

Dec. 28, 1937.

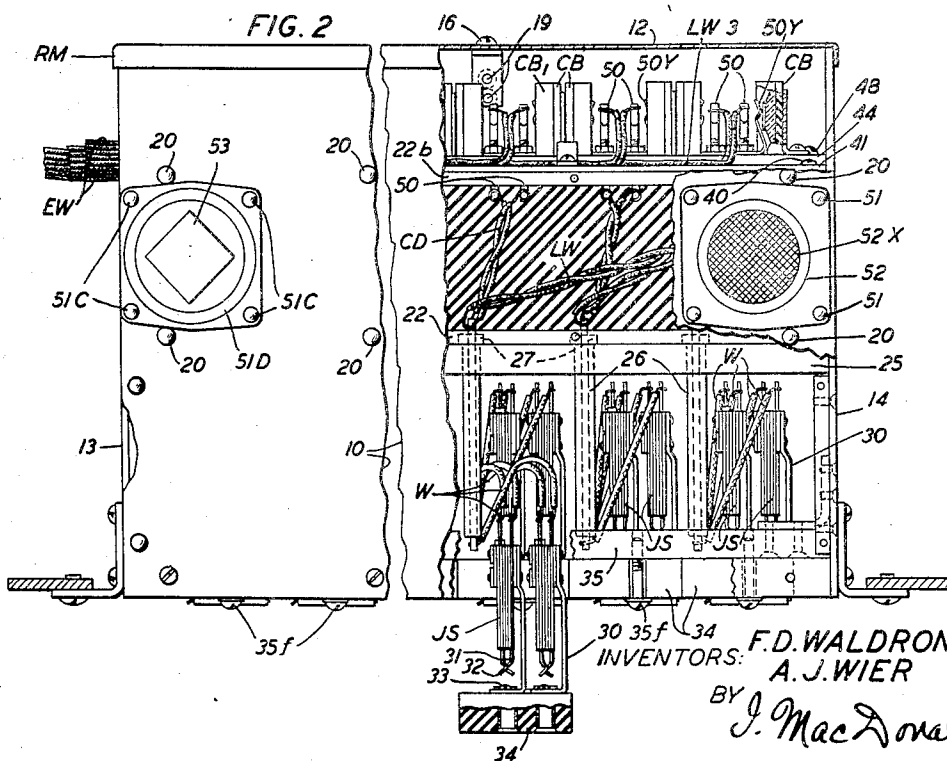
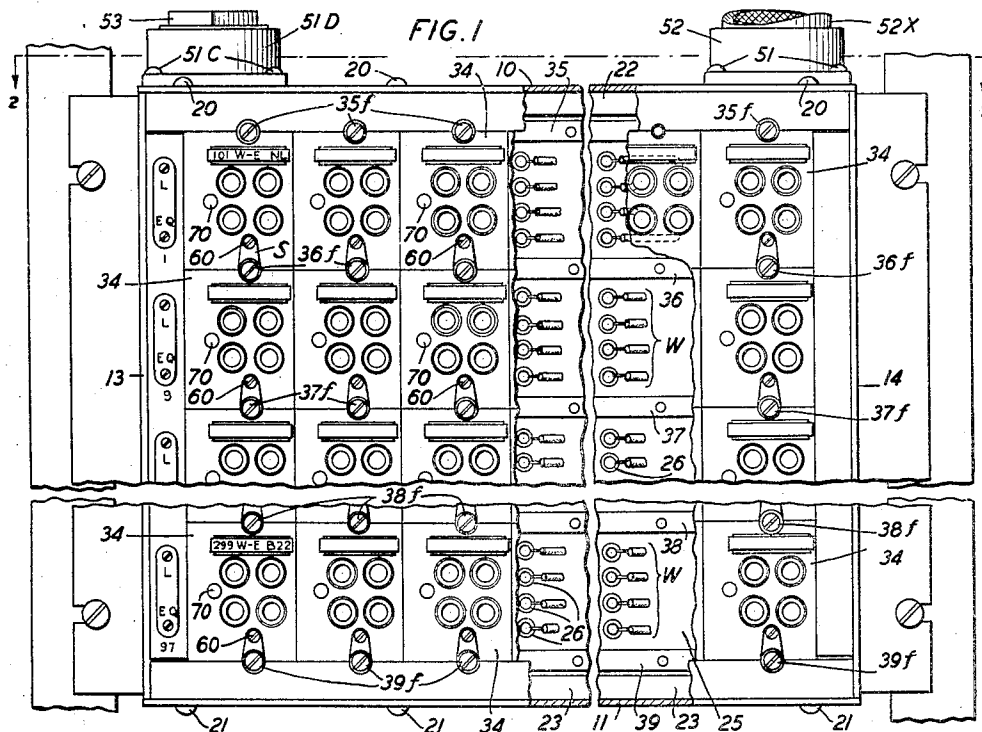
F. D. WALDRON ET AL

2,103,501

TERMINAL BOX DEVICE

Filed Sept. 16, 1936

2 Sheets-Sheet 1



F. D. WALDRON
A. J. WIER

BY J. MacDonald

ATTORNEY

Dec. 28, 1937.

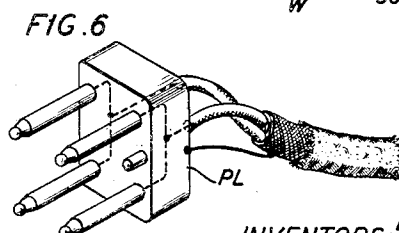
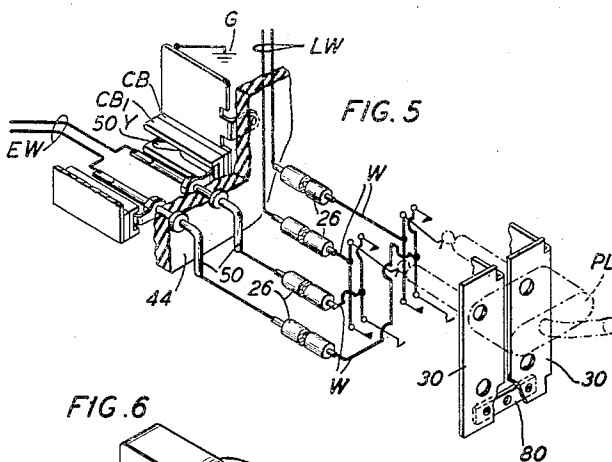
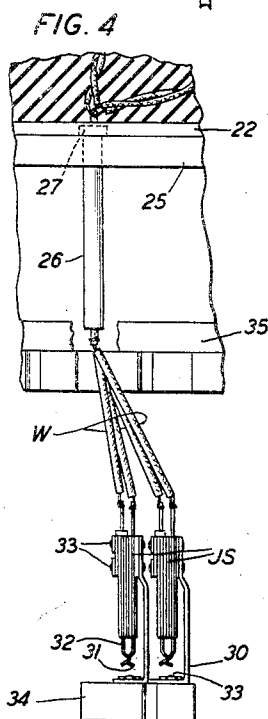
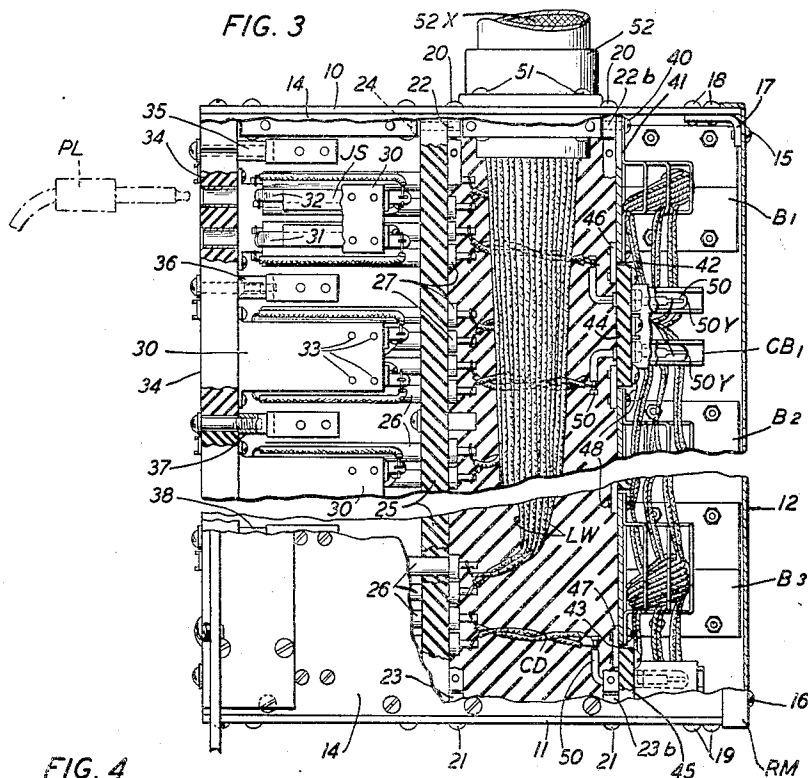
F. D. WALDRON ET AL

2,103,501

TERMINAL BOX DEVICE

Filed Sept. 16, 1936

2 Sheets-Sheet 2



INVENTORS: F.D. WALDRON
A.J. WIER
BY J. MacDonald
ATTORNEY

UNITED STATES PATENT OFFICE

2,103,501

TERMINAL BOX DEVICE

Fred D. Waldron, Queens Village, N. Y., and
Anthony J. Wier, Elizabeth, N. J., assignors to
Bell Telephone Laboratories, Incorporated,
New York, N. Y., a corporation of New York

Application September 16, 1936, Serial No. 101,054

5 Claims. (Cl. 179-91)

This invention relates to terminal box devices, and more particularly to a sealed test terminal box device for use in high quality testing of voice and carrier communication circuits.

5 The object of the invention is to improve the construction of such terminal box devices.

A feature of the invention resides in the provision of a terminal box device in which partitions cooperate with the walls of the terminal box to form a series of compartments for housing associated testing and protecting electrical devices and a sealing chamber for the line wires and their associated terminals.

Another feature resides in mounting the line protector devices in the compartment formed on one side of the sealed chamber, a removable cover for the terminal box being provided for permitting visual observation and replacement of the protector devices without interference from associated wiring connections.

Another feature resides in mounting test terminals in a compartment formed on the opposite side of the sealing chamber to that of the line protector devices, thus effectively shielding the test terminals from the line protectors.

Another feature is the provision of means whereby the test terminals may be removed from their supporting elements for adjustment and repair without interference from their soldered connections with the line wire terminals.

Other novel features and advantages of the invention will appear from the following description and by the claims appended thereto, reference being had to the accompanying drawings, in which:

Fig. 1 is a partial front view with the casing and a number of test terminal blocks shown with portions cut away;

Fig. 2 is a partial top view showing one of the switching devices removed from its supporting member and the top wall of the casing with portions cut away, the cover casing being shown partly in section;

Fig. 3 is an end view showing the walls of the casing with portions cut away and a number of operating parts and the partitions in section;

Fig. 4 is a partial view showing the connections between a number of switching devices and their associated line terminals; and

Fig. 5 is a diagrammatic view of the line wires with their associated switching devices and protectors connected according to the invention;

Fig. 6 shows a test plug.

The test terminal box device of the invention as shown in Figs. 1, 2, and 3 consists of a top

wall 10, a bottom wall 11, side walls 13 and 14, and a removable rear wall or cover 12 which is held to the top and bottom walls by a plurality of screws 15 and 16 engaging brackets, such as 17, which in turn are secured to the top wall 10 by rivets 18 and to the bottom wall 11 by rivets 19. On the top wall 10 is secured, as by rivets 51, a sleeve or collar 52 for receiving the protecting lead cable sheath 52X from which the line wires LW are distributed to terminals which will be hereinafter described in detail. The rear wall or cover 12 is provided with a peripheral rim portion RM shown in Figs. 2 and 3 overlapping the contour of the casing thus formed so as to render the casing substantially dust-proof at this point.

To the top and bottom walls 10 and 11 of the casing and in longitudinal relation thereto are secured, as by screws 20 and 21, two pairs of parallelly disposed insulating bars 22 and 22b and 23 and 23b shown in Figs. 2 and 3. To the bars 22 and 23 is secured, as by a number of screws 24, a partition 25 of insulating material on which are mounted the wire terminals 26, these terminals being secured to the insulating partition 25 by a press-fit engagement in correspondingly sized holes to a stop afforded by a collar 27 in abutment with the rear surface of this partition, and to the ends of the terminals 26, adjacent the collar portions 27, are secured the line wires LW. To the opposite ends of these terminals are connected, as by wires W, shown in Figs. 1, 2, 3, 5, and 6, switching devices in the form of jacks JS, each consisting of a mounting bracket 30 secured to an insulating block 34, the contact elements 31 and 32 being insulated from each other by spaced members of insulating material and the whole secured in a pile-up arrangement on the mounting bracket 30.

The jacks JS are arranged by pairs on each bracket 30 and these brackets are arranged by pairs on the rectangularly-shaped insulating blocks 34 which are in turn arranged in coordinate rows and secured to parallelly disposed supporting metal bars 35, 36, 37, 38, and 39, shown in Figs. 1, 2, 3, and 4 by screws 35f engaging the bar 35, screws 36f engaging the bar 36, screws 37f engaging the bar 37, screws 38f engaging the bar 38, and screws 39f engaging the bar 39. Bars 35, 36, 37, 38, and 39, which these screws 36f, 37f, 38f, and 39f engage, are grounded, and a strap 50 interconnects these screws with screws 60 screwed into a cross piece 80 secured to the two brackets 30, 30. Since each screw 60 is thus connected to the two brackets, each supporting

a pair of jacks, and thus grounds the two brackets and the sleeves of the plugs when they are inserted in the jacks, this provides additional shielding for the transmission circuit associated therewith and also furnishes ground for the shield on patching or level testing cords. These shields are of woven metal connected to the sleeves of the plugs. This strap can be removed when making high insulation Wheatstone bridge measurements.

Any one of the insulating blocks 34 may be removed individually from its supporting bars by the simple removal of its two securing screws 35f—36f or 36f—37f, etc., as the case may be without interference from its adjacent blocks 34. The wires W in cooperation with the line terminals 26 which extend in proximity to the insulating blocks 34 permit these blocks and the jacks JS mounted thereon to be drawn a considerable distance from the front surface of the board thus formed (Fig. 2) without necessitating the breaking of any of their soldered connections, thus facilitating repairs and adjustments of these parts while correspondingly decreasing the maintenance cost of such equipment. The arrangement of spacing the groups of jacks from each other as shown in Fig. 1 provides sufficient separation electrically for circuits up to 150 kilocycles without the necessity of shielding.

To the parallel bars 22b and 23b, which are secured to the top and bottom walls 10 and 11, is secured, as by a plurality of screws 40, a metallic partition 41 shown in Figs. 2 and 3. This partition is provided with two rectangular openings 42 and 43 for receiving the insulating strips 44 and 45, these strips being secured to the partition by metallic links 46 and 47 secured to the partition 41 and to the insulating strips 44 and 45 by similar screws 48. On the insulating strips 44 and 45 are mounted the terminals 50 connecting with the jacks JS and protector devices of the carbon block type, the electrodes CB and CB1 of which are held in engaged relation to each other by springs 50Y, the line wires LW being distributed or supported by the protector terminals to the side wall 13 of the casing by a plurality of sets of U-shaped supporting brackets B1, B2, and B3 shown in Fig. 3.

On the top wall 10 there is secured, as by rivets 51C, a screw threaded sleeve 51D for receiving a cap screw 53 provided for permitting the filling of the middle or intermediate compartment with a suitable sealing compound, thereby effectively shielding the component conducting parts on opposite sides of the sealing chamber.

Referring now to Fig. 5, when it is desired to test a pair of line wires incoming from the cable, plug PL is inserted in the upper pair of jacks L allotted to this circuit, see Fig. 1. This disconnects this pair of line wires LW from the wires EW leading to the equipment apparatus and connects instead a test set not shown. When it is desired to test a pair of wires leading to the equipment, such as repeaters etc., plug PL is inserted in the lower pair of jacks EQ (Fig. 1) allotted to this circuit. This disconnects this pair of wires from its associated pair of line wires LW and connects in place thereof the test set.

A circuit is normally closed through the spring 50Y, the electrodes CB1 and CB of the protector to ground G connected to the protector support.

It will be noted that with each set of four jacks (Fig. 1) there is associated a small perforation 70 in the associated insulating block 34. Heretofore it has been necessary to furnish two differ-

ent types of jacks, one pair with cut-off springs for use with patching cords and another without cut-off springs to prevent opening the circuits in transmission level testing. By employing the above arrangement, the same jacks can be used for both purposes by using a four-prong plug as shown in Fig. 6 with two sets of prongs electrically connected and the level testing set connected in bridge of these two sets of prongs, the plug having a pin to insure that the prongs enter the proper jacks. Then for patching purposes, a regular twin plug can be used with these same jacks.

It is understood that minor changes may be made as to shape, dimension, and the number of lines terminating in the test terminal box of this invention without departing from the scope of the appended claims.

What is claimed is:

1. A test terminal box device comprising a casing, partitions in said casing forming a plurality of adjacently disposed compartments, a plurality of terminals carried by one of said partitions and extending on opposite sides thereof into two of said compartments, a plurality of insulating bars supported by the end walls of said casing in adjusted spaced relation to each other, a plurality of switching devices having each a supporting block mounted in coordinate rows on said bars and connected to adjacent ends of said terminals, in one of the outer disposed compartments, a sleeve secured to one of the walls of said casing through which the line wires enter the middle compartment for connection with the other ends of said terminals, and other electrical apparatus mounted on the other of said partitions in the other outer disposed compartment and having terminals connecting with the first-mentioned terminals in the said middle compartment.

2. In a test terminal box, a casing, partitions in said casing cooperating with the walls thereof to form three compartments, terminals mounted on one of said partitions, a sleeve secured to one of said walls, a cable stub engaging said sleeve for leading the line wires to said terminals in one of said compartments, other terminals mounted on the other partition and having one of their ends disposed adjacent the ends of the first-mentioned terminals in the last-mentioned compartment, electrical connections between the first and second-mentioned terminals, and electrical devices connected to the other ends of the first and second-mentioned terminals in the other and the last-mentioned compartments.

3. In a test terminal box, a casing, partitions in said casing cooperating with the walls thereof to form a series of three adjacent compartments, terminals mounted on one of said partitions, a sleeve secured to one of said walls, a cable stub engaging said sleeve for leading the line wires for connection to said terminals in the middle disposed of said compartments, switching devices, insulating means for each of said devices, and means carried by said casing for supporting said insulating means, said terminals extending from said partition with one of their ends extending to a point adjacent said insulating means, conducting means connecting said terminals to said switching devices, said insulating means being removable individually from said insulating means while maintaining electrical continuity between said terminals and said switching devices, other terminals carried by the other of said partitions and connecting with said conducting

means, and other electrical devices in the other outer disposed compartment connecting with the last-mentioned terminals.

4. In a test terminal box device, a casing, partitions in said casing cooperating with the walls of said casing to form a series of adjacently disposed compartments, terminals mounted on one of said partitions and protruding on opposite sides thereof, means secured to one of said walls for receiving the cable stub for leading the line wires for connections to said terminals in one of said compartments, other terminals mounted on the other partition and protruding on opposite sides thereof, electric connections between the adjacent ends of the first and second-mentioned terminals in said compartment, switching devices mounted in another of said compartments and connected to the other ends of the first-mentioned terminals, protector devices, supporting means carried by the other partition for mounting said protector devices in another of said compartments, spring means secured by the last-mentioned terminals on the last-mentioned partition for yieldably holding said devices on said supporting means, and means carried by said casing communicating with the first-mentioned compartment for filling it with an insulating compound.

5. A test terminal box device comprising a casing, a plurality of partitions dividing said casing into a series of three adjacently disposed compartments, a set of terminals carried by each of said partitions extending on both sides thereof, one set of terminals connecting with the line wires in the middle disposed compartment and with the other set of terminals in that compartment, electrical devices mounted on one of said partitions in one of the outer disposed compartments and connecting with the set of terminals carried by that partition, a plurality of supporting bars secured to said casing, switching devices, an insulating block for each of said devices mounted in rows relative to each other on said supporting bars in the other outer disposed compartment, and conducting means attached to the ends of said terminals in that compartment and connecting with the last-mentioned devices, said insulating blocks being individually removable from said supporting bars, and a sealing compound filling the middle disposed compartment for shielding the electrical devices from said switching devices.

FRED D. WALDRON.
ANTHONY J. WIER.