No. 710,333. Patented Sept. 30, 1902.

F. R. McBERTY.

SELECTIVE CALLING APPLIANCE FOR TELEPHONE LINES.

(Application filed May 21, 1898. Renewed May 24, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1

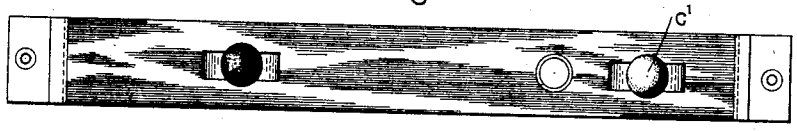


Fig. 2

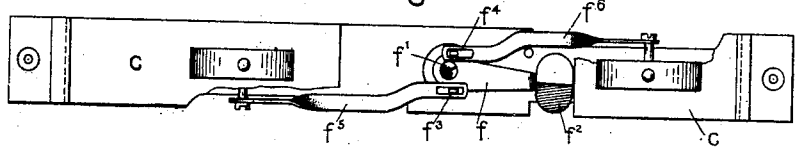


Fig. 3

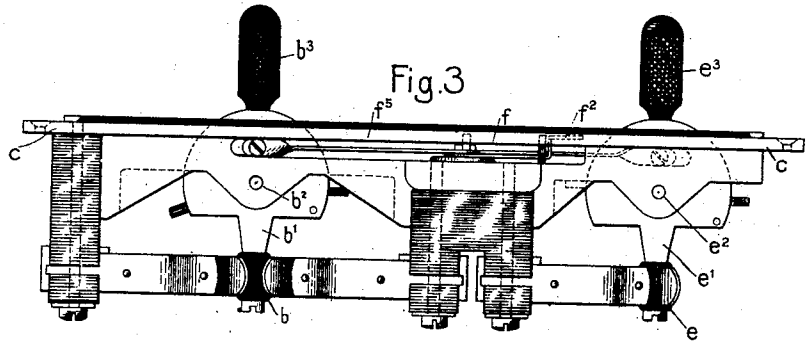
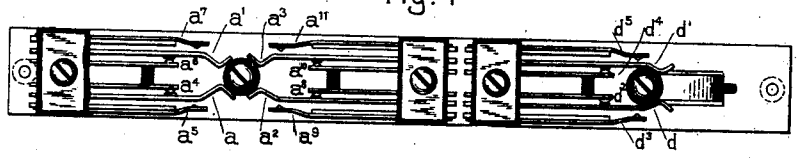


Fig. 4



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2 Sheets—Sheet 2.

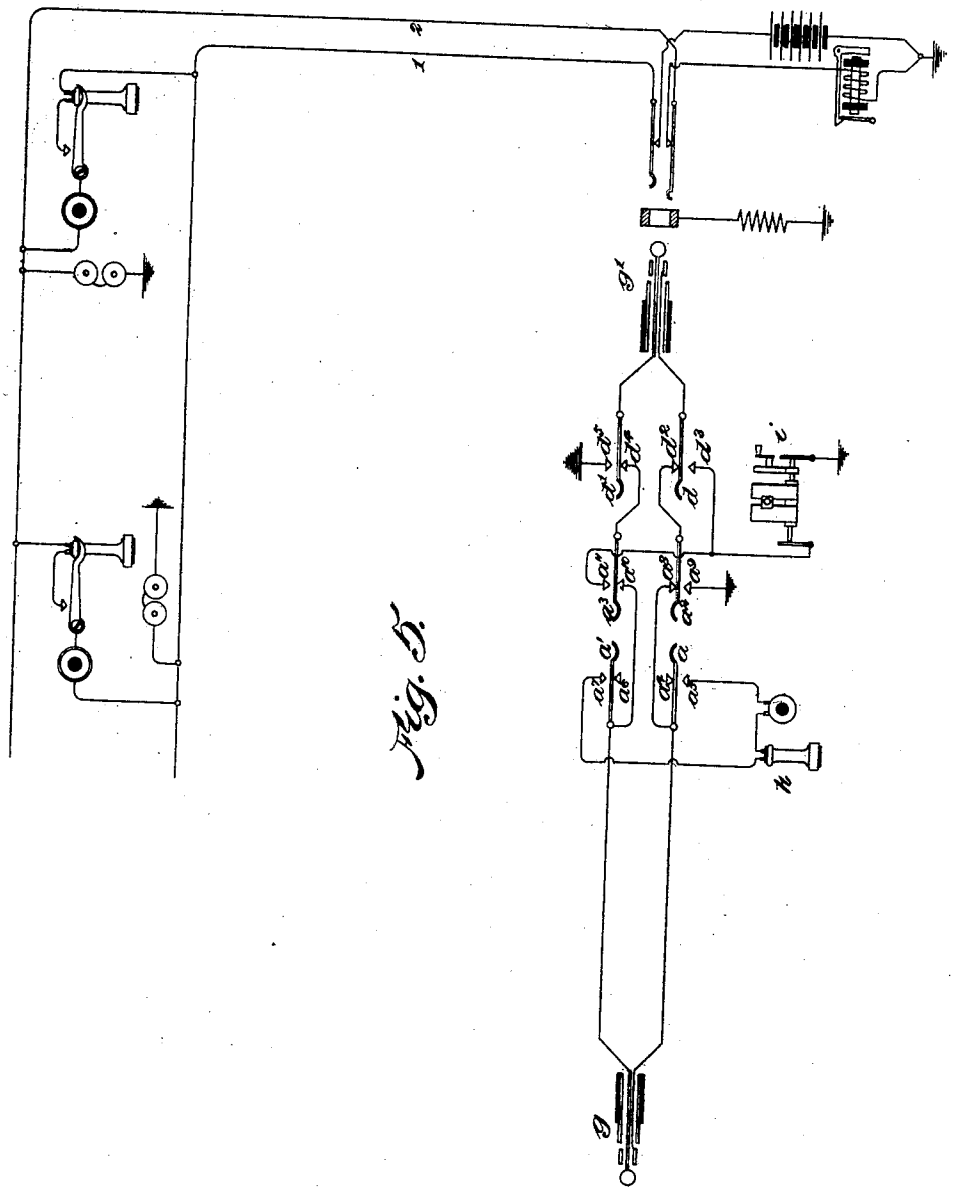


Fig. 2.

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UNITED STATES PATENT OFFICE.

FRANK R. McBERTY, OF EVANSTON, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SELECTIVE CALLING APPLIANCE FOR TELEPHONE-LINES.

SPECIFICATION forming part of Letters Patent No. 710,333, dated September 30, 1902.

Application filed May 21, 1898. Renewed May 24, 1899. Serial No. 718,107. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. McBERTY, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Selective Calling Appliances for Telephone-Lines, (Case No. 67,) of which the following is a full, clear, concise, and exact description.

My invention relates to switching apparatus, and more particularly to apparatus for selectively operating any one of a plurality of instruments which are connected with a single electric circuit—for example, ringing-keys for selectively transmitting signals to the substations of a party telephone-line. In telephone engineering parlance the expression "party-line" is understood to mean a single telephone-line terminating at a spring-jack or switch-socket at the central office and connected with a plurality of subscribers' stations. In such a system each of the signaling receiving instruments of the several substations is adjusted to respond to electric current of a distinctive character, and signaling-keys are provided at the central-office switchboard for so changing the circuit connections or impressing upon the party-line current of such suitable character as to operate the signaling instruments at any one of the substations to the exclusion of the others. These keys are ordinarily associated with a plug and cord circuit, such as is commonly used for connecting lines with one another by way of their spring-jack terminals at the switchboard, and there are usually as many such selective signaling-keys associated with a cord-circuit as there are substations on the party-line, so that the actuation of a particular key will always cause a certain corresponding substation to be signaled. After the switchboard operator at the central office has connected a calling subscriber's line with that of the subscriber called for she selects for manipulation that particular key of the cord-circuit connecting the lines which is adapted to transmit current of a character to operate the called subscriber's signal-bell to the exclusion of the signal-bells at other substations on the same line; but heretofore no means have been provided for recording or noting the identity of the station signaled for reference at a future time. Should, therefore, the called subscriber fail to respond to the first signal and it thus become desirable to signal him a second time, considerable inconvenience is caused, since the operator has no means other than her memory for determining which of the calling-keys associated with the called subscriber's line should be operated.

It is the object of the present invention to provide such means; and to this end my invention consists in the provision of mechanism whereby the actuation of any particular one of the keys will cause an indicator or signal to be set to denote the character of the current which is transmitted—that is, to denote the identity of the station signaled—this indicator after having once been set remaining in such distinctive position or displaying such characteristic signal until restored, preferably until the subsequent operation of a different key and the consequent transmission of a different signal.

I will describe my invention more particularly by reference to the accompanying drawings, wherein—

Figure 1 is a plan view of switching mechanism and indicators therefor constructed and operated in accordance with my invention. Fig. 2 is a similar view wherein the cover or escutcheon has been removed to disclose the mechanism for operating the indicator or target. Fig. 3 is a side elevation. Fig. 4 is a view from beneath, and Fig. 5 is a diagrammatic illustration of a circuit between two connecting-plugs inclosing the switch-contacts of the keys.

Similar letters of reference are used to designate the same parts wherever they are shown.

One of the appliances which I have designated a "key" is in the nature of a double key, such as is commonly called a combined listening and ringing key. This key comprises two pairs of switch-springs a a' and a^2 and a^3, having their free extremities symmetrically disposed about a small central space wherein lies a double-faced wedge b, carried

by a lever b', pivoted at b^2 in the frame c of the key and terminating in a handle b^3 above the surface of the cover. The switch-springs are each provided with a normal resting-anvil and with an alternate contact-anvil, these being designated a^4, a^5, a^6, a^7, a^8, a^9, a^{10}, and a^{11} for the different springs a, a', a^2, and a^3, respectively. Of this switching mechanism the springs a and a', with their contact-anvils, are designed to be connected in the circuit to serve the functions of a listening-key. To this end the stops limiting the stroke of the lever b' are so disposed that the wedge b may enter to such a distance between the springs a and a' as to be retained by them until withdrawn by force. The switch-springs a^2 and a^3, with their switch-contacts, constitute the ringing portion of this key. The other ringing-key consists in the switch-springs d d', with normally resting anvils d^2 d^4 and alternate contacts d^3 d^5 suitably supported and insulated from the base or frame c of the keys. These switch-springs are likewise presented to a movable wedge e, carried on a lever e', pivoted at e^2 in the frame and having a handle e^3 above the keyboard.

In the recess formed in the frame c of the key is provided a short centrally-pivoted lever f, pivoted at f', carrying at the extremity of an extension at right angles thereto a target-disk f^2. Beneath the lever is placed a resilient washer for the purpose of obtaining a certain amount of friction on the lever f to prevent its easy movement. This lever is provided with upwardly-projecting pins f^3 f^4 at its opposite extremities, which engage links connected with the levers b' and e' of the ringing-keys. Thus a link f^5, pivoted to the lever b', engages the pin f^3. The link f^6 is likewise pivoted to lever e' and engages pin f^4. The link f^5 is formed with a slot, which permits the link considerable play between certain points without producing movement of the lever f. Thus if the lever b' be moved to the right to thrust the wedge b between the springs of the listening-key the link will move freely upon the pin f^3 without imparting motion to the target. If, however, the lever b' be moved to the left to thrust the wedge between the springs of the ringing-key, the end of the slot in the link will come into engagement with the pin f^3 and will bring the target into a particular position. If now the handle e^3 be moved to the left, the link f^6 will be thrust against the pin f^4 and will move the target f^2 into its alternate position. The slot in each of the links is of sufficient length to permit the movement of the pin lying in it by the action of the other key without imparting motion to the lever f.

As indicated in Fig. 5, the drawings show a party-line system of two stations, both of which are provided with selective calling appliances which are in circuits having parts in common, but extending through different line conductors for ringing. Thus the line-wires 1 and 2, which constitute the line conductors of the metallic circuit employed for talking, are used separately for the transmission of signaling-currents to the different stations. A polarized call-bell is connected in a ground branch from line conductor 1 at one of the stations, while a like bell is connected in a ground branch from the line conductor 2 at the other station. The usual telephones are provided at the stations with telephone-switches adapted to bring them into bridges of the line-circuit. The line conductors 1 and 2 extend to contact-springs of a spring-jack in a switchboard, which springs are designed to register with the tip and sleeve, respectively, of the plug employed for making connection with the line. In associating these ringing and listening keys with a pair of plugs in a plug-circuit the sleeve and tip contacts of the answering-plug are connected with the switch-springs a and a', respectively, of the listening-key and also with the normal resting contacts a^8 and a^{10} of the ringing-key. The switch-springs a^2 and a^3 are connected, respectively, with the contact-anvils d^2 and d^4 of the other ringing-key, whose switch-springs d and d' are connected with the sleeve and tip, respectively, of the calling-plug. The alternate contact-anvils a^5 a^7 of the listening-key form the terminals of an operator's telephone. The alternate contact a^9 of spring a^2 is grounded, while the alternate anvil a^{11} of spring a^3 is led to one pole of a generator of calling-current. Anvil d^3 of spring d leads to the free pole of the generator of calling-current, while the anvil d^5 is grounded. Thus if the wedge b be thrust between the springs a and a' of the listening-key the operator's telephone is brought into a bridge of the plug-circuit. If the same wedge be thrust between the springs a^2 a^3, a calling-current is applied to the tip of the calling-plug, the sleeve of the calling-plug being grounded. If the wedge e be thrust between the springs d d', the source of calling-current will be applied to the sleeve of the calling-plug, while the opposite contact-piece of the plug will be grounded. In other words, the movement of the wedge e between springs d and d' connects the source of calling-current with line conductor 2 and rings the bell at one of the stations, or the movement of the wedge between the other springs applies a calling-current to the line conductor 1 and rings the bell at the other station. It will be understood by those familiar with the art of telephony that numerous arrangements are possible by which current may be specially applied to one or more conductors of the line-circuit to selectively operate the different call-bells of the line. The movement of the lever to transmit ringing-current on either conductor of the circuit will move the target f^2 into a corresponding position, so that any suitable color or indication carried thereon will appear beneath the opening in the escutcheon of the keys to indicate the identity of the ringing-key last manipulated, and thus

the identity of the station to which the call has been sent.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. The combination with two ringing-keys and pivoted switch-levers thereof, of a pivoted arm, a target or indicator carried thereon, and links between the said switch-levers and the said target-lever, whereby the target is set in a different position in the movement of each of the keys, as described.

2. The combination with two calling-keys in a telephone-switchboard, and the actuating-levers thereof movable in the same direction to call, of a centrally-pivoted lever and an indicator carried thereby, a link connecting one of the actuating-levers with one extremity of the said target-lever and a link connecting the other actuating-lever with the other extremity of the target-lever, whereby the target is moved in different directions in the use of the different keys, as described.

3. The combination with two telephone calling-keys and the pivoted actuating-levers thereof, of a pivoted target-lever and an indicator carried thereby, and links connecting each of the actuating-levers of the keys with the target-lever, each of said links having play to permit movement of the target by one link without moving the other link, as described.

4. The combination with two selective calling-keys having pivoted switch-levers movable in the same direction to send different calls, of a centrally-pivoted target-lever and an indicator carried thereby, a link connecting one of said levers with one extremity of the target-lever, and another link connecting the other actuating-lever with the other end of the target-lever, each of said links having play to permit the movement of the target by the other link, as described.

5. The combination with a combination listening and calling key, and a pivoted actuating-lever therefor adapted for movement in opposite directions to actuate the listening or the calling key, and an independent special calling-key having a pivoted lever, of a target-lever, and mechanism connecting each of the actuating-levers with the target-lever, said mechanism being adapted to permit the actuation of the listening-key without moving the target, as described.

6. The combination with the listening and calling key and the pivoted actuating-lever b' therefor, the special calling-key and the pivoted actuating-lever e' therefor, of the target-lever f and the indicator carried thereon, the links f^5 f^6 engaging pins on the target-lever at opposite sides of the pivotal point thereof, link f^5 having play to permit the actuation of the listening-key without moving the target-lever, and each of the links f^5 and f^6 having play to permit free movement of the target by the other lever, as described.

In witness whereof I hereunto subscribe my name this 18th day of April, A. D. 1898.

FRANK R. McBERTY.

Witnesses:

DUNCAN E. WILLETT,

ELLA EDLER.