

(No Model.)

U. H. BALSLEY.
TELEPHONE SYSTEM.

No. 518,773.

Patented Apr. 24, 1894.

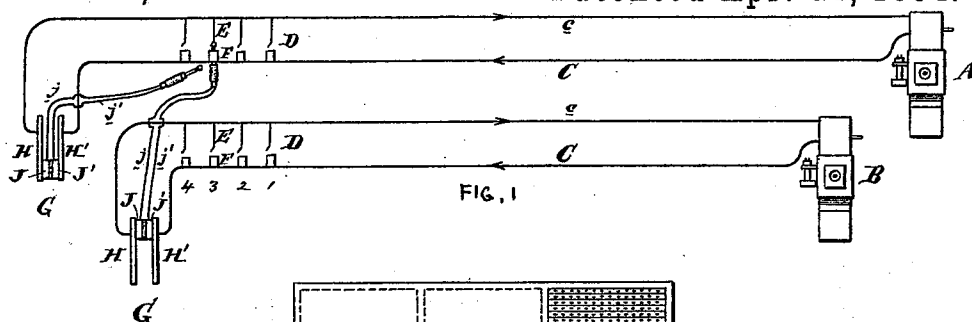


FIG. 1

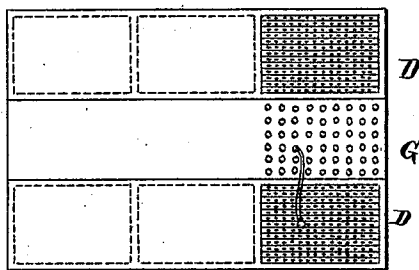


FIG. 2

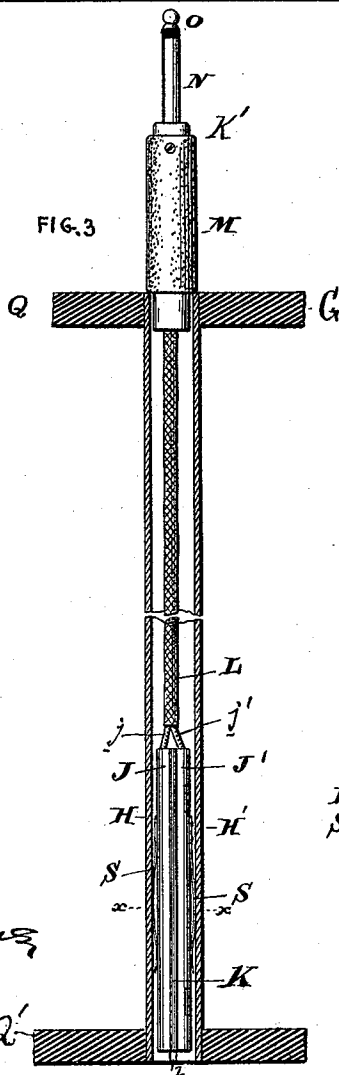


FIG. 3

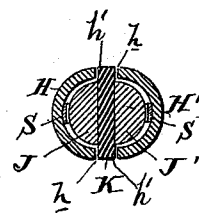


FIG. 4

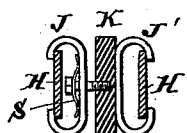


FIG. 5

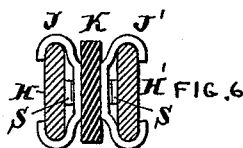


FIG. 6

WITNESSES:

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UNITED STATES PATENT OFFICE.

UPTON H. BALSLEY, OF PHILADELPHIA, PENNSYLVANIA.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 518,773, dated April 24, 1894.

Application filed April 29, 1889. Serial No. 308,904. (No model.)

To all whom it may concern:

Be it known that I, UPTON H. BALSLEY, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Telephone Apparatus, of which the following is a specification.

My invention relates to telephone apparatus; and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

More specifically my invention relates to the switch plugs and their contacts for the purpose of operating the switches in a central station to connect subscribers together, and to the means of supporting those plugs so that they may be operated easily and are not liable to have their wires tangled or crossed and the circuit broken thereby.

My invention is particularly suited to large systems having a great number of subscribers, and is intended to simplify the manipulation of a large number of switches.

The system for central stations having a large number of subscribers most generally in use is that known as the Shaw and Child's system which employs ground return circuits and single contact plugs, and in which the metallic circuits begin and end outside of the switch board. My invention is an improvement upon that system and I employ complete metallic circuits in which the beginning and ending of the circuit is within the switch board, and double contact plugs with corresponding changes in the contacts of the switches, circuits, and sliding weight contacts of the plugs.

In carrying out my invention I employ a double contact plug which is connected with two movable contacts adapted to move in suitable guides arranged in circuit with the subscriber, so that the plug and connecting conductors may be easily moved and the plug be inserted into the proper switch socket without breaking the contact or allowing of any loose wire, and when out of use be conveniently supported out of the way of the operator.

In the drawings:—Figure 1 is a diagram illustrating the operation of my invention in coupling up two subscribers showing the circuit connections. Fig. 2 is a plan view of

the switch board. Fig. 3 is a sectional side elevation of the plug, support and devices. Fig. 4 is a cross sectional view of the same on the line X—X of Fig. 3 and Figs. 5 and 6 are cross sectional views similar to Fig. 4 illustrating modifications of the support and contacts.

In this application I do not claim the particular arrangement of the switches and the metallic circuits shown, as they form subject matter of another and pending application of mine for Letters Patent, and the present invention has to do with the plug and its supporting and contact devices.

A and B are two subscribers' telephones having the line wires *c* C leading to the central station and connecting respectively with the contact guides H. H'. These contact guides are preferably formed in the shape of a split tube the two portions of which are separated from each other sufficiently to form a slot or opening, and supported between supporting tables Q Q' (as shown in Figs. 3 and 4).

J. J' are two contacts adapted to move in the guides H H' and make contact therewith and are united by a piece of insulating material K. I prefer to construct these contacts J J' of a split cylinder adapted to fit the split tube of which the guides H H' are formed and have the insulating material K with a projection on each side forming feathers *h* adapted to run in the slots or openings *h* between the guides H H' for the purpose of guiding the contacts in their movements. Springs S S' may be employed upon the contacts J J' to insure a constant contact with the guides H H'.

It is apparent that the form and arrangement of these guides H. H' and contacts J, J' may be varied in many ways without making any change in the operation of the parts. Thus in place of the tubular guide described, parallel bars, or rods such as are shown in Figs. 5 and 6 may be used and the contacts J J' may be curved pieces of metal secured to the insulating material K and making contact with the guides H H'. A spring *s* may be used to insure a constant contact between the parts.

K' is the switch plug consisting of the metallic cylindrical portion N, the head or tip O insulated from the cylindrical portion, and an insulating handle or coating M to prevent

short circuiting of the current while handling the plug, but leaving a portion of the cylindrical part N exposed to make contact. The contacts J and J' are connected by wires j j' respectively with the tip or head O and the cylinder N. These wires are properly insulated and may be incased in a flexible tube or covering L.

F, E is the switch, arranged in the subscribers' circuit, into which the plug K' is to be inserted, the cylindrical portion N making contact with tubular socket F, and the head O with the spring E, completing a metallic circuit between the two subscribers.

The contacts E and F shown in Fig. 1 and over the numbers 1, 2, 3, and 4, are designed to represent the plug contact switches of the switch board, and the numerals indicate different successive sections of the same switch board. Normally the plug is in the position shown in Fig. 3, with the contacts J J' at the bottom of the guide and the plug projecting above the table Q. If it is desired to make a connection the plug may be pulled out and away from the table Q drawing the contacts up in the guides H H'. The plug may then be inserted in the switch desired and the subscribers' wires coupled together. By this method of making the contacts J J' so that they may be moved or drawn up in the guides H H' and of having the wires j j' connecting the contacts with the plug it will be seen that the plug K' will be capable of connection with a large number of switches E F covering a considerable area of switch board, so that one operator may have control of the switches of all of the subscribers of a system, every one of which will be within reach of the plug K' notwithstanding that two conducting wires and contacts are employed for each plug. It is apparent that the extent to which this plug may be extended will depend upon the length of the guides H H' and of the wires j j', which may of course be made to suit the demands of station and the area of the switch board.

In Fig. 2 is shown an arrangement of switch boards particularly adapted to very large systems. G represents a section of the board made up of the plug supports and contacts shown in Fig. 3. These plugs are divided into convenient numbers allotted to separate operators each of whom has charge of a particular number of plugs but by a convenient and compact arrangement of the switch, they may be so arranged that each operator has before him within reach of his particular plugs, a complete set of switches for the entire system, so that he may couple up any of his plugs with the switch of any subscriber. When the plug is withdrawn from the switch to break connection it is drawn back by the weight of the contacts J J' into the position shown in Fig. 3, out of the way of the operator.

While I prefer the details of construction which are here shown I do not limit my invention thereto as it is apparent that they

may be modified in many ways without departing from the principles of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a telephone apparatus, the combination with the line wires of the subscribers, of switches located in the line wires, a double contact plug adapted to be inserted in said switches to complete the circuit through said switches, two sliding contacts insulated from each other and connected respectively to the two contacts of the plug, and electrical connections between said sliding contacts and the subscribers' wires.

2. In a telephone switch board device for a central station, the combination with the switches arranged in the line wires of the subscribers, of plugs adapted to be inserted in said switches to complete the circuit through them having two contacts insulated from each other, two movable contact devices insulated from each other and in circuit with said subscribers' wires, and a flexible connection between said movable contacts and the two contact portions of the plug.

3. In a telephone switch board device for a central station, the combination with the switches arranged in the line wires of the subscribers, of plugs having two contact parts insulated from each other and adapted to be inserted in the switches, two fixed guides in circuit with said subscribers' wires, two movable contacts insulated from each other, adapted to move in contact with said fixed guides, and electrical connections between said movable contacts and the two contact portions of said plug respectively.

4. In a telephone switch board device for a central station, the combination with the switches arranged in the line wires of the subscribers, of plugs having two contact parts insulated from each other and adapted to be inserted in the switches, two fixed guides in circuit with said subscribers' wires, two movable contacts insulated from each other, adapted to move in contact with said fixed guides, electrical connections between said movable contacts and the two contact portions of said plug respectively, and spring devices to keep said movable contacts in constant electrical connection with said guides when moving therein.

5. In a telephone switch board device for a central station, the combination with the switches arranged in the line wires of the subscribers, of plugs having two contact parts insulated from each other and adapted to be inserted in the switches, two fixed guides in circuit with said subscribers' wires, two movable contacts insulated from each other, and provided with spring contact surfaces adapted to move in contact with said fixed guides, and electrical connections between said movable contacts and the two contact portions of said plug respectively.

6. Two vertical or upright guides formed like a split tube and insulated from each

other and also in electrical connection with the subscribers' circuits, in combination with a heavy slide moving within the guides and having two contacts working in electrical
5 connection with the guides respectively, and a switch plug having two contacts of the plug respectively with the contacts of the slide.

7. Two parallel insulated guides arranged in an upright position, two contacts guided
10 thereby and respectively connected with each of said guides, a two contact switch plug,

connecting flexible conductors connecting the two contacts of the plug respectively with those guided by the guides, and line wires from the subscriber connecting with the in- 15
sulated guides.

In testimony of which invention I hereunto set my hand.

UPTON H. BALSLEY.

Witnesses:

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S. T. YERKES.