

(No Model.)

M. G. KELLOGG.

SPRING JACK FOR TELEPHONE SWITCHBOARDS.

No. 592,416.

Patented Oct. 26, 1897.

Fig. 1^a

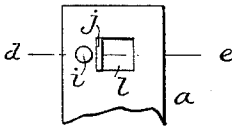


Fig. 1^b

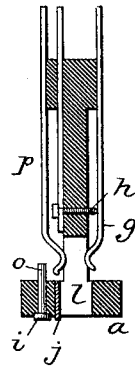


Fig. 2

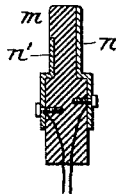
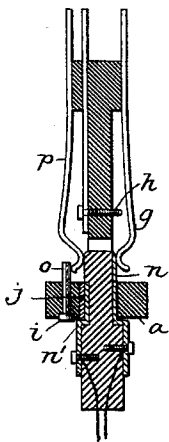


Fig. 3



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MILO G. KELLOGG, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF SAME PLACE.

SPRING-JACK FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 592,416, dated October 26, 1897.

Application filed April 1, 1893. Renewed December 30, 1893. Serial No. 495,265. (No model.)

To all whom it may concern:

Be it known that I, MILO G. KELLOGG, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Telephone-Exchange Switches, 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 a spring-jack switch adapted for use in certain forms of exchange operation in connection with the test system shown in my Patent No. 308,315, of November 18, 1884, and for other purposes. In said patent the lines which are shown are ground or single-circuit lines, and it shows both lines which normally pass through series of pairs of normally closed contacts on the various multiple switchboards and lines which are connected permanently to series of switch bolts or contacts on the various boards. In the test system therein shown the test-circuits are entirely local and disconnected from the main-line circuits. For each line there is on each board a pair of local contacts on each board disconnected from the main-line circuits and normally insulated from each other, but brought automatically into electric connection when the line is switched at that board, and one of each of said pairs of local contacts is so constructed and located that a test plug or device may be applied to it by the operator for testing. The test-circuits and connections are substantially as shown and described in the patent. The switch therein shown and described is, however, not applicable to metallic-circuit lines.

The switch which I shall herein describe and claim is applicable to a metallic-circuit telephone-exchange system which embodies the test system shown in said patent as outlined above.

The switch which is my invention is a spring-jack switch in which a contact-piece is placed along the switch-hole, and there is one pair of contacts normally in contact and another pair normally open, and said first pair are opened and said second pair are closed by the switch-plug on its insertion; also, in which a contact-piece is placed along the switch-hole, and there is one pair of con-

tacts normally in contact and another pair normally open, and said first pair are opened and said second pair are closed by the switch-plug on its insertion, while the plug then forms connection with one of the contact-pieces of said normally closed pair; also, in which a contact-piece is placed along the switch-hole, and there is one pair of contacts normally closed and another pair normally open, and a switch-plug on its insertion opens said normally closed points and closes said normally open points, and there is a test contact-piece on the front of the switchboard connected to one of said normally open contact-points; also, in which a contact-piece is placed along the switch-hole, and there is one pair of contacts normally closed and another pair normally open, and a switch-plug on its insertion opens said normally closed contact-points and forms connection with one of them and closes said normally open points, and there is a test contact-piece on the front of the switchboard connected to one of said normally open contact-points; also, in which there are two insulated contacts and a pair of contacts insulated from the others and normally open, but automatically closed on the insertion of the plug, and when the plug is inserted its two contacts form connection with said two insulated contacts of the switch, respectively; also, in which there are two insulated contacts and a pair of contacts insulated from the others and normally open, but automatically closed on the insertion of the plug, and a test contact-piece on the front of the board connected to one of said normally open contact-points.

My invention also consists in the combination of said switch with a loop-switch plug which on its insertion separates said normally closed points and closes said normally open points, while the two contact-pieces of the plug form connection with one of said normally closed points and with the contact-piece along the switch-hole, respectively; also, in the combination of said switch with a loop-switch plug which on its insertion forms connection between its two contacts and two of the switch-contacts, respectively, while automatically on the insertion of the plug the pair of contacts which are normally open and in-

ulated from said other contacts are closed to each other.

In the accompanying drawings, illustrating my invention, Figure 1^a is a front view of the switch. Fig. 1^b is a sectional view of the switch as indicated by the line *d e* in Fig. 1^a. Fig. 2 is a side view of the loop-switch plug adapted to be inserted into the switch. Fig. 3 shows the plug inserted into the switch with the connections thereby made and broken as will hereinafter be described.

In the drawings like parts are indicated by the same letters of reference.

In Fig. 1^b, *a* is the rubber strip of the shape substantially as shown, on which the metal parts of the switch are mounted, and through the front of which is the switch-hole *b*. *g* is a contact-spring mounted in the rear of the strip and extending toward its front parallel to the length of the hole and to one side of the center of the hole. *h* is a contact-point against which spring *g* normally presses. *p* is a contact-spring mounted on the rear of the strip and extending toward its front parallel to the length of the switch-hole and to the other side of the center of the switch-hole from where *g* is placed. *o* is a contact-point mounted in close proximity to *p*, but farther from the hole and normally out of contact with *p*. *i* is a contact-piece mounted on the front of the strip and in electrical connection with *o*. *j* is a contact-piece placed along the surface of the switch-hole and on the same side as spring *p*.

In Fig. 2, *m* is the rubber insulation of the switch-plug, and *n n'* are its two contact-pieces. *n*, as shown, does not extend to the end of the plug-tip, but leaves an insulated surface *m* at the end of the plug and in front of the contact-piece *m'*. The plug is made so that its tip fits the switch-hole, and when inserted presses spring *g* away from contact with point *h* and by the insulated surface *m* presses spring *p* into contact with point *o*, and the contact-piece *n* of the plug forms connection with *g*, and the piece *n'* of the plug forms connection with *j* and not with *p*. The plug should be inserted into the switch in such a direction as to perform the switching operations above described.

Fig. 3 shows the plug inserted in the switch with the connections made as described.

The connections of the metallic-circuit lines of various forms of telephone-exchange operation to the contacts of the switches are obvious. For instance, in those systems where one side or branch of the line passes successively through pairs of normally closed contacts of the switch and the other side or branch of the line is connected rigidly to third or insulated contact-pieces of the switch the first-mentioned side will pass, as usual, through the pairs of contacts *g h* of its line-switches, and the other side or branch of the line will be connected, as usual, to all the contacts *j j* of the line-switches, and in those systems in which each side or branch of the line

is connected permanently to a contact-piece of its switch on each board one side or branch is connected to all the contacts *g g* and the other side or branch to all the contacts *j j* of its switches on the several boards. In the latter case the contacts *h h* need not be necessarily utilized.

I claim as my invention—

1. A spring-jack switch containing a contact-piece in or along the switch-hole, and a pair of contact-pieces normally closed, and another pair of contacts permanently insulated from the rest and normally open, in combination with a loop-switch plug containing two contact-pieces each insulated from the other, and an insulated surface of the plug insulated from said plug contact-pieces, said plug being inserted into said switch, and when inserted automatically opening said normally closed contact-pieces, and forming connection between said two contact-pieces of the plug respectively and said contact-piece in or along the switch-hole and one of the contact-pieces of said pair of normally closed contact-pieces, and said insulated surface of the plug pressing one of said normally open contact-pieces of the switch into electrical contact with its mate.

2. A spring-jack switch containing a contact-piece in or along the switch-hole, and another contact-piece, and a pair of contacts permanently insulated from the rest and normally open, in combination with a loop-switch plug containing two contact-pieces each insulated from the other, and an insulated surface of the plug insulated from said plug contact-pieces, said plug being inserted into said switch, and when inserted forming connection between said two contact-pieces of the plug respectively and said two first-mentioned contact-pieces, respectively, and said insulated surface of the plug pressing one of said normally open contact-pieces of the switch into electrical contact with its mate.

3. A spring-jack switch containing a contact-piece, and a pair of contact-pieces normally closed, and another pair of contacts permanently insulated from the rest and normally open, in combination with a loop-switch plug containing two contact-pieces each insulated from the other, and an insulated piece of the plug insulated from said plug contact-pieces, said plug being inserted into said switch, and when inserted automatically opening said normally closed contact-pieces, and forming connection between said two contact-pieces of the plug respectively and said first-mentioned contact-piece and one of the contact-pieces of said pair of normally closed contact-pieces, and said insulated piece of the plug pressing said normally open contact-pieces of the switch into electrical connection with each other.

4. A spring-jack switch containing a contact-piece in or along the switch-hole, and a pair of contact-pieces normally closed, and another pair of contacts permanently insulated

lated from the rest and normally open, and a test contact-piece a part of or in electrical connection with one of said normally open contact-pieces, in combination with a loop-switch plug containing two contact-pieces each insulated from the other, and an insulated piece of the plug insulated from said plug contact-pieces, said plug being inserted into said switch, and when inserted automatically opening said normally closed contact-pieces, and forming connection between said two contact-pieces of the plug respectively and said contact-piece in or along the switch-hole and one of the contact-pieces of said pair of normally closed contact-pieces, and said insulated piece of the plug bringing said normally open contact-pieces of the switch into electrical connection with each other.

5. A spring-jack switch containing a contact-piece in or along the switch-hole, and another contact-piece, and a pair of contacts permanently insulated from the rest and normally open, and a test contact-piece a part of or in electrical connection with one of said normally open contact-pieces, in combination with a loop-switch plug containing two contact-pieces each insulated from the other, and an insulated piece of the plug insulated from said plug contact-pieces, said plug being inserted into said switch, and when inserted forming connection between said two contact-pieces of the plug respectively and said two first-mentioned contact-pieces, and said insulated piece of the plug bringing said normally open contact-pieces of the switch into electric connection with each other.

6. A spring-jack switch containing a contact-piece and a pair of contact-pieces normally closed, and another pair of contacts permanently insulated from the rest and normally open, and a test contact-piece a part of or in electrical connection with one of said normally open contact-pieces, in combination with a loop-switch plug containing two contact-pieces each insulated from the other, and an insulated piece of the plug insulated from said plug contact-pieces, said plug being inserted into said switch, and when inserted automatically opening said normally closed contact-pieces, and forming connection between said two contact-pieces of the plug respectively and said first-mentioned contact-piece and one of the contact-pieces of said pair of normally closed contact-pieces, and said insulated piece of the plug bringing said normally open contact-pieces of the switch into electric connection with each other.

7. A loop-switch plug containing two insulated contact-pieces to each of which a flexible switch-cord is attached, and containing an insulated piece insulated from said contact-pieces of the plug, in combination with a switch adapted to receive the plug, said switch

containing a hole into which the plug is placed for switching, containing also two contact-pieces with one of which one of the contact-pieces of the plug forms connection, and with the other of which the other contact-piece of the plug forms connection, when the plug is inserted into the switch, and containing also two other contact-pieces never in electrical connection with the other contact-pieces and normally insulated from each other but automatically electrically connected on the insertion of the plug into the switch by said insulated piece of the plug.

8. A loop-switch plug containing two insulated contact-pieces to each of which a flexible switch-cord is attached, and containing an insulated piece insulated from said contact-pieces of the plug, in combination with a switch adapted to receive the plug, said switch containing a hole into which the plug is placed for switching, containing also two contact-pieces with one of which one of the contact-pieces of the plug forms connection, and with the other of which the other contact-piece of the plug forms connection, when the plug is inserted into the switch, and containing also two other contact-pieces never in electrical connection with the other contact-pieces and normally insulated from each other but automatically electrically connected on the insertion of the plug into the switch by said insulated piece of the plug, one of said last-mentioned contact-pieces extending to the front of the switch.

9. A loop-switch plug containing two insulated contact-pieces to each of which a flexible switch-cord is attached, and containing an insulated piece insulated from said contact-pieces of the plug, in combination with a switch adapted to receive the plug, said switch containing a hole into which the plug is placed for switching, containing also two contact-pieces with one of which one of the contact-pieces of the plug forms connection, and with the other of which the other contact-piece of the plug forms connection, when the plug is inserted into the switch, containing also two other contact-pieces never in electrical connection with the other contact-pieces and normally insulated from each other but automatically electrically connected on the insertion of the plug into the switch, by said insulated piece of the plug, and containing also a contact-piece at the front of the switch connected with one of said last-mentioned contact-pieces.

In testimony whereof I have hereunto subscribed my name.

MILO G. KELLOGG.

Witnesses:

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E. S. WALKER.