No. 681,868. Patented Sept. 3, 1901.

J. A. BOWEN.

CONNECTING PLUG FOR TELEGRAPH SWITCHBOARDS.

(Application filed Dec. 8, 1900.)

(No Model.)

Fig. 1.

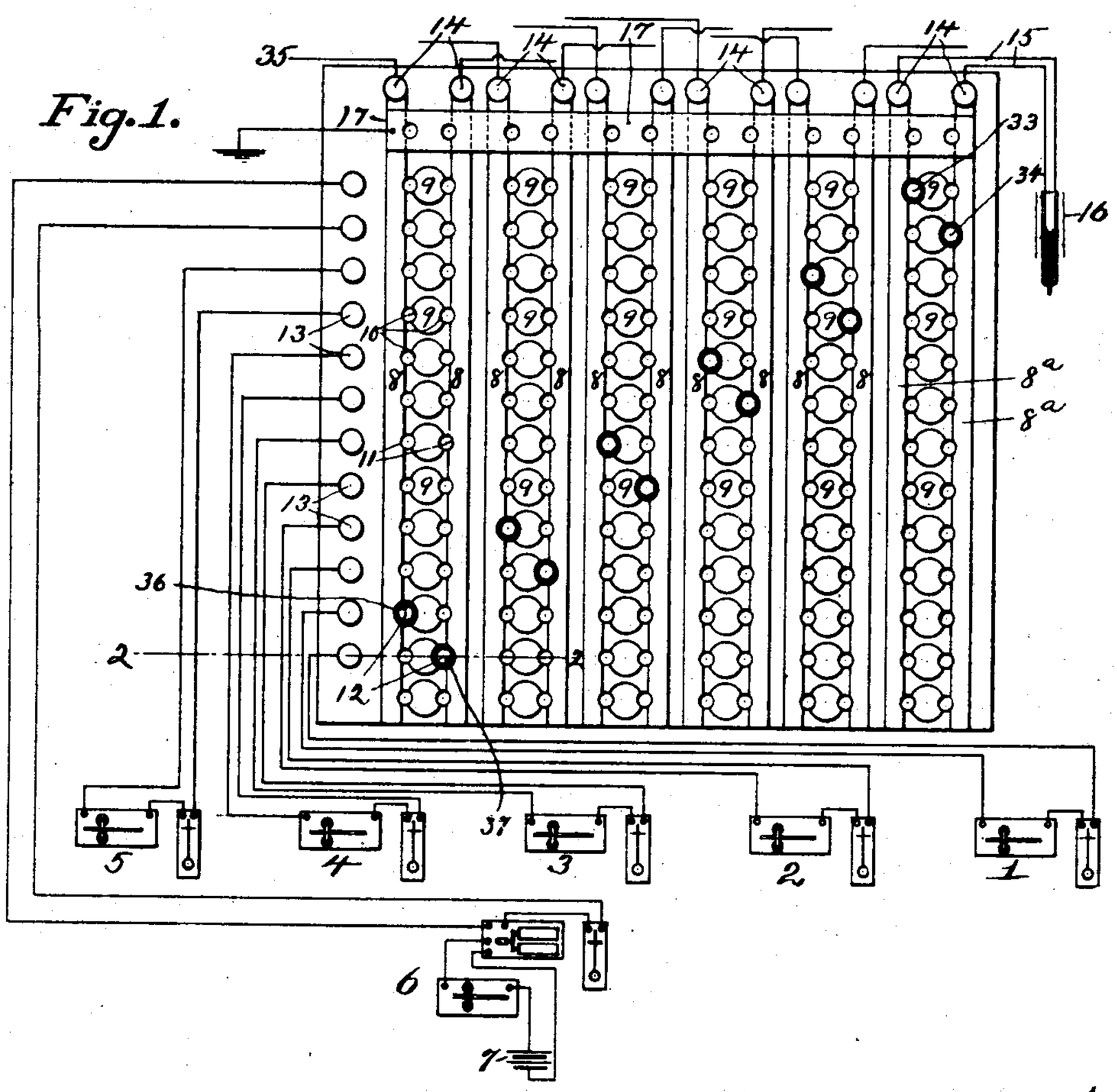


Fig. 2.

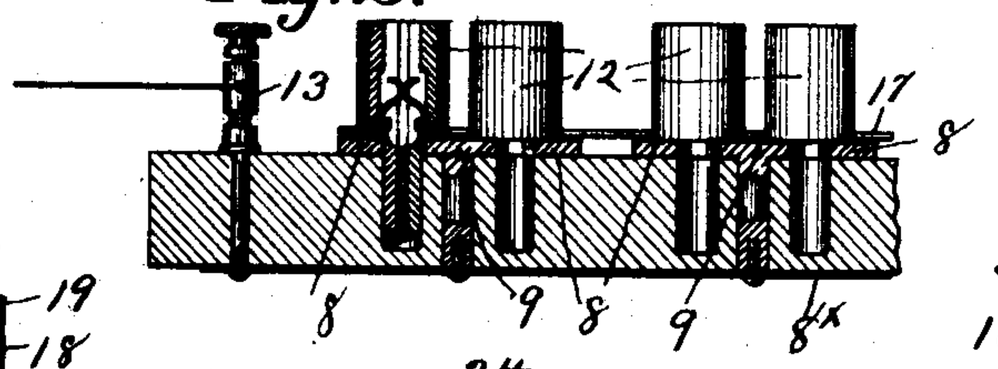
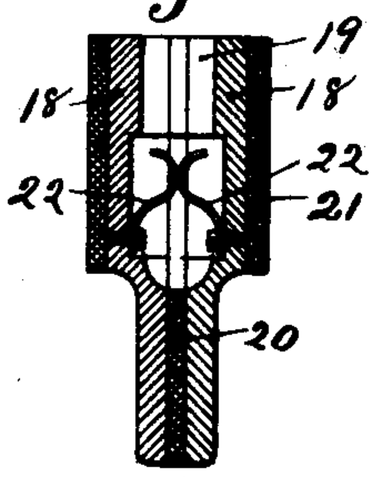


Fig. 3.



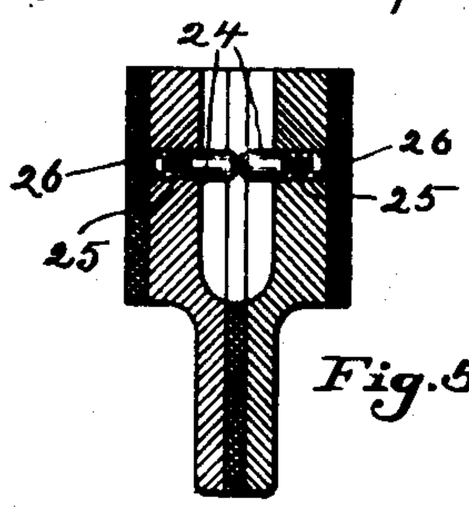


Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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CONNECTING-PLUG FOR TELEGRAPH-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 681,868, dated September 3, 1901.

Application filed December 8, 1900. Serial No. 39,214. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. BOWEN, a resident of Millvale borough, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Connecting-Plugs for Telegraph-Switchboards; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to connecting-plugs for telegraph-switchboards, and has for its object plugs for this purpose which will greatly reduce the work of the operator in making connections at the board, which will prevent the lines being left open, and which will result in a saving of battery-cells at the local office.

The ordinary telegraph-switchboard comprises a series of vertical and a series of horizontal bars insulated from each other, with holes or depressions where said bars most closely approach each other, in which holes or depressions it is customary to insert solid metallic plugs in order to connect the various lines or any one line with any one instrument at the local office. It requires two plugs to connect any given two lines or any line with any given instrument for the reason that the lines are open at two places. Whenever it is necessary to change the connection between the lines, these two plugs must be withdrawn and inserted in other places, or if it is desired to connect any one of the instruments at the local office with any one of the connected lines these plugs must likewise be withdrawn and special plugs connected to the instrument which is to be placed in the circuit inserted in place thereof. In any event, to change the connections it is required that the connecting-plugs in the switchboard be withdrawn and others inserted in their place, thereby necessitating two operations on the part of the attendant and also leaving the line open while these changes are being made, and, furthermore, there is always liability that the line will be left open by reason of the failure to restore the plugs.

One object of my invention is to reduce this labor and to provide connecting-plugs whereby any instrument at the local office may be connected to any one of the lines or the connections between the lines and the local instruments may be changed without the necessity of withdrawing the connecting-plugs in the board and inserting others in place thereof, but by merely inserting a special form of plug into the special form of connecting-plug already in the board.

In almost all telegraph-offices there are a number of instruments, each connected to its own line, and when business is slack—as, for instance, in the night-time—it is customary for a single operator to attend all these instruments. Each of these instruments has a local circuit provided with two cells of batteries and whenever a call comes in on any one of the instruments the attending operator will go to that instrument and receive and answer the message. This necessitates a constant moving about on his part and also there are constantly in use two cells of battery for each instrument of the office.

Another object of my invention is to reduce the labor of the attending operator and also to reduce the number of battery-cells at the local office.

To these ends my invention consists in a special connecting-plug for telegraph-switchboards provided with suitable terminals, which connecting-plugs are inserted in the board to make the proper connection between the lines or between a given line and a given instrument and then remain in place. Should it be desired to connect any other instrument in this line, a special form of plug connected to the instrument which it is desired to insert in the line is inserted into the special form of plug already in the board, so that it is not necessary to withdraw these plugs, and the work and time consumed in making the connections are greatly reduced. Furthermore, the line is never open; but as soon as the special form of plug is withdrawn the line is immediately closed, thereby saving considerable time in the working of the lines. Furthermore, only one of the instruments at the office need be supplied with two battery-cells. The others need have but a single battery-cell, as it will give sufficient current to enable the attending operator to hear the call received on that instrument. When the call is received, he inserts a special form of plug

connected to his own instrument, which is provided with two battery-cells, into the line of the instrument receiving the call and then receives and answers the message on his own instrument, which, as above stated, is provided with two battery-cells, so that distinctness in receiving the message is assured.

In the accompanying drawings, Figure 1 is a diagrammatic view of telegraphic switchboard with six instruments connected thereto. Fig. 2 is a horizontal transverse section on the line 2 2, Fig. 1. Fig. 3 is a longitudinal section of my improved form of connecting-plug. Fig. 4 is a similar view of the plug with a special form of split plug inserted therein. Fig. 5 is a modification of the plug shown in Fig. 3.

In Fig. 1 the switchboard has connected thereto the instruments 1, 2, 3, 4, 5, and 6, the first five of which are provided in their local circuit with a single battery-cell, (not shown,) whereas the last one is provided with two battery-cells. (Shown at 7.) The switchboard is provided with the series of vertical metallic bars 8 8 on the front of the board and a series of horizontal bars $8^{\times}$ on the back thereof which are provided with projections 9 9, which extend forwardly through holes in the board and lie between a pair of vertical bars 8 8. These projections are provided on opposite sides with a semicircular depression 10, and the bars 8 8 are provided with similar depressions 11 11, the depressions 10 and 11 forming circular openings for receiving the connecting-plugs 12 for connecting the desired vertical and horizontal bars. The horizontal bars are provided at their ends with the binding-posts 13, from which connections are made to the various local instruments, and the vertical bars are provided with the binding-posts 14, to which are connected the incoming and outgoing lines, except one set of said bars 8^a 8^a, which are connected by means of the cord 15 to the split plug 16. In front of the upper end of the vertical bars lies the ground-plate 17, through which the various lines may be connected to the ground, said plate being separated by a small air-gap from the bars 8 8, so that it will ground any heavy charges that may come onto the lines.

The special form of connecting-plug 12 is shown in Fig. 3 and consists of two metallic sections 18, cored out at their ends to form the hollow chamber 19 and separated by the insulation 20. An insulating-sleeve 21 serves to hold the sections together, and to each of said sections is connected a spring 22, said springs normally bearing against each other, so as to electrically connect the sections. Instead of the springs 22 shown I may employ spring-pressed plungers 24, Fig. 5, which are mounted in sockets 25 in the sections 18 and are held in contact with each other by means of the spiral springs 26. The split plug comprises two metallic sections 27, separated by the insulation 28, which projects beyond said section, as at 29, said sections being held together by the insulating-sleeve 30. To each of said sections is connected a wire 31, which may be connected directly to the operator's special instrument or connected to a pair of vertical bars 8^a 8^a, as shown in Fig. 1.

In the use of my invention the proper connection between the lines and the instruments is made by inserting the connecting-plug 12 (shown in Fig. 3) into the desired depression between the vertical bars 8 and the projections 9 on the horizontal bars. The current coming in over the line passes along the vertical bar 8 until it reaches the plug 12, whence it passes through one section of said plug through the springs 22 to the other section thereof and thence to the horizontal bar, from which it proceeds to the instrument through the same, back by the other horizontal bar through a similar plug in a similar manner to the other one of the pair of vertical bars, and thence out on the line. These connecting-plugs remain in the board as long as it is desired to have that particular instrument connected to that particular line. These plugs may also be used to connect any one of the incoming lines with any other of the incoming lines by inserting the plugs in the proper holes in the board, as will be readily understood. Should it be desired to connect any other of the instruments at the local office with the given line or connect any of the instruments in any through-line, it is not necessary to withdraw the plugs 12; but it is merely necessary to insert into said plug the split plug 16, which is connected to the instrument which it is desired to connect to the line. This plug separates the terminals 22, so that the current coming in over the line and into the plug 12 passes by means of the spring 22 to one section 27 of the plug 16, thence through one wire of the cord 15 to the instrument, and back by the other wire of the cord to the other section of said plug through the other spring 22 and out in the usual way. As soon as the plug 16 is withdrawn the terminals 22 spring into contact, thereby immediately closing the line, so that loss of time in working the line is obviated. Furthermore, the attending operator has only to insert or withdraw the split plug 16, and thus saves considerable time in making the various connections. If all of the instruments must be attended by a single operator, he will use the instrument 6, and if a call comes in on any of the other instruments he will insert the split plug 16, which is connected to the vertical bars 8^a, connected to his instrument, and insert it in one of the connecting-plugs 12 on the line over which the call comes, when his instrument will immediately be connected in the line in series with the instrument to which the call came. For instance, as shown, his instrument 6 is connected to the vertical bars 8^a 8^a by means of plugs at 33 and 34, and said bars 8^a 8^a are connected by the cord 15 to the plug 16. Should a call come over the line 35, it will

pass through the connecting-plug at 36 to the instrument 1 and thence out through the connecting-plug at 37 onto the line. The operator takes the plug 16 and inserts it in either one of the connecting-plugs at 36 or 37, it being immaterial into which one it is inserted. The line is then connected through, for instance, the plug at 36, through the split plug 16, through the instrument 6, back to the plug at 36, and from this plug through the instrument 1, back through the plug at 37, and out to the line, so that by this simple means the instrument 6 is in series on the line with the instrument 1, and inasmuch as the instrument 6 is provided with two cells of battery the message can be distinctly read. At the same time the operator is saved the trouble of getting up and going to the instrument 1. It will thus be seen that my improved plug insures a saving of time in making connections between the instruments and the lines, prevents the lines being left open, thereby obviating the loss of time in working the lines, and also greatly reduces the work of the operator in making the various connections. Furthermore, in a local office having six instruments, as shown, it is possible to save five cells of battery.

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

1. In a telegraph-switchboard, the combination with the vertical and cross bars, of a plug adapted to connect any one of the vertical bars with any one of the cross-bars, said plug being provided with separable circuit-terminals which are normally in contact.

2. In a telegraph-switchboard, the combination with the vertical and cross bars, of a plug adapted to connect any one of the vertical bars with any one of the cross-bars, said plug being provided with separable circuit-terminals, and a split plug adapted to be inserted in said connecting-plug, said split plug comprising two sections insulated from each other and conductors united to each of said sections.

3. A plug for telegraph-switchboards comprising two longitudinal metallic sections, insulation between said sections, means for securing said sections together, and separable circuit-terminals connecting said sections, said terminals being normally in contact.

4. A plug for telegraph-switchboards comprising longitudinal metallic sections hollowed out at one end, insulation between said sections, means for securing said sections together, and springs connected to each of said sections and normally bearing against each other.

5. Telegraph-switchboard connecting devices comprising separable circuit-terminals, and a split plug, said plug comprising two metallic sections adapted to make contact with said separable circuit-terminals, insulating material between said sections and projecting beyond the same, said projecting insulating material being adapted to pass between said separable circuit-terminals, and a conductor connected to each of the metallic sections of the split plug.

6. Telegraph-switchboard connecting devices comprising a hollow plug provided with separable circuit-terminals and a split plug adapted for insertion in the hollow plug and between the separable terminals thereof, said split plug comprising two sections insulated from each other and circuit connections to each of said sections.

In testimony whereof I, the said JOSEPH A. BOWEN, have hereunto set my hand.

JOSEPH A. BOWEN.

Witnesses:

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F. W. WINTER.