

A New Cordless Switchboard

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FOR small business establishments, even a complete and comprehensive telephone service may require comparatively few central-office lines and extension telephones. Except in the smallest organizations, a private branch exchange is generally desirable, however, to make any incoming call conveniently available to any of the employees, and to facilitate calls between the local telephones. It is especially necessary that switchboards for such installations take up a minimum of office space. Since the telephone calls seldom occupy the attendant's full time, the board should be arranged to allow her to carry on clerical or other work as well. Cordless switchboards, which occupy only a small part of the top of a desk or table, have therefore been made for many years, to provide the necessary switching facilities with the utmost compactness. As the name indicates, no switching cords are used; interconnections between extension telephones, and connection of these telephones to central-office lines for incoming and outgoing calls, are made by keys on the face of the switchboard.

At these boards there are terminated as many as three trunks from a central office and seven extension lines, in addition to the attendant's telephone. Each line, whether from the central office or from one of the extensions, terminates at a lever-type key made with three key handles.

The handles can be operated both up and down, so that there are six positions available for each line. Five of these are used for connecting paths, so called—circuits within the switchboard, which join all the keys. Inter-



Fig. 1—Outer view of the 506-A switchboard. The other three pictures also show this switchboard

connection is secured by operating the keys of any two lines, to join them to the same connecting path. On a board fitted with the full number of lines, five conversations can be carried on at once—three to the outside, and the other two between extensions. Should the attendant not be involved in any of these calls, all seven of the extensions can be used simultaneously. The sixth key position is used for ringing, on the extension keys, and on the trunk keys for holding incoming calls until the desired line is free.

Since the necessary direct current

for talking and signalling is obtained through cable conductors running to the central office, it is desirable that current requirements be kept as low as possible. For this reason, and because the small number of lines makes simplification possible, electro-mechanical signals requiring little current are used for attracting the operator's attention in place of the signal lamps customary in switch-board practice. Above the key for each trunk circuit is a drop* operated by ringing current from the central office and restored by hand. Station line signals and supervisory signals are of the magnetic target type. Those for the extension lines are located above their respective keys; when a receiver is taken from the hook, the target of the corresponding signal appears, and it restores when the attendant answers. Supervisory signals are at the left of the key bank and opposite their respective connect-

** Drops, the first visual telephone signals, have been made in many forms. As here used, they carry a shutter hinged at the bottom and held vertical by a latch at the top. Ringing current raises the latch, allowing the shutter to fall forward.*

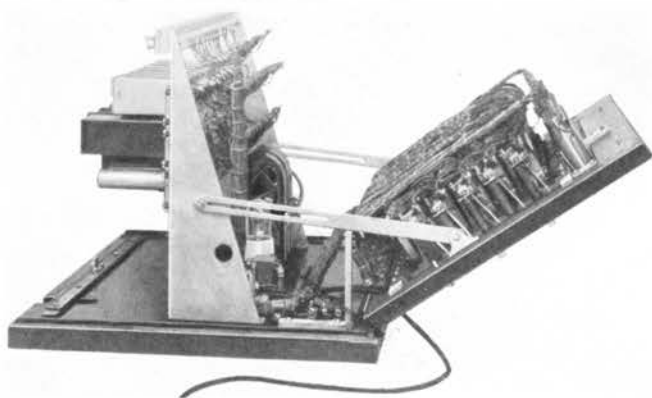


Fig. 2—When the cover is removed and the front swung down, ready access is given to all the apparatus

ing paths. They are displayed at the end of each conversation, after the extensions have hung up, and are restored when the attendant restores the keys to normal.

For ringing any of the extensions, pressing down the lowest handle of the appropriate key connects ringing current to the extension line. This current ordinarily comes from the central office, but when central-office ringing current is not available, a magneto generator built into the board is used.

On an incoming call from a central office, the drop associated with one of the trunks operates, and a buzzer gives audible notice that a call is waiting unless the buzzer is shut off at its control key. The attendant, choosing an idle path, connects it to the trunk and to her own telephone set by the appropriate key handles. On learning which station is wanted, she completes the call by connecting and ringing the desired station line. She disconnects her own telephone by restoring the key to its normal position, and when the call is finished restores both trunk key and extension key. Calls

from one extension to another, or from one extension to the outside, are completed in practically the same manner.

When the switch-board is to be unattended, at night or at other times, three of the lines may be left connected to the trunks by operating keys just as for calls during the day. Calls may then be made and received directly at the

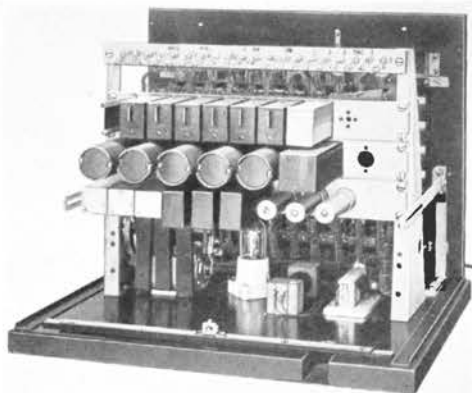


Fig. 3—The mounting-plate assembly is in the foreground, in this picture taken from the rear

extensions. The night service key is provided for use when these permanent night connections are set up. Its operation disconnects the battery from the supervisory signal circuits and opens the connection between the buzzer and the trunk drops, to prevent unnecessary battery drain.

Direct current for talking is supplied to local conversations through a retardation coil in each connecting path. To eliminate the transmission loss of these coils on outside calls, direct current in those cases is supplied from the central office over the talking circuit, and the retardation coils are cut out. This arrangement gives the local station the benefit of standard transmission on all central-office connections.

In the course of switchboard development the circuit features described had been provided a number of years ago. Now a new board of

this type is being made, known as Number 506-A*. It is the same in circuits and in functioning as its predecessor, but in arrangement and mounting of the apparatus it has been revised completely to simplify manufacturing and to give maximum accessibility for maintenance. A salient feature of the new design, whereby the changed construction first becomes evident, is the type of cover, which includes roof, back, and two sides. When it is taken off, and the hinged front swung down as in Figure 2, the apparatus can be reached from all sides. The front itself has not been changed, but the apparatus mounted on the side walls of the older switchboard has been transferred to mounting plates on the interior, supported by two gusset plates of heavy sheet metal. Four pieces of apparatus—hand generator, resistance lamp, induction coil, and buzzer—are fastened to the wooden base, but every-

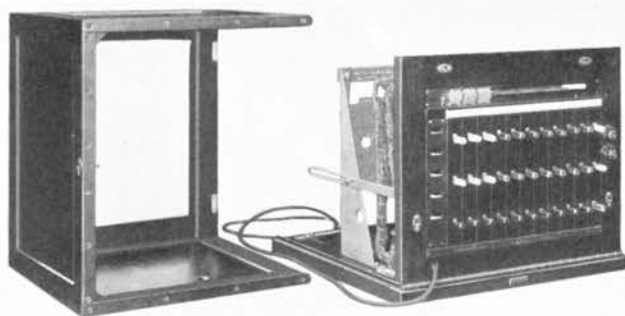


Fig. 4—The switchboard with cover removed, showing how readily the interior is made accessible

thing else has been transferred to the

*Another new cordless switchboard, 506-B, gives switching facilities for five trunks and twelve extensions. In method of operation and circuit essentials it is the same as the smaller cordless P.B.X. Construction and arrangement of the apparatus are similar, but certain pieces of apparatus are mounted differently.

mounting plates, except of course the apparatus mounted on the key front. At the top of the mounting-plate supports, where it is handiest, is a terminal strip for making connections to the central-office trunks and the extension lines.

Even removal and replacement of the cover have been simplified. It is open on the bottom and the front, and is arranged to fit against the back of the key front. A lock screw at the back, and two at the front, hold it in place. Steel runners at either side of the base, turned up at their outer edges, provide a surface on which the cover may slide, and prevent it from moving sidewise. A projecting strip at the bottom of the cover hooks under a metal strip running across the back edge of the base. As a result of this construction, removal or

replacement of the cover, including unscrewing or replacing the three lock screws, is a matter only of seconds.

From the viewpoint of users and attendants, the distinguishing colors of the various groups of key handles facilitate operation by showing at a glance the grouping of the keys. At the same time identifying the keys has been made easier by an additional designation strip provided near the bottom, but otherwise the new switch-board has the same general appearance as that previously supplied. From the standpoint of installation and maintenance, however, it marks a prominent advance, giving greater speed for any necessary work as a result of the much greater convenience. Likewise the new construction, with everything so open and so readily accessible, facilitates manufacture.

