(No Model.) 2 Sheets—Sheet 1.

J. A. & F. B. COOK.

WIRING SWITCH BOARDS.

No. 385,846. Patented July 10, 1888.

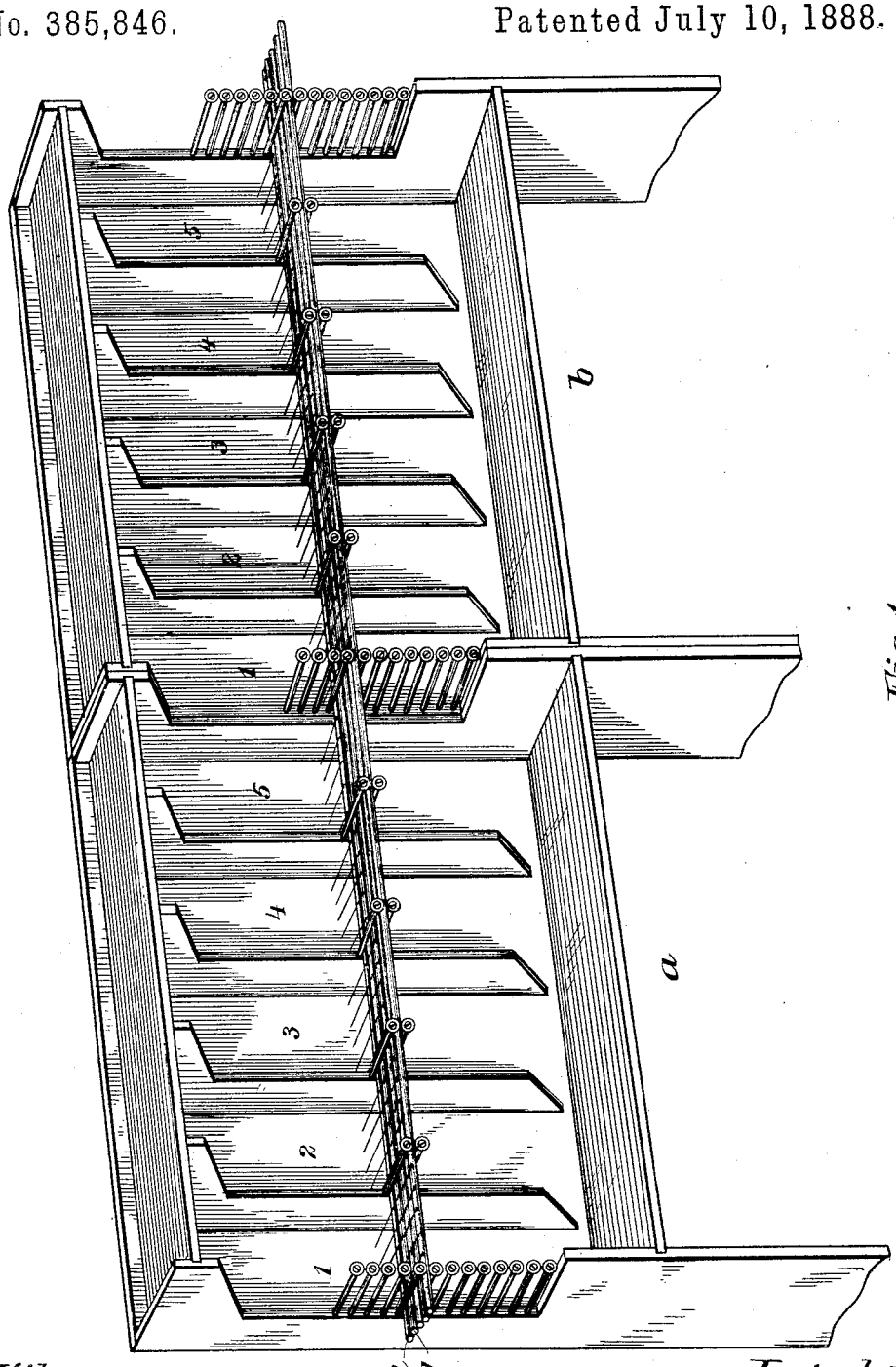

Fig. 1.

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2 Sheets—Sheet 2.

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Fig. 3

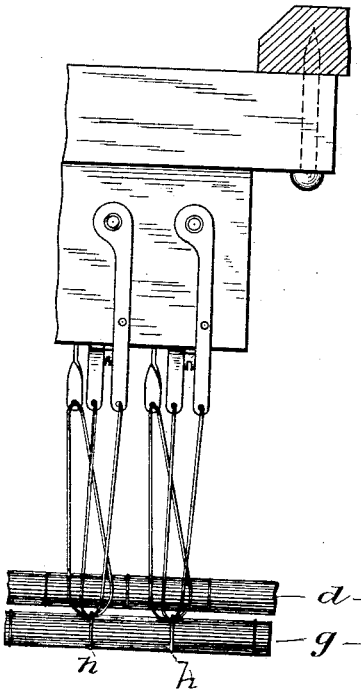
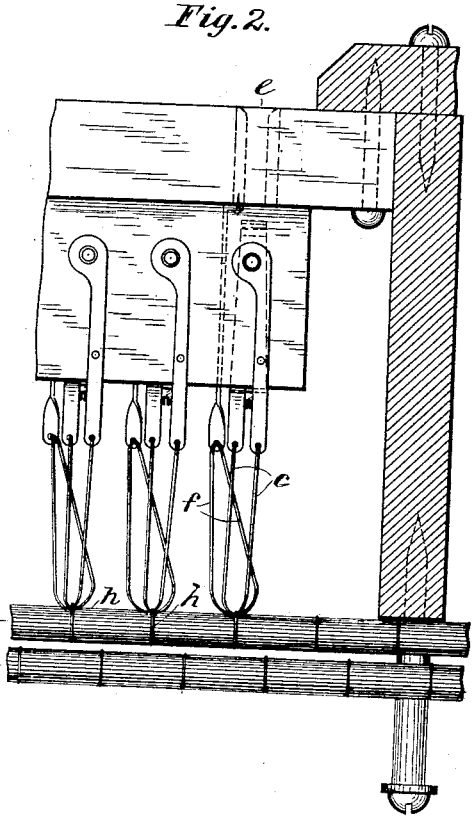


Fig. 2.



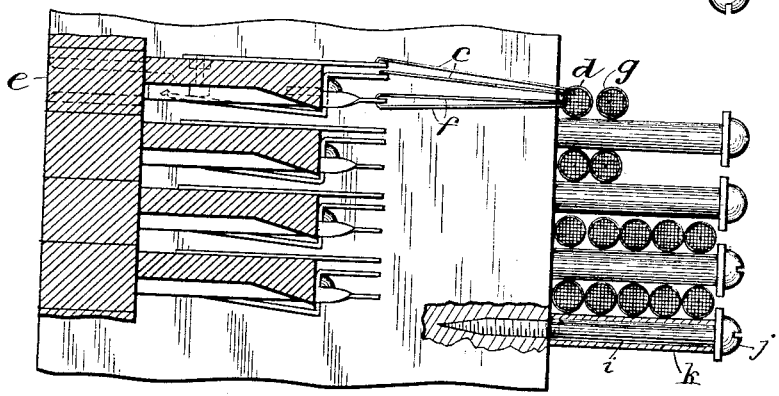


Fig. 4.

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UNITED STATES PATENT OFFICE.

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WIRING SWITCH-BOARDS.

SPECIFICATION forming part of Letters Patent No. 385,846, dated July 10, 1888.

Application filed July 25, 1887. Serial No. 245,219. (No model.)

To all whom it may concern:

Be it known that we, JAMES A. COOK, of Detroit, in the State of Michigan, and FRANK. B. COOK, of Toledo, in the State of Ohio, have made certain new and useful Improvements in Wiring Multiple Switch-Boards of a Telephone-Exchange, 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.

In multiple switch-board systems of telephone-exchanges it has been common to make the connections with the spring-jack switches from the rear of the boards. As to the state of the art prior to our invention, reference is made to Letters Patent No. 367,730, granted John A. Seely, August 2, 1887, for cable-rack for switch-boards.

Our invention consists in the provision for supporting the cables so that they may be carried directly from one section to another of the switch-board and disposed in horizontal layers in a compact and convenient manner. The cables are preferably supported upon pins inserted horizontally from the rear of the boards, the pins being preferably provided with heads for keeping the cables from falling off. The pins, as shown more clearly in Figure 4, may each consist of a tube through which a screw is inserted into the uprights of the frame, a washer being preferably placed under the head of the screw.

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

Fig. 1 is a perspective view showing a single layer of cables at the rear of two multiple switch-boards. Fig. 2 is a plan view of three spring-jack switches and their connections with the wires of a cable. Fig. 3 is a similar view of two spring-jacks, showing the connections with the wires of their cables, the connecting-wires passing over one cable of a layer of cables. Fig. 4 is a transverse vertical sectional view showing four strips of spring-jack switches, and the cables supported at their rear, and the connections between one of said spring-jacks and the wires of one of the cables.

Referring now to Fig. 1, *a* and *b* are two multiple switch-boards placed end to end. These switch-boards are duplicates the one of the other. Any number of duplicates may be arranged end to end in the same exchange. These switch-boards each consist of five divisions, 1 2 3 4 5 and 1 2 3 4 5, as shown in Fig. 1. The springs and contacts of the spring-jack switches are usually mounted on rubber frames or strips, each strip usually containing twenty spring-jacks, and being about a foot long and from an inch to three-fourths of an inch in thickness, as illustrated in Figs. 2, 3, and 4.

It will be understood that in multiple switch-board systems each line is provided with a separate switch or spring-jack upon each of the duplicate switch-boards, the different switches of each line being placed preferably in the same order or location upon the different boards. Thus one set of twenty lines will be connected first to a strip of twenty spring-jacks, we will say on division 1 of board *a*, and next with a corresponding strip of division 1 of board *b*, and so on with corresponding strips on each of the boards of the exchange.

It has been common to make up the cables so that each will contain enough wires to make the connections with the spring-jacks of twenty lines—that is to say, each cable usually contains forty wires, twenty being used for the regular telephone-line circuits, and twenty for the test-wires, since each line requires a separate test-wire.

As shown in Fig. 4, wire *c* of cable *d* is shown connected through the line-spring and contact-point of switch *e*. The test-wire *f* of said line is shown connected with the test-piece of said spring-jack *e*. As shown in Fig. 2, three spring-jack switches of a strip are thus shown connected with different wires of cable *d*. In Fig. 3 the connection between cable *g* and its strip of spring-jacks is shown passing over cable *d*. We will thus consider the spring-jacks shown in Fig. 2 as those of a division 5 of one of the switch-boards, and the spring-jacks shown in Fig. 3 we will consider as those of a division 4 of one of the switch-boards.

We preferably make the connections between the strips of spring-jacks and the cables before the strips are placed in the switch-

board. After the connections are made we preferably tie the wires together with strong yarn, as indicated at *h*, Figs. 2 and 3. In this manner the cable is made to retain its form at the rear of the strips with which connections are made. The connections between the cable *d*, nearest the spring-jacks, are shorter than the connections between the second cable *g* and its spring-jacks, as illustrated in Figs. 2, 3, and 4.

In case there were only four divisions in each switch-board only four cables would be required in each horizontal layer, and in general it will be understood that the cables in each layer will correspond in number to the vertical divisions in each switch-board. These cables are supported on brackets or pins *i*, which are screw-pointed, as shown in Fig. 4, in order that they may be readily removed. A screw-cap, *j*, forms the head of the pin. A sleeve, K, is shown on the pin, which is large enough to revolve when the cable is drawn over it. A washer may also be placed in the rear of the screw-cap to retain the cables on the pin or support.

In order to remove any cable, it is only necessary to take out a sufficient number of pins to afford the required space. Thus, suppose it should be desired to remove cable *g*, as shown in Fig. 1. The pins immediately under the layer to which cable *g* belongs would be removed and, if necessary, the pins under the next layer below. In this manner sufficient space would be afforded for removing said cable *g*, with the strips of spring-jack switches to which the wires of said cable are connected in sections.

By our system of wiring the least possible amount of cable is required, and the switch-connections are made readily accessible at the rear of the board.

It is evident that the manner of supporting the cable might be varied in different ways that would readily be suggested to those skilled in the art, and we therefore do not limit our invention to the specific mechanism illustrated and described.

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

1. The combination, with two or more multiple switch-boards having vertical divisions, of spring-jack switches and cables provided with wires connecting with said spring-jacks, said cables being run directly from one board to another at the rear and placed in horizontal layers, the cables in each layer corresponding to the number of said divisions of each switch-board and each cable being connected with a single strip or set of switches on each of the switch-boards.

2. In combination with the uprights of a switch-board and projecting from the rear thereof, the pins *i*, having the screw-cap *j*, the sleeve K, with the cables resting thereon, substantially as described.

3. The combination, with the strips of spring-jack switches arranged upon different multiple switch-boards in the same order, of telephone-lines, each connected with a different switch on each of the boards, the connections being made from the rear of the board, the wires for the connections being made up in cables extending horizontally from one board directly to another board, the cables being placed in layers, the different layers being adapted to be separated or crowded apart, whereby any cable may be removed with its attached strips of spring-jacks, substantially as described.

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