent-pins serve to engage the depressions 62 to lightly but surely stop the motion of the slider 55 in such a position as to bring the stem 67 directly above a stud 53. A slight pressure exerted upon the slider or the cap 58 carried thereby serves to disengage the pins from the depressions, whereupon the slider may be moved so as to permit the actuation of any desired ringing-key.

A more or less ornamental casing 65 is provided to inclose and protect the slider and the detent mechanism mounted thereupon.

The operation of the device will at once be apparent to those skilled in the art. The central operator having inserted her calling-plug 22 within the line-jack of a line to which four substations are connected, a movement of the slider to its proper position and the depression of the push-button to manipulate any one of the ringing-keys serves to connect the terminal of the corresponding source of signaling-current with one of the telephone-line limbs. It is a frequent practice to designate a number of substations connected with a single telephone-line each by a different color, as black, red, blue, and green. I have found it desirable, therefore, to provide upon the top plate 10 of the operator's ringing and listening key suitable patches of color to correspond with the color by which is noted a substation whose signaling apparatus is actuated by the corresponding ringing-key. Thus the ringing-key A may be marked by the black patches 66, the ringing-key B may be marked by the red patches 67, the ringing-key C may be marked by the blue patches 68, and the ringing-key D may be marked by the green patches 69. A central operator, therefore, desiring to signal a subscriber whose substation is designated "blue," may bring the push-button 56 into the position shown in the drawings, between the blue patches 68. A depression of the button will then cause the connection through the instrumentality of the ringing-key C of a source of current through the telephone-line, such as to actuate only the signaling apparatus located at the substation "blue." The slider and push-button carried thereby remain in the position in which last utilized until removed therefrom by an operator, whereby an indicating-key is provided to indicate at all times which of a series of substations connected with a single line has last been signaled from the central station.

The character of the currents supplied by the signaling-generators is immaterial and forms no part of my present invention, it being sufficient that the connections established by a manipulation of each of the ringing-keys cause the proper signaling of but one of a series of substations connected with a single party-line.

The embodiment of my invention herein disclosed is particularly designed and well adapted for use in conjunction with such a party-line telephone system as is disclosed in an application, Serial No. 151,249, filed April 6, 1903, by William M. Davis.

While I have herein shown and described one preferred embodiment of my invention, it will be apparent that many modifications may be employed without departing from the spirit thereof. I do not, therefore, wish to limit myself to the precise disclosure herein set forth; but,

Having described my invention, I claim as new and desire to secure by Letters Patent—

1. In a device of the class described, the combination with a suitable frame including a top plate 10, of a plurality of groups of contact-springs each group comprising a ringing-key adapted upon actuation to connect the terminals of a source of signaling-current with a telephone-line, a wedge of insulating material for each of said ringing-keys each carried upon a stud projecting through a suitable opening in the top plate, a slider movably mounted upon said top plate, and a push-button carried in said slider adapted upon depression to engage one of said studs to cause an actuation of the corresponding key.

2. In a device of the class described, the combination with a suitable frame including a top plate 10, of a plurality of groups of contact-springs each group comprising a key, a wedge of insulating material for each of said keys, each carried upon a stud projecting through a suitable opening in the top plate, a slider movably mounted upon said top plate, and a push-button carried in said slider adapted upon depression to engage one of said studs to cause an actuation of the corresponding key.

3. In a device of the class described, the combination with a suitable frame including a top plate 10, of a plurality of groups of contact-springs, each group comprising a ringing-key adapted upon actuation to connect the terminals of a source of signaling-current with a telephone-line, a wedge of insulating material for each of said ringing-keys, each carried upon a stud projecting through a suitable opening in the top plate, a slider movably mounted upon said top plate, a push-button carried in said slider adapted upon depression to engage one of said studs to cause an actuation of the corresponding key, and detent mechanism for stopping the movement of said slider to bring said push-button into register with any desired stud.

4. In a device of the class described, the combination with a suitable frame including a top plate, of a plurality of groups of contact-springs each group comprising a ringing-key adapted upon actuation to connect the terminals of a source of signaling-current with a telephone-line, a slider movably mounted upon said top plate, a push-button carried in said slider, means whereby a movement of said slider may serve to bring said push-button into register with any one of said ringing-keys, means whereby a depression of said push-button may cause an actuation of the ringing-key in register therewith, and detent mechanism for stopping the movement of said slider to bring said push-button into register with any one of said ringing-keys.

5. In a device of the class described, the combination with a suitable frame including a top plate 10, of a plurality of groups of contact-springs each group comprising a ringing-key, a wedge of insulating material for each

of said keys, each carried upon a stud projecting through a suitable opening in the top plate, a slider movably mounted upon said plate, a push-button carried in said slider adapted upon depression to engage one of
 5 said studs to cause an actuation of the corresponding key, detent mechanism for stopping the movement of said slider to bring said push-button into register with any one
 10 of said studs, and means for indicating the key with which said push-button is in register.

6. In a device of the class described, the combination with a suitable frame including
 15 a top plate 10, of a plurality of groups of contact-springs each group comprising a key, a slider movably mounted upon said top plate, a push-button carried in said slider adapted upon depression to cause an actuation of one
 20 of said keys, detent mechanism for stopping the movement of said slider to bring said push-button into register with any one of said keys, stops for positively limiting the movement of said slider, and means for indicating
 25 the key with which said push-button is in register.

7. In a device of the class described, the combination with a suitable frame including
 30 a top plate 10, of a plurality of groups of contact-springs each group comprising a key, a slider movably mounted upon said top plate, a push-button carried in said slider adapted upon depression to cause an actuation of one
 35 of said keys, detent mechanism for stopping the movement of said slider to bring said push-button into register with any one of said keys, and stops for positively limiting the movement of said slider.

8. In a device of the class described, the
 40 combination with a suitable frame including a top plate 10, of a plurality of groups of contact-springs each group comprising a key, a slider movably mounted upon said top plate, a push-button carried in said slider adapted
 45 upon depression to cause an actuation of one of said keys, and detent mechanism for stopping the movement of said slider to bring said push-button into register with any one of said keys.

9. In a device of the class described, the
 50 combination with a top plate 10, of a center plate 13 secured to said top plate, a telephone operator's listening-key carried by said center plate, lever mechanism for operating said
 55 listening-key carried by said top plate, a plurality of ringing-keys mounted in a straight line on said center plate, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate
 60 for each of said ringing-keys, a track on said top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, and detent mechanism
 65 adapted to stop said slider in such position that a depression of said push-button will cause said stem to engage any one of said

studs to cause an actuation of the associated ringing-key.

10. In a device of the class described, the
 70 combination with a top plate 10, of a center plate 13 secured to said top plate, a telephone operator's listening-key carried by said center plate, lever mechanism for operating said listening-key carried by said top plate, a plu-
 75 rality of ringing-keys mounted in a straight line on said center plate, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said
 80 top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, detent mechanism adapted to stop said slider in such position that a
 85 depression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key, and means for indicating the key with which said push-button is in position for actua-
 90 tion.

11. In a device of the class described, the combination with a top plate 10, of a center
 95 plate 13 secured to said top plate, a telephone operator's listening-key carried by said center plate, lever mechanism for operating said listening-key carried by said top plate, a plurality of ringing-keys mounted in a straight
 100 line on said center plate each adapted to connect the terminals of a source of current with a telephone-line, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each
 105 of said ringing-keys, a track on said top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, detent mechanism adapted to stop said slider in such position that a de-
 110 pression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key, and means for indicating the key with which said push-button is in position for actuation.

12. In a device of the class described, the
 115 combination with a top plate 10, of a center plate 13 secured to said top plate, a telephone operator's listening-key carried by said center plate, lever mechanism for operating said listening-key carried by said top plate, a plu-
 120 rality of ringing-keys, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said top plate, a slider having dovetailed engage-
 125 ment with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, and detent mechanism adapted to stop said slider in such position that a depression of said push-button will
 130 cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key.

13. In a device of the class described, the

combination with a top plate 10, of a center plate 13 secured to said top plate, a telephone operator's listening-key carried by said center plate, lever mechanism for operating said listening-key carried by said top plate, a plurality of ringing-keys, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, detent mechanism adapted to stop said slider in such position that a depression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key, and means for indicating the key with which said push-button is in position for actuation.

14. In a device of the class described, the combination with a top plate 10, of a center plate 13 secured to said top plate, a plurality of ringing-keys mounted in a straight line on said center plate, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, and detent mechanism adapted to stop said slider in such position that a depression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key.

15. In a device of the class described, the combination with a top plate 10, of a center plate 13 secured to said top plate, a plurality of ringing-keys mounted in a straight line on said center plate, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, detent mechanism adapted to stop said slider in such position that a depression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key, and means for indicating the key with which said push-button is in position for actuation.

16. In a device of the class described, the combination with a top plate 10, of a center plate 13 secured to said top plate, a plurality of ringing-keys mounted in a straight line on said center plate each adapted to connect the terminals of a source of current with a telephone-line, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said top plate, a slider having engagement with said track, a

push-button carried in said slider, a downwardly-projecting stem on said push-button, detent mechanism adapted to stop said slider in such position that a depression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key, and means for indicating the key with which said push-button is in position for actuation.

17. In a device of the class described, the combination with a top plate 10, of a center plate 13 secured to said top plate, a plurality of ringing-keys, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, and detent mechanism adapted to stop said slider in such position that a depression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key.

18. In a device of the class described, the combination with a top plate 10, of a center plate 13 secured to said top plate, a plurality of ringing-keys, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a track on said top plate, a slider having dovetailed engagement with said track, a push-button carried in said slider, a downwardly-projecting stem on said push-button, detent mechanism adapted to stop said slider in such position that a depression of said push-button will cause said stem to engage any one of said studs to cause an actuation of the associated ringing-key, and means for indicating the key with which said push-button is in position for actuation.

19. In a device of the class described, the combination with a suitable frame including a top plate 10, of a plurality of ringing-keys acceptably mounted on said frame, a wedge of insulating material carried upon a stud projecting through a suitable opening in said top plate for each of said ringing-keys, a movable push-button mounted on said frame, a downwardly-projecting stem on said push-button, means for moving said push-button into position to register with any one of said studs whereby a depression of said push-button may cause an actuation of the corresponding key, and detent mechanism adapted to stop the movement of said push-button in register with any desired ringing-key.

In witness whereof I hereunto subscribe my name this 5th day of May, A. D. 1903.

WILLIAM KAISLING.

Witnesses:

LYNN A. WILLIAMS,
HARVEY L. HANSON.