

Jan. 4, 1938.

C. G. McCORMICK ET AL

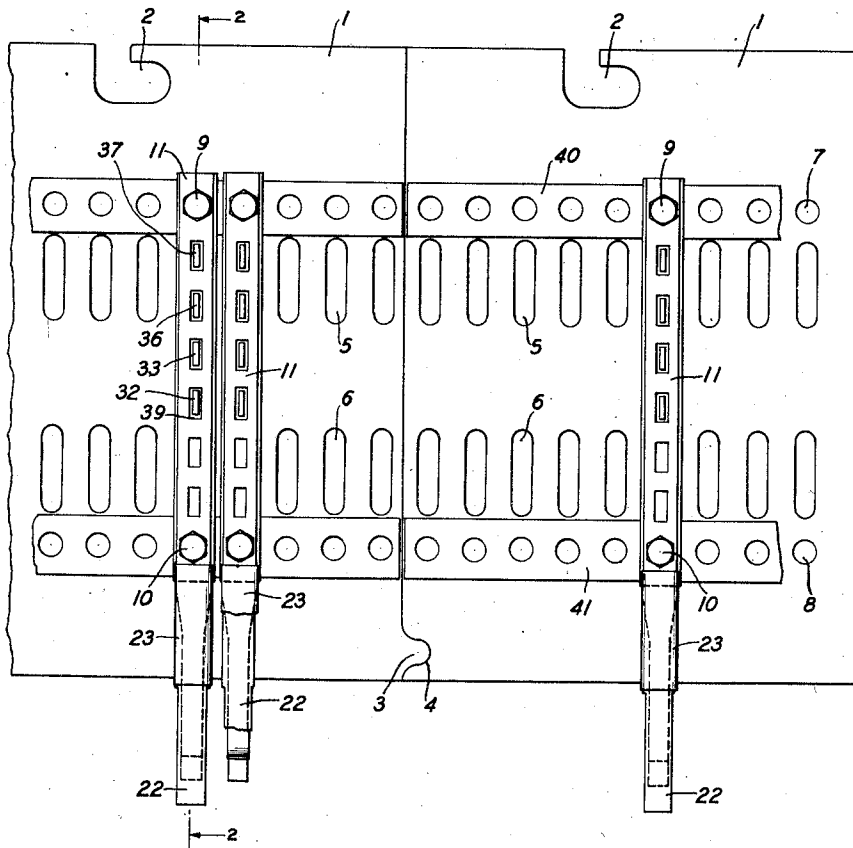
2,104,434

CONNECTING BLOCK AND JACK ASSEMBLY

Filed April 22, 1936

2 Sheets-Sheet 1

FIG. 1



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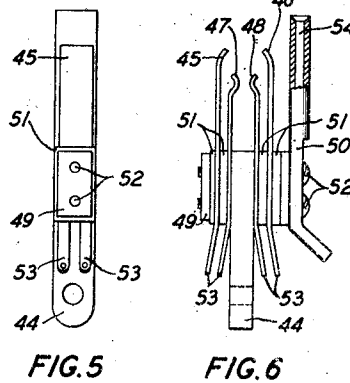
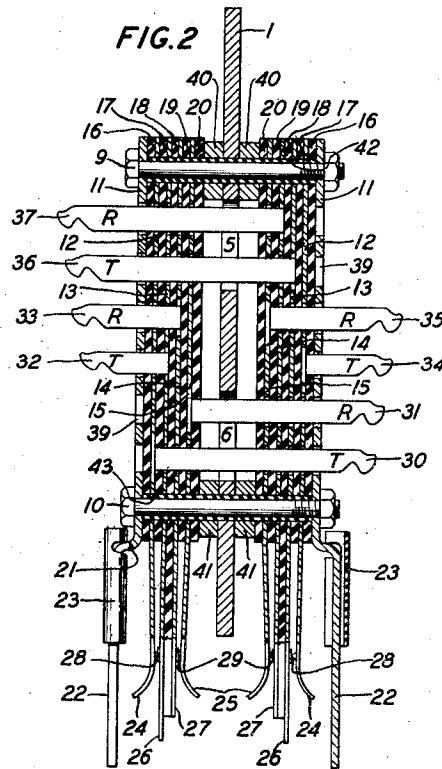
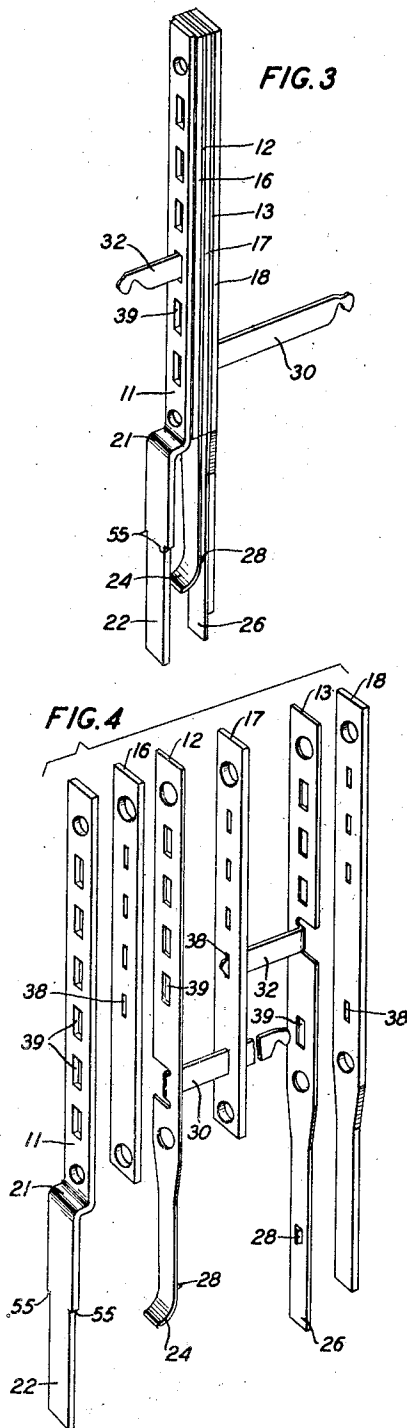
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UNITED STATES PATENT OFFICE

2,104,434

CONNECTING BLOCK AND JACK ASSEMBLY

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Application April 22, 1936, Serial No. 75,724

7 Claims. (Cl. 179—96)

This invention relates to a connecting block and jack assembly and more particularly to an assembly for use on the main distributing frame of a telephone exchange system.

5 A main distributing frame is employed in every telephone office upon which all subscribers' lines and trunks incoming to the office are terminated and from which extensions from such lines are extended to central office equipment al-
10 located to such lines. The main distributing frame now in general use is provided with a connecting block for each line or trunk having protector blocks and heat coils thereon which serve the purpose of protecting the central office equip-
15 ment from high voltages and abnormal currents and to permit the lines and trunks to be opened up for testing or other purposes.

Since in large exchange areas incoming lines and interoffice trunks are generally run in cables, protector blocks are not considered necessary
20 and have in some instances been omitted from the main distributing frame. It has also been found that adequate protection against abnormal currents which might result through the connection of commercial power to subscribers' lines
25 at the subscribers' premises may be obtained by adding protective devices in the central office equipment which may become connected to the subscribers' lines in the establishment of connections, thereby obviating the necessity of equip-
30 ping each line incoming to the main distributing frame with individual heat coils. With the elimination of both protector blocks and heat coils at the main distributing frame a much simpler connecting block is possible. It is there-
35 fore the object of the present invention to provide a simple, compact connecting block for each incoming line combining therewith a test jack by means of which connections may easily be
40 established with both the incoming lines and the central office extensions thereof.

In accordance with the present invention the combination connecting block and jack assemblies are designed for mounting in pairs on op-
45 posite sides of a mounting plate attached to the main distributing frame, each plate having a capacity for fifty such pairs or one hundred assemblies serving one hundred lines or trunks. In some cases one hundred and four assemblies
50 may thus be mounted. Each assembly comprises four connector strips and an outside clamping strip all insulated from each other and from the mounting plate by interposed strips of fiber or other suitable insulation. Each con-
55 nector strip terminates at one end in a jack

spring extension and is provided intermediate its ends with a right angled extension serving as a soldering lug. The jack spring extensions are provided with contacts in such a manner that
5 when the connector strips are assembled and bolted to the mounting plate the spring extensions of the two outside strips contact with the spring extensions of the two inside strips respectively. The outside clamping strip extends
10 parallel to the jack spring extensions and serves as a guide for a test plug which is designed to be engaged with the jack spring extensions. Two such assemblies are held in assembled position
15 on opposite sides of the mounting plate by insulated bolts extending therethrough.

The soldering lugs of the connector strips of each assembly are struck up therefrom at different points intermediate to the ends of the strips and midway of their width, the connector
20 strips, separating fiber strips and the outside clamping strips being provided with aligned slots through which the soldering lugs extend, the separating fiber strips holding the lugs out of
25 contact with the sides of the slots in the connector strips through which they extend. The soldering lugs of a pair of associated assemblies are so arranged that when the two assemblies
30 are mounted on the mounting plate, the lugs from the inside strips of each assembly extend to one side of the mounting plate and the lugs from the outside strips extend to the other side
35 of the mounting plate whereby the tip and ring conductors of the outside lines may be attached to the lugs on one side of the mounting plate and the tip and ring conductors of the inside
40 extensions of such lines may be attached to the lugs on the other side of the plate. With the soldering lugs struck up from the connector strips in this manner, the over-all width of each assembly is reduced to a minimum thus permit-
45 ting a large saving in mounting space.

For enabling testing operations to be conducted on either the inside or outside of a trunk or subscriber's line, a test plug is provided com-
45 prising four contact springs, insulatedly mounted on a central member, and a tubular guide member. The guide member is adapted to fit over the guide extension of the connecting block assembly to guide the contact springs into engage-
50 ment with the spring extensions of the assembly. When the plug is fully inserted the four springs thereof engage the four jack spring extensions of the connecting block assembly and open the normal connections between the inner and outer springs of the assembly thereby open-
55

ing the connections between the inside and outside conductors of the line connected thereto and connecting the outside and inside lines over the springs of the plug.

For a clearer understanding of the invention reference may be had to the following detailed description taken in connection with the attached drawings of which:

Fig. 1 is an elevational view of the adjoining ends of two mounting plates showing connecting block assemblies mounted thereon;

Fig. 2 is a sectional view of the mounting plate taken along section line 2—2 of Fig. 1;

Fig. 3 is a perspective view showing the outside mounting strip, two of the connector strips and separating insulating strips of one assembly in assembled position;

Fig. 4 is a perspective view showing the elements of Fig. 3 in their partly disassembled position;

Fig. 5 is a front elevation view of a test plug for use with a connecting block assembly; and

Fig. 6 is a side elevation view of the test plug.

Referring to the drawings, portions of two adjoining mounting plates 1 are disclosed for attachment to a supporting frame (not shown) by bolts extending through the bayonet slots 2. The abutting ends of the two plates are provided respectively with a tab 3 and cooperating recess 4 for the purpose of holding the plates in alignment. Each plate is provided with two horizontal rows of slots 5 and 6 through which the soldering terminals of the connecting block assemblies may extend as shown in Fig. 2. Each plate is also provided with two horizontal rows of holes 7 and 8 through which bolts, such as 9 and 10, may extend for clamping the assemblies thereto.

Each connecting block assembly comprises an outside clamping strip 11, four connector or terminal strips 12, 13, 14 and 15 and interposed insulating strips 16, 17, 18, 19 and 20 preferably of fibrous material. The outside clamping strip 11 is offset at 21 and terminates in a guide extension 22. Two shoulders 55 on the extension 22 serve as a stop for the guide sleeve of the test plug shown in Fig. 6 as will be later described. A tubular sleeve 23 of cellulose acetate is provided on the extension 22 to serve as a holder for a line or trunk identification slip.

Each of the connector strips terminates at its lower end in a jack spring extension. The extensions 24 and 25 of the two outside connector strips 12 and 15 are curved outwardly and the extensions 26 and 27 of the inside strips 13 and 14 extend downwardly beyond the extensions 24 and 25 being separated from each other by the lower end of the fiber insulating strip 18. These spring extensions are provided with cooperating contacts 28 and 29.

Each connector strip is also provided with a soldering lug struck up therefrom intermediate the ends thereof and bent to lie in a plane at right angles to the face of the strip and midway between the edges of the strip as most clearly disclosed in Fig. 4. The soldering lugs of the four connector strips of each assembly are struck up at different points thereon, the lugs 30 and 31 of the outside strips 12 and 15 of the left-hand assembly, as viewed in Fig. 2, extending to the right and the lugs 32 and 33 of the inside strips 13 and 14 extending to the left. Similarly, the lugs 34 and 35 of the outside strips 12 and 15 of the right-hand assembly, as viewed in Fig. 2, extend to the right and the lugs 36 and 37 of the inside strips extend to the left.

The connector strips, fiber insulating strips and outside clamping strip are all provided with aligned slots through which the soldering lugs extend as most clearly shown in Fig. 4. The slots 38 in the fiber strips 16 to 20, inclusive, are of such size that the terminal lugs pass tightly therethrough, whereas the slots 39 in the connector strips 12 to 15, inclusive, and in the outside clamping strip 11 are of such size that the soldering lugs may pass therethrough without engaging the edges thereof.

In order to provide more flexibility in the jack spring extensions 24 and 25, each connector strip 12 and 15 may, if desired, be made in two parts, one part slotted as shown and provided with a soldering lug and the other part similarly slotted and terminating in a jack spring extension. With this modified construction the first part may be thick enough to give sufficient rigidity to the soldering lug struck up therefrom and the second part may be made of more flexible material such as phosphor bronze.

As disclosed in Fig. 2, two assemblies are mounted respectively on opposite faces of the mounting plate 1 being spaced therefrom by spacing bars 40 and 41 and secured by bolts 9 and 10 which pass through the assemblies, bars 40 and 41 and the mounting plate 1. The bolts are completely insulated from the connector strips 12 to 15, inclusive, through which they pass, by sleeves 42 and 43 of rubber or other suitable insulating material. In the assembled position the soldering lugs 32, 33, 36 and 37 of the inside connector strips of both assemblies all extend to the left side of mounting plate 1, the lugs 36 and 37 extending through the slot 5 in the plate 1, and the soldering lugs 30, 31, 34 and 35 of the outside connector strips of both assemblies all extend to the right side of the mounting plate 1, the lugs 30 and 31 extending through slot 6 in plate 1.

When installed for service the tip and ring conductors of incoming subscribers' lines or trunks are connected to the lugs 32, 33 and 36, 37 and the tip and ring conductors of the inside extensions of these lines or trunks are connected to the lugs 30, 31 and 34, 35 and, with the contacts 28 and 29 of the jack spring extensions of the connector strips normally closed, the conductors of the outside lines are normally connected to the corresponding conductors of the inside lines. For example, the tip conductor of one outside line may be traced from tip lug 36, over connector strip 13, contacts 28, connector strip 12, tip lug 34 to the tip conductor of the corresponding inside line and the ring conductor of the same outside line may be traced from ring lug 37 over connector strip 14, contacts 29, connector strip 15, ring lug 35 to the ring of the corresponding inside line.

For enabling the connection of test equipment to the outside and inside conductors of any line, a test plug of the character disclosed in Figs. 5 and 6 is provided. This plug comprises a central member 44 of insulating material, four springs 45 to 48, inclusive, a clamping plate 49, a guide member 50 and insulating separators 51, all clamped together by the screws 52. The screws 52 are suitably insulated from the springs 45 to 48, inclusive, through which they pass by insulating sleeves (not shown). Each spring terminates at one end in a soldering lug 53 to which a conductor of a test cord may be attached. The guide member 50 is tubular in formation as shown in cross-section at 54 to enable it to embrace the guide extension 22 of a connector block assembly.

If it be assumed that the test man desires to conduct a test on the line or trunk which terminates in the right-hand assembly of Fig. 2, he will insert the test plug into the jack spring extensions of this assembly, the plug being guided thereinto by the engagement of the tubular portion 54 of the guide member 50 with the guide extension 22 of the assembly until the upper end of the portion 54 engages the shoulders 55 of the extension 22. With the test plug thus inserted the inside springs 47 and 48 of the plug will be in engagement respectively with the jack spring extensions 27 and 26 and the outside springs 45 and 46 will engage and press outwardly the jack spring extensions 25 and 24 thereby opening the contacts 28 and 29. The opening of the contacts 28 and 29 now disconnects the outside conductors of the line from the corresponding inside conductors and separate circuits from the outside and inside conductors of the line are then established over the test plug. For example, the tip conductor of the outside line is now connected over tip lug 36, connector strip 13, jack spring extension 26 and plug spring 48 and the ring conductor of the outside line is connected over ring lug 37, connector strip 14, jack spring extension 27 and plug spring 47. Also the tip conductor of the inside line is connected over tip lug 34, connector strip 12, jack spring extension 24 and plug spring 46 and the ring conductor of the inside line is connected over ring lug 35, connector strip 15, jack spring extension 25 and plug spring 45.

From the foregoing description it will be apparent that the connector block assembly is compact and readily constructed by modern punching and fabricating procedures and permits large numbers of lines to be terminated in a smaller compass on a main distributing frame than has heretofore been possible. By combining in the same assembly, line connection and test jack facilities a further important economy in mounting space and manufacturing cost is also attained.

What is claimed is:

1. In a connecting block, a set of superimposed terminal strips, each strip terminating at one end in a jack spring, insulating members interposed between adjacent strips, and a soldering lug extending at right angles from each strip, said strips and insulating members being slotted whereby the lugs of said strips extend through said block to the outer faces of said terminal set.

2. In a connecting block, a set of superimposed terminal strips, insulating members interposed between adjacent strips, and a soldering lug extending at right angles from each strip intermediate its ends, the lugs of the several strips being bent up at different positions thereon and said strips and insulating members being slotted whereby the lugs extend through said slots to the outer faces of said terminal set in alignment with each other.

3. In a connecting block, a set of superimposed terminal strips, insulating members interposed between adjacent strips, and a soldering lug ex-

tending at right angles from each strip intermediate its ends, the lugs of the several strips being bent up at different positions therefrom and said strips and insulating members being slotted whereby the lugs of certain of said strips extend through said slots to one face of said terminal set and the lugs of the other of said strips extend through said slots to the other face of said terminal set.

4. In a connecting block, a mounting plate, a pair of terminal sets insulatedly supported on opposite sides of said plate, each terminal set comprising a plurality of superimposed terminal strips, insulating members interposed between adjacent strips and each strip having a soldering lug intermediate its ends, the lugs of the several strips of the two sets being bent up at right angles therefrom at different positions, said mounting plate, strips and insulating members being slotted whereby the lugs of certain of said strips extend through said slots to one side of said mounting plate and the lugs of the others of said strips extend through said slots to the other side of said mounting plate.

5. In a combined connecting block and jack assembly, a plurality of superimposed terminal strips each terminating at one end in a jack spring extension, insulating members interposed between adjacent strips, a soldering lug extending at right angles from each strip, said strips and insulating members being slotted whereby the lugs of said strips extend through said slots to the outer faces of said terminal set, and contacts on the jack spring extensions of said strips whereby certain of said strips are normally interconnected therethrough.

6. In a connecting block, a mounting plate, and a terminal set insulatedly supported on said plate, said terminal set comprising a plurality of terminal strips and a plug guide superimposed upon and insulated from each other by interposed insulating members, each strip terminating at one end in a jack spring and having a soldering lug extending therefrom at right angles, said strips, plug guide and insulating members being slotted whereby the lugs of said strips extend through to the outer face of said terminal set.

7. In a connecting block, a mounting plate, and a pair of terminal sets insulatedly supported on opposite faces of said plate, each terminal set comprising a plurality of terminal strips and a plug guide superimposed upon and insulated from each other by interposed insulating members, each strip terminating at one end in a jack spring and having a soldering lug intermediate its ends, the lugs of the several strips of the two sets being bent at right angles therefrom at different positions, said mounting plate, strips, plug guides and insulating members being slotted whereby the lugs of certain of said strips extend through said slots to one side of said mounting plate and the lugs of the others of said strips extend through said slots to the other side of said mounting plate.

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