GROUNDED TRANSMISSION MEDIUMS.—III.

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Track Drops—Comparative Simultaneous Voltages of Different Points.

It is very necessary, not only to assist in making surveys, but also to keep check on the condition of the tracks from a conductivity point of view after they have once been placed in good order, that some arrangement should be made whereby the voltages of different points of the low-voltage side of a system can be simultaneously taken at least once a month.

For this purpose, the writer once designed a rather complete set of apparatus, consisting, in the main, of one special switchboard for the telephone central office and subsidiary apparatus for each point of the system chosen as suitable to know the voltage of.

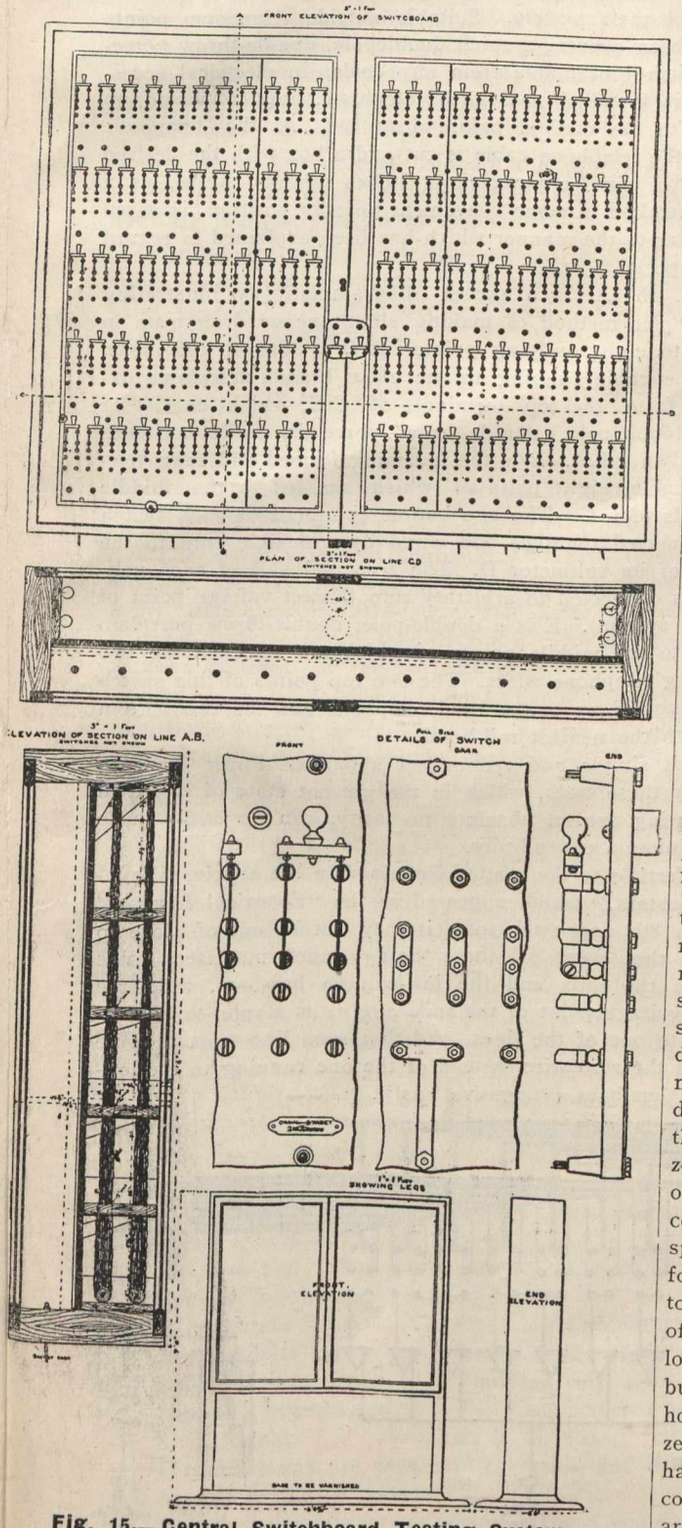

Fig. 15.—Central Switchboard Testing System.

Fig. 15 is the reproduction on a reduced scale of a drawing such special board, which consists of a substantially made frame box, with the back removable, and two glass doors so hinged in front that they can be locked in the centre. The switchboard proper is built of three sheets of hard rubber fastened down around the edges, by countersunk flat-head brass screws, to an inner-projecting portion of the frame. On these sheets are mounted five rows of twenty-four double-pole, double-throw switches with one plug below each switch. Through the bottom of the frame run twelve flexible cords, to the inner end of each of which is attached a small socket made to fit the plugs under each switch, and to the outer end of each of which is connected a suitable meter terminal. The wiring is on the back of the board (between the rubber sheets and the removable back), and consists of small rubber-covered wires, formed and stitched on the principle similar to that adopted in telephone practice. One bunch of formed wires constitutes the incoming cable and the other bunch the outgoing cable.

To connect this special board up, the required telephone wires are cut between the distributing rack and the switchboard of the telephone exchange; and the ends from the distributing rack are connected to the incoming cable of the special board, while the ends from the telephone switchboard are connected to the outgoing cable of the special board. The two wires of each pair of the incoming cable are connected to the middle points of their particular switch, to the upper points of which switch are connected the two wires of the corresponding pair in the outgoing cable. Each switch has its bottom points connected in multiple to the plug mounted below it. The details of the wiring and the other parts will be understood after examining the detail drawings in Fig. 15. Thus, when all the switches are up, the telephone wires are in regular service; while, when down, each pair of wires will be in multiple with one of the small plugs and the telephone service cut out.

Fig. 16 is a drawing showing the subsidiary apparatus. This consists of a small box, the upper part of which contains a sheet of hard rubber on which is mounted one double-pole, double-throw switch. One of these is placed alongside of each telephone located nearest to the point of the track of which a reading of the voltage is required. To connect up this subsidiary apparatus, the line wires are cut at each point near the telephone and the line ends are then connected to the middle points of the switches, the upper points of which switches are connected to the line posts of the telephones. Each box has a lower compartment lined with asbestos and divided in the centre with a piece of leatheroid (fibre); and in each of the divisions so formed is mounted a binding-post with a fuse wire between them. In practice, the writer has found that this fuse is not necessary but it is provided to allay the fears of telephone officials. The first binding-post in each box is connected by a wire or strip to the lower points of the switch, and the second one to the nearest track bond. If two connections (two points to take readings of) are required at any one of the stations, the second binding-post is connected to the middle point of a single-pole double-throw switch mounted alongside of the double-throw one, the top point of which is connected to the nearest track bond and the lower point to the other point desired. To use the apparatus which has been described, the modus operandi is as follows: Eleven below-and-above-zero-reading potential-meters (Richmond pattern) are placed on a table near to the special board, and all the zero posts connected to one of the flexible cords at the bottom of the special board. The plug on the other end of this cord is forced on to the socket below the switch, which is connected to the wires from the power-house telephone, and the switch of the subsidiary apparatus alongside this telephone has its lower points connected to the low-voltage bus-bars (negative bus) instead of to the nearest track bond. This power-house line, when the readings are being taken, becomes the zero wire. The other eleven cords, after their socket ends have been forced on the plugs belonging to the switches controlling the points at which voltage readings are desired, are connected one to each of the other binding-posts of the meters. The operator at central is then requested by the head reader to call up the twelve points (power-house first) and request them to throw their double-throw switches down,