

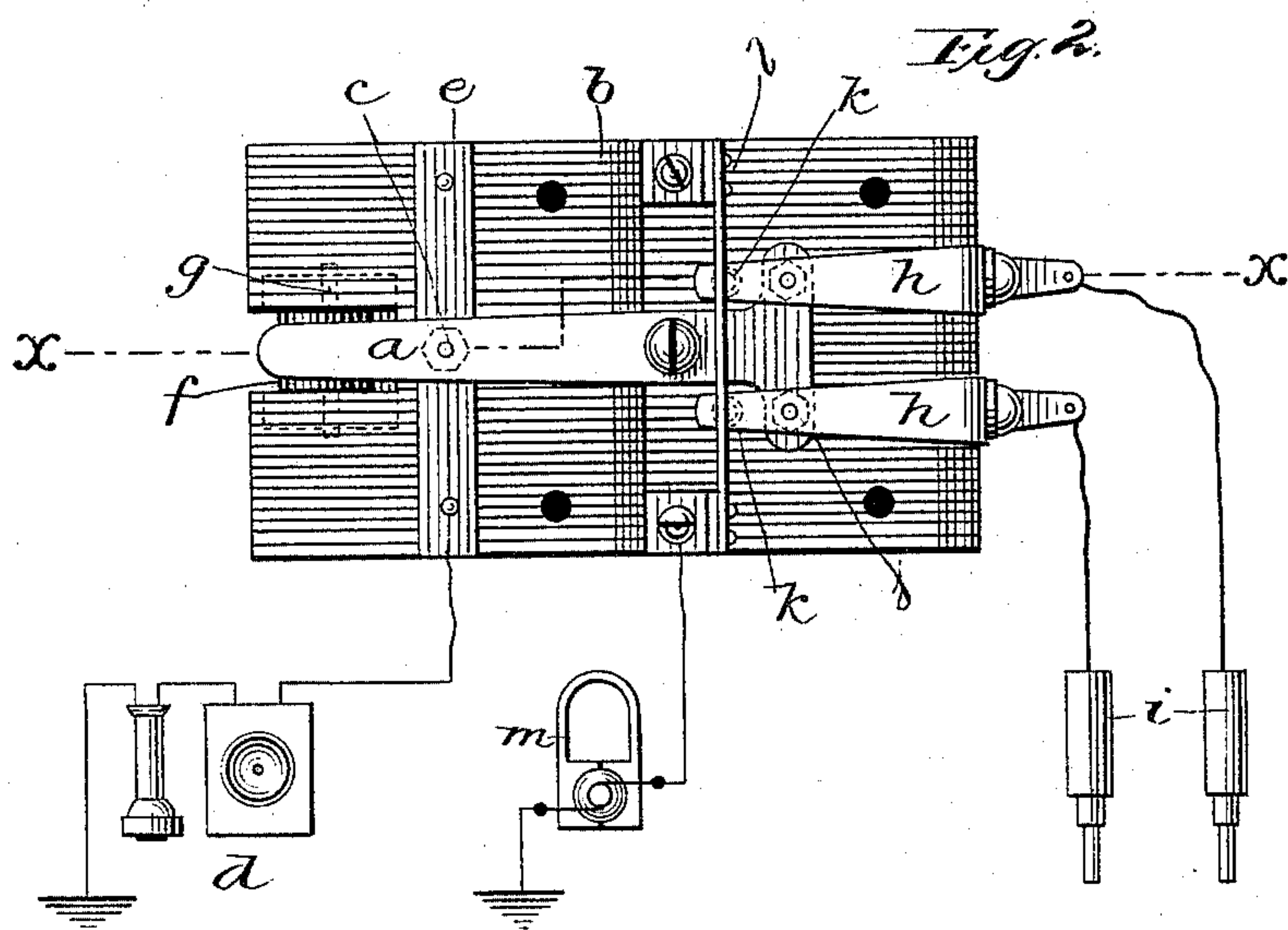
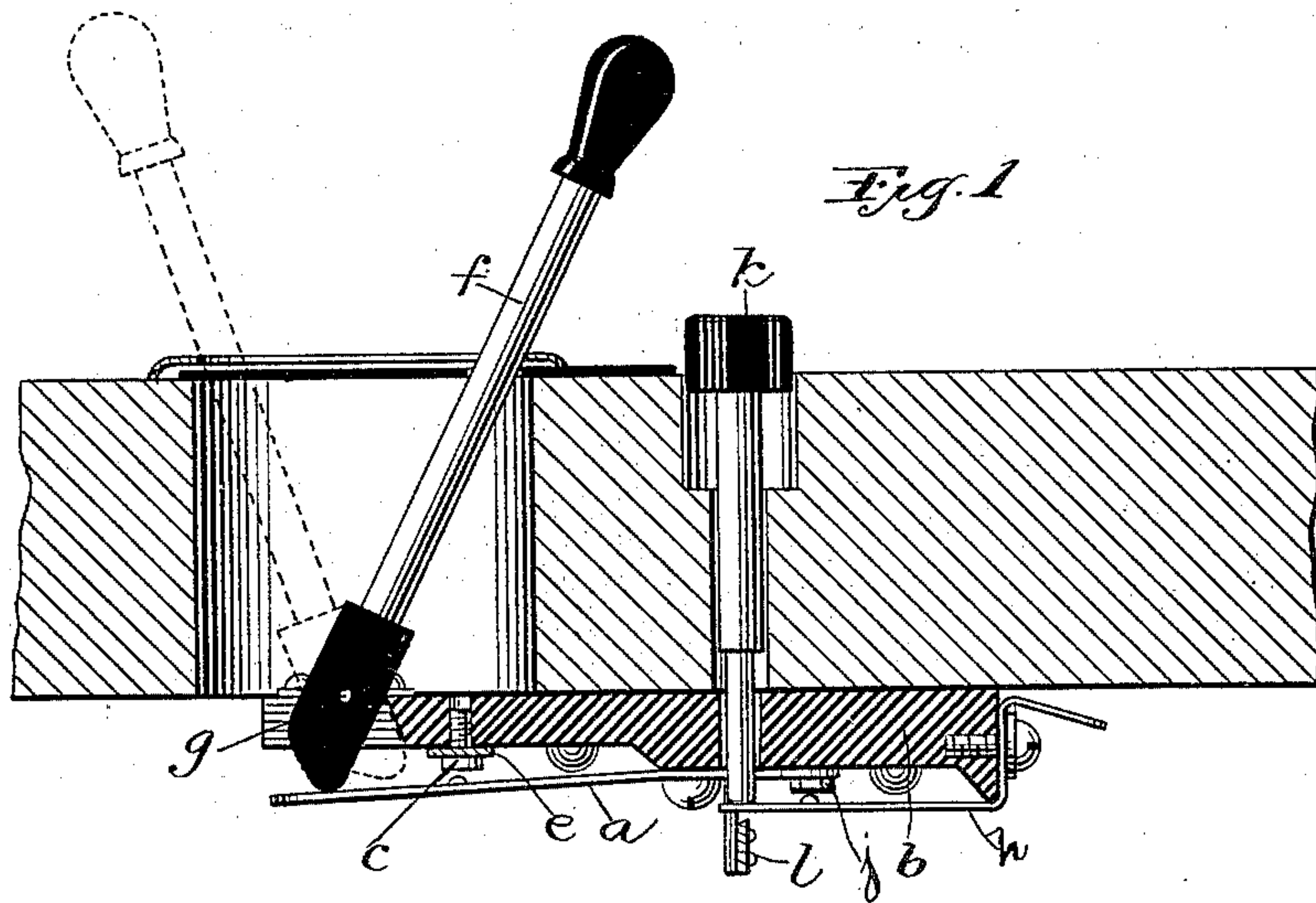
(No Model.)

W. M. GOODRIDGE.

LISTENING AND RINGING KEY FOR TELEPHONE SWITCHBOARDS.

No. 493,704.

Patented Mar. 21, 1893.



Witnesses.

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WILLIAM M. GOODRIDGE, OF HIGHLAND PARK, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

LISTENING AND RINGING KEY FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 493,704, dated March 21, 1893.

Application filed July 19, 1890. Serial No. 359,247. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. GOODRIDGE, a citizen of the United States, residing at Highland Park, in the county of Lake and State of Illinois, have invented a certain new and useful Improvement in Listening and Ringing Keys for Telephone-Switchboards, (Case No. 15,) 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 combination ringing and listening keys for use on multiple switch boards at the central station of a telephone exchange system.

The object of my invention is to provide means whereby the operator may readily take a subscriber's order, complete his connection and ring up the called subscriber.

I have shown my invention as used in connection with a system of grounded telephone lines. One of my ringing and listening keys is provided for each pair of connecting plugs and cords.

The principal features of my invention consist in a flat metallic spring lever secured at one end to an insulating block and adapted at its free end to be moved into and out of contact with a connection to the operator's telephone by means of a cam and lever moving on a pivot provided therefor on the insulating block, together with two other metallic springs, each of which forms the terminal of a plug and cord and which are secured to the insulating base in such position that their free ends bear upon contacts provided therefor upon the heel of the main spring lever. Above each of these two terminal springs are placed push buttons, whereby the respective springs may be forced away from contact with the heel of the main spring lever, which is adapted to connect with the operator's telephone, and into contact with a strip connected to a common generator.

My invention will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of one of my combination ringing and listening keys embodying my invention, the section being taken upon line $x-x$ of Fig. 2. Fig. 2 is a plan

of the same from below, in connection with a pair of plugs, operator's set and generator.

In Fig. 1 the combination key is shown attached to a portion of the switch board.

As shown one end of the main metallic spring lever a is secured to the insulating block b . The other end normally rests upon the contact c . The contact c is connected directly with the operator's set d through the strip e . The cam and lever f swings upon the pivot g provided upon the insulating block b and is held against lateral movement by the guiding slot in the block b as shown. The cam and lever f being in the position shown by full lines the operator's telephone set d is cut out, while, if in the position shown by dotted lines the operator's set d would be in circuit. There is enough strength in the spring a to hold the cam f against a slight movement.

The two flat metallic springs $h h$ form the terminals of the pair of connecting plugs $i i$, are secured to the insulating block b as shown and rest normally upon the contacts $j j$ provided upon the heel of the main spring lever a . Thus if the two plugs are inserted in the jacks of two lines the circuit is completed through the said heel or practically through the main spring lever a . Hence the operator may listen in by merely cutting in her telephone at c .

A push key k is provided over each of the terminal springs h by means of which the said springs h may be separated from contact with the heel of the main spring lever and pressed down against the generator strip l . Thus current from the generator m may be sent over either or both of the lines with which the plugs i are connected without danger of giving the operator an unpleasant ring in her telephone.

In order that dust may not accumulate between the points of the various contacts I provide as shown sharp points and edges for the lower contact places. The dust is continually shaken from these and hence the contacts are kept clean.

For convenience I usually place several sets of ringing and listening keys upon the same strip of insulating material. In such arrangement the telephone and generator strips e and l are common.

The operation of my combination ringing and listening key is as follows: When an operator sees an annunciator drop fall she immediately inserts one of the pair of plugs *i* into the answering jack of that line, thus bringing her telephone *d* into connection with the subscriber. The circuit being through the subscriber's line to the connecting plug, thence by the cord to the metallic spring *h* forming the terminal thereof, thence through the main spring lever *a* to the contact *c* connecting with the operator's set *d*, and thence to ground. This connection being made the operator takes the number of the line wanted and immediately places the other plug of the pair in the spring jack terminal of that line. She may then cut out her telephone by throwing back the spring lever *f* and proceed to push down the button *k* over the spring *h* which forms the terminal of the line called for, thus sending generator current over the line to ring the called subscriber's bell. This being done she releases the push button *k* when her set is entirely cut out from the connected lines and she is free to make other connections. If, however, the operator should wish to listen in for any reason she may do so by merely throwing the cam lever *f* forward. In doing so, the main spring lever *a* is allowed to come against its contact, thus cutting in her telephone set between the talking lines.

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

1. In a ringing and listening key the combination of the insulating block, the main metallic spring lever, the cam and lever pivoted on the said insulating block and adapted to force the said spring lever out of contact with a connection to the operator's telephone set, the two terminal metal springs, the contacts therefor provided on the heel of the said main spring lever, the generator strip, the push buttons, said terminal springs adapted to be forced into contact with said generator strip and out of contact with the heel of the said main spring lever by the said push buttons, substantially as shown and described.
2. The combination of the insulating block with the main metallic spring lever secured thereto and provided at the fixed end with two contacts, the cam and lever, the pivot thereof secured to the said insulating block, the contact forming a connection with the operator's telephone set, said cam and lever working on said pivot in the slotted guide in the insulating block and adapted in one position to hold the said main spring lever away from the connection with the operator's set

and in the opposite position to allow said spring to rest on the said contacts, the metallic springs forming the terminals of a pair of plugs and cords and normally resting on the said contacts provided on the fixed end of the said main spring lever, the push buttons one over each terminal spring, the common generator strip, said terminal springs being adapted to be carried away from their contacts on the main spring lever and into contact with the said generator strip, substantially as shown and described.

3. The combination of the insulating base *b* with the main metallic spring lever *a*, the contact *c* on which said spring lever *a* normally rests, the metallic terminal springs *h* secured to said base *b*, the contacts upon the end, said main spring lever *a* upon which the said terminal springs normally rest, the generator strip *l*, the push buttons *k*, one for each terminal spring by means of which the said springs are pressed away from their normal contacts and into contact with the said generator strip, substantially as shown and described.

4. In a switch board connecting and listening apparatus, a conducting interconnecting section for connecting any two lines comprising a pair of plug connectors united by flexible conductors, and intermediate contact springs; a set of operators telephones normally in electrical connection with the said interconnecting section whereby it is brought into circuit with any line intermediately upon the connection of either plug with said line; and means as indicated, for disconnecting the said telephones from the said interconnecting section when desired without electrically opening said inter-connecting section.

5. A telephone switch board listening and ringing appliance, comprising a normal but separable electrical connection between the two plug connectors of a pair constituting an interconnecting link for any two lines and the operators telephones; means substantially as indicated for connecting either of said plug connectors independently to a call generator for sending an outgoing signal; and a cam lever circuit controller acting simultaneously upon the said separable connections of the said pair of plugs to disconnect them when in use from the said operators telephones.

In witness whereof I hereunto subscribe my name this 7th day of January, A. D. 1890.

WILLIAM M. GOODRIDGE.

Witnesses:

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