May 20, 1930. M. J. ARNDT 1,758,919

CABLING ARRANGEMENT FOR TELEPHONE SYSTEMS

Filed April 6, 1927 2 Sheets-Sheet 1

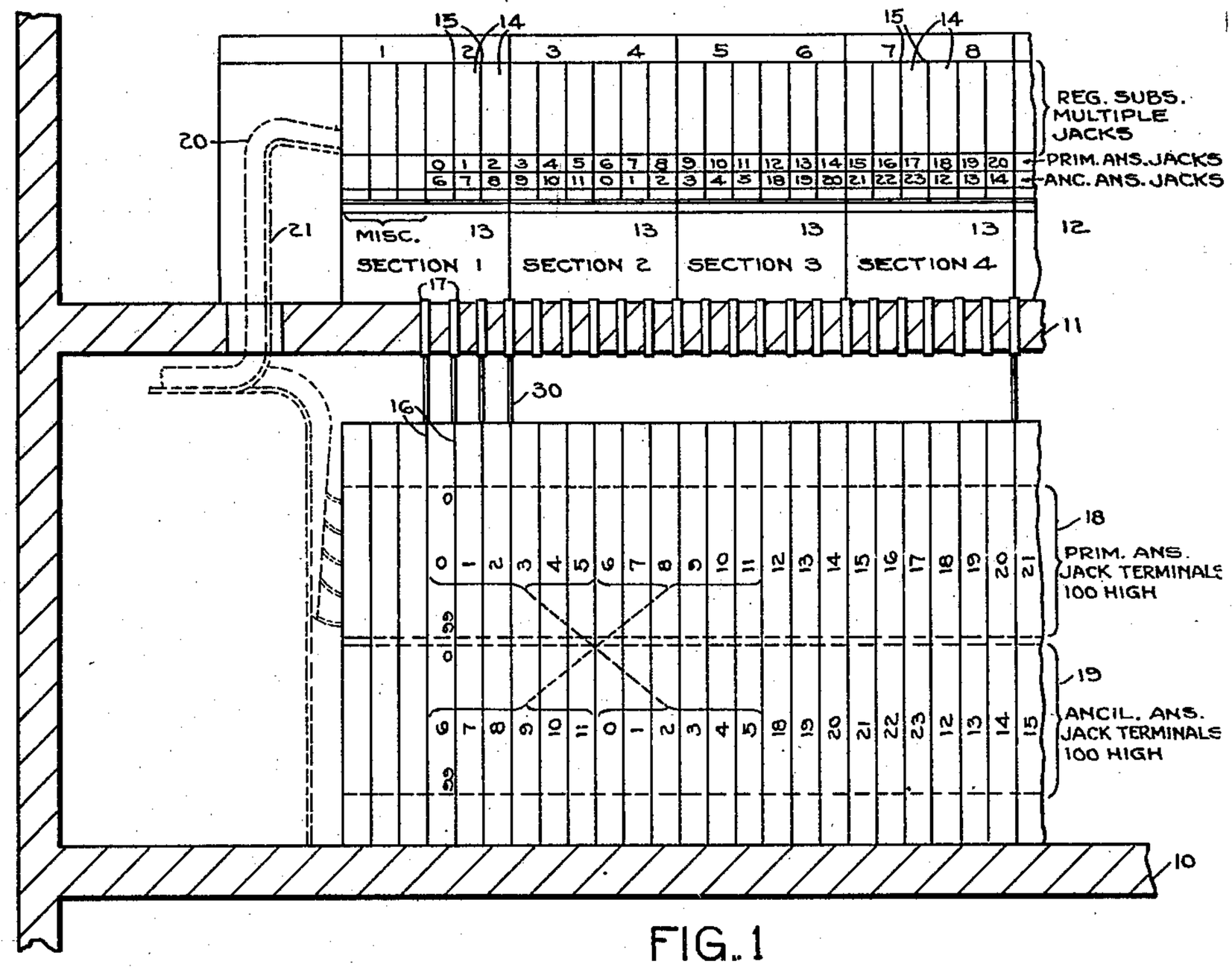

FIG. 1

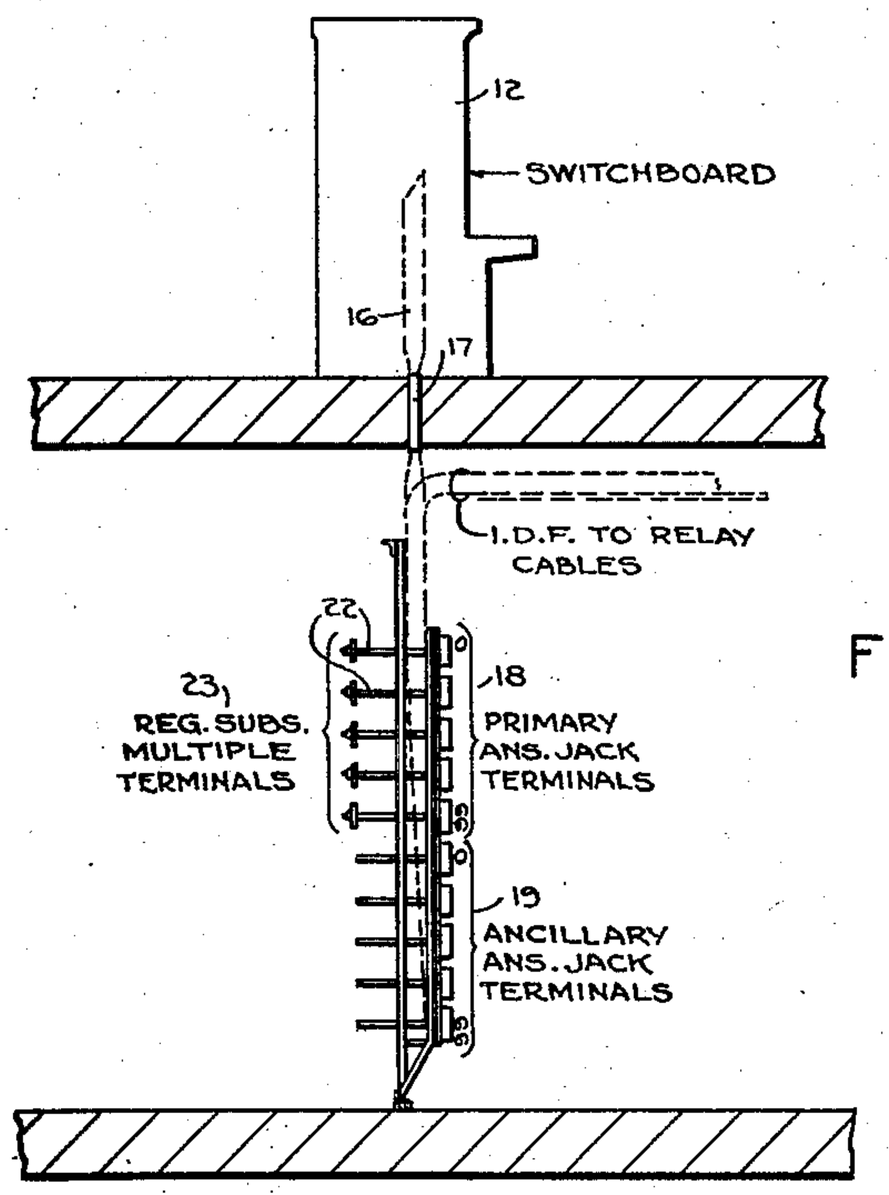

FIG. 2

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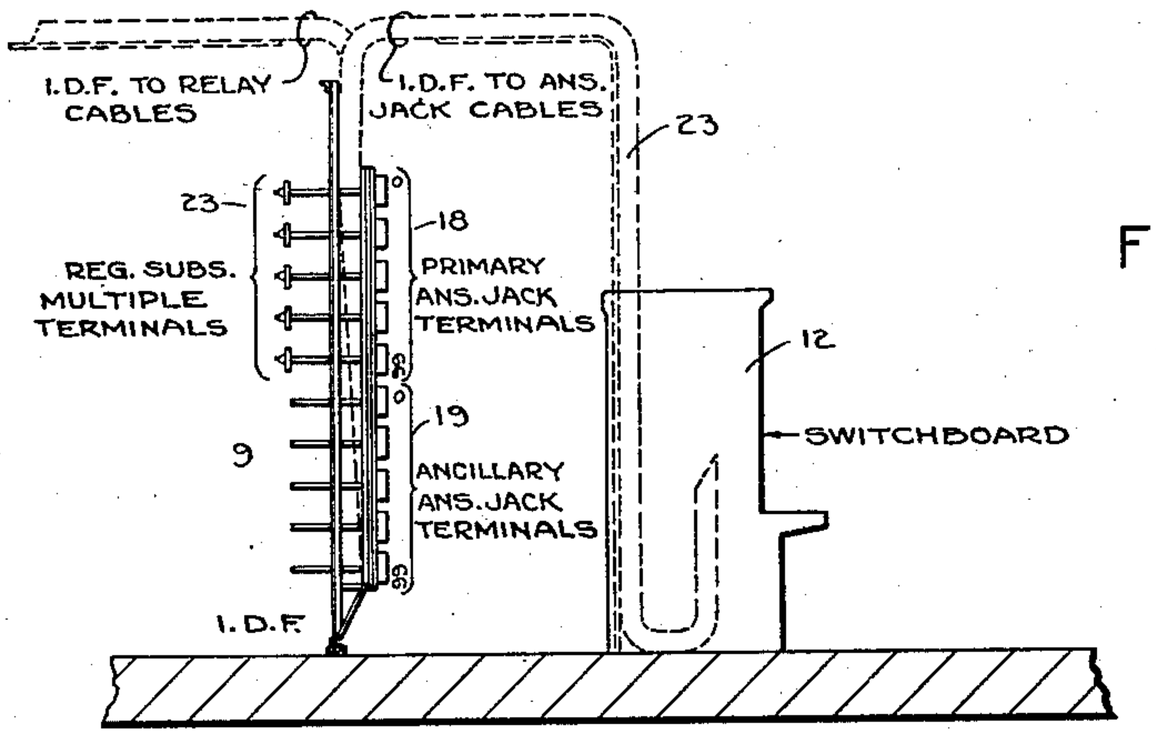

FIG. 3

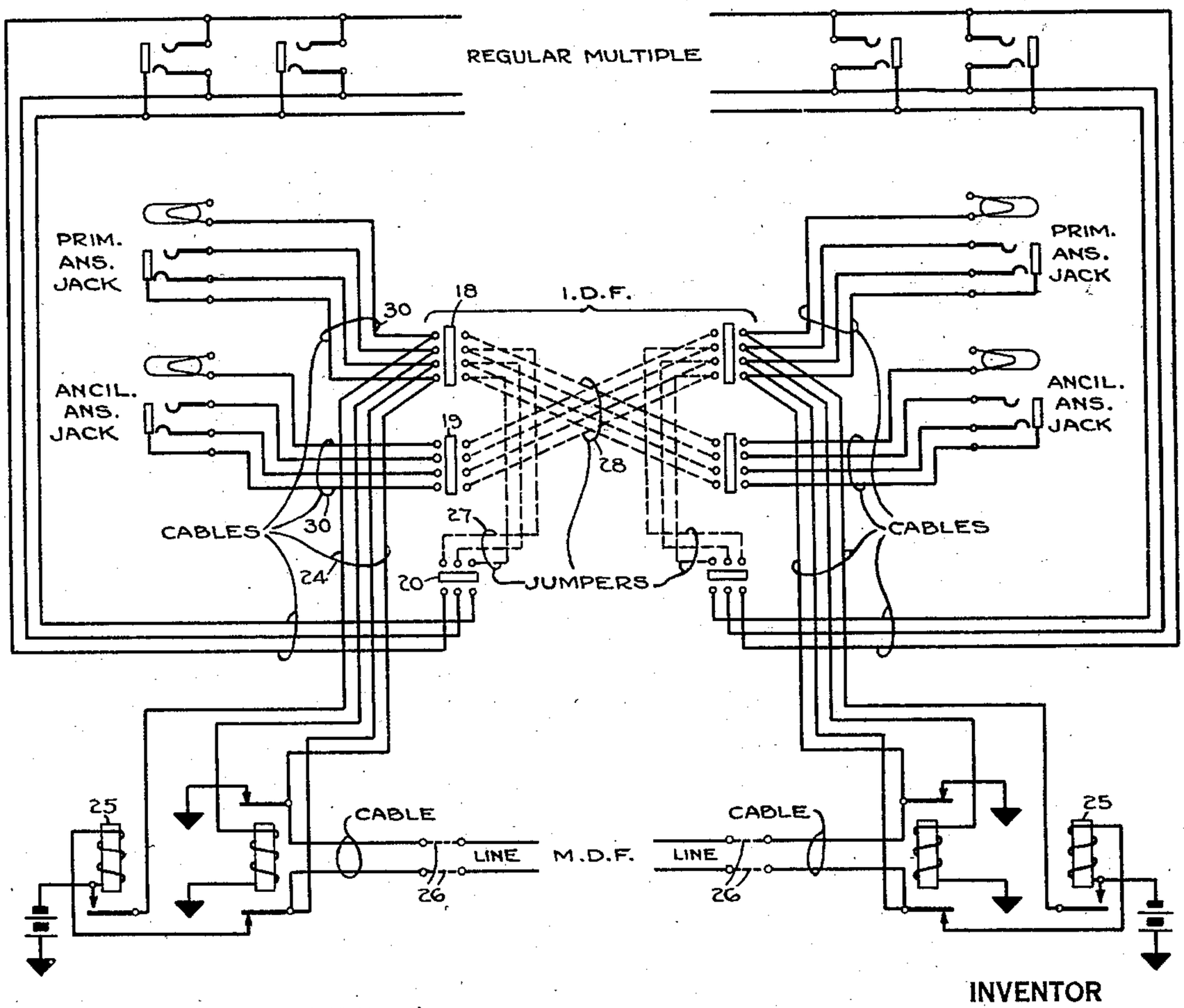

FIG. 4

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UNITED STATES PATENT OFFICE

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CABLING ARRANGEMENT FOR TELEPHONE SYSTEMS

Application filed April 6, 1927. Serial No. 181,399.

This invention relates to manual telephone systems and more particularly to the arrangement and cabling of a telephone switchboard and its associated terminal equipment.

In certain of the improved types of switchboards now in use it is customary for each subscriber's line served therein to terminate in an answering jack at an operator's position and in addition it also appears in an ancillary jack at another operator's position, while the upper portion of the switchboard is provided with the well-known multiple jacks through which subscribers' lines may be called.

This multiple arrangement of answering jacks has necessitated the use of one or more cable runs which extend throughout the entire length of the switchboard. These cable runs, since they are carefully formed and laced during the process of manufacturing and installing of the switchboard, are expensive and once they are installed in a switchboard it is a difficult and costly operation to rearrange the appearances of the lines at the several answering jacks. At the time of installing the switchboard, it is practically impossible to distribute the load uniformly to all operators and since the cabling arrangement just referred to does not lend itself to rearrangement, if the answering equipment must be rearranged, it is necessary either to splice out the present cables or furnish new cables both of which make-shifts tend to complicate the cable run and may entirely block the cable run from future growth.

A further disadvantage of the present arrangement is the fire hazard since with the cable run extending the whole length of the switchboard a fire starting at an answering jack in the board usually burns into the cable run thereby disabling more or less of the switchboard.

The present invention permits wide flexibility of the answering equipment because the answering jacks may be multipled in any desired manner at the time of installation and may be easily changed at some later time to meet changing traffic requirements. In addition the answering jacks, lamps and cables can be moved from one part of the switchboard to another without the necessity of splicing the old cables or furnishing new ones, and furthermore the method of cabling eliminates the answering jack cable run entirely from the switchboard thereby leaving the rear of the board much more accessible.

The main feature of the invention by which the above advantages are obtained consists in mounting the intermediate distributing frame parallel to the switchboard with one vertical of the frame aligned with each panel of the switchboard and by employing short cables between the panels of the board and the verticals of the intermediate distributing frame.

A further feature of the invention consists in mounting the switchboard directly above the intermediate distributing frame with the verticals of the frame spaced on the same centers as the jack stiles in the switchboard.

An additional feature of the invention resides in the wiring connections and cables between the multiple terminals, the answering jacks and the relay rack.

In the drawings Figs. 1 and 2 represent one embodiment of the invention in which Fig. 1 shows a vertical section through two floors of a telephone building with the intermediate distributing frame on one floor and the switchboard placed on the floor directly above. Fig. 2 is a section through the telephone building at right angles to that of Fig. 1 and shows how the switchboard is positioned directly above the intermediate distributing frame. Fig. 3 shows a modified form of the invention representing an end view of an intermediate distributing frame and the switchboard which are mounted on the same floor in parallel relation. Fig. 4 is a wiring diagram indicating the method of interconnecting the different pieces of equipment by jumpers and cables.

For a better understanding of the invention reference is made to Figs. 1 and 2 in which 10 represents one floor of a telephone exchange and 11 designates the floor directly above. On this upper floor there is positioned a switchboard generally designated 12 and which consists of a plurality of sections such as 13 only four of which are shown.

Each section is shown as consisting of six panels such as 14 separated by jack stiles 15. In the lower portion of each panel there are mounted one hundred ancillary jacks designated ANC. ANS. and a block of one hundred primary answering jacks designated PRIM. ANS. while in the space in the panel directly above the primary and ancillary answering jacks there are mounted the usual multiple jacks through which subscribers' lines may be called. It will be noted that in the squares representing the blocks of one hundred primary answering jacks and the ancillary answering jacks, there appear small numerals such as 0, 1, 2, 3, etc. which indicate the hundreds designation of the lines terminating in these blocks. For example the lines appearing in the "0" block have the designation of 0 to 99 inclusive.

On the lower floor designated 10 there is erected an intermediate distributing frame built with its verticals 16 spaced on the same centers as the jack stiles 15 of the switchboard. Thus there is provided one vertical of the frame for each panel of the switchboard that is used for local telephone lines. The cables 30 from the answering jacks and lamps of the switchboard 12 are brought down through the floor 11 through pipes 17 as shown, or the floor can be constructed with a slot therein extending the entire length of the switchboard.

These answering cables are made in sets of ten for each panel and since all panels are alike as to form and over-all length, it is only necessary to design the ten cables for the first panel since the other sets of ten cables for the remaining panels are identical with the first. In addition to simplifying the engineering of an installation this arrangement reduces the chances of error in laying out the cabling system. Furthermore if it is desirable to move the equipment of any panel or panels it is only necessary to move the set of ten cables associated with each panel and this can be done without disturbing the cabling of the remaining panels.

In the arrangement shown in Figs. 1 and 2 the intermediate frame is built with two hundred terminals on the answering jack side of the vertical, and the upper hundred of these terminals throughout the frame are connected with the primary answering jacks of each panel of the switchboard while the lower hundred terminals 19 of the vertical are connected to the ancillary answering jacks of the corresponding panel. By referring to the primary and ancillary answering jack arrangement shown in Fig. 1 it will be noted that while the primary answering jacks are arranged in numerical order the ancillary answering jacks are transposed or staggered in such a manner that while the lines in the 6th, 7th, 8th, 9th, 10th and 11th hundreds groups are given preference by being connected to the primary answering jacks in the 4th and 5th divisions of sections 2 and 3, these lines having a secondary preference by being connected to the ancillary answering jacks in the second and third divisions of sections 1 and 2. The multipling and transposition of these lines just referred to may be effected in the intermediate distributing frame as shown by the parallel braces and dotted connecting lines in Fig. 1 representing jumper wires. The regular subscriber's multiple jacks appearing in the upper portion of the switchboard are connected in the usual manner by a cable extending throughout the length of the board and indicated in dotted lines at 20. This cable is supported over a cable rack such as 21 and extends to one end of the intermediate distributing frame where it is supported on the cross-irons such as 22 of the five upper levels on the horizontal side of the frame which carries terminal strips 23 for terminating the multiple cable. It will be noted that there are no terminals placed in the lower portion of this side of the frame and it will be understood that the multiple terminals are connected or jumpered to the primary answering jack terminals 18 on the opposite side of the frame.

In the modification shown in Fig. 3 the switchboard 12 and the intermediate distributing frame generally designated 9 are mounted on the same floor or level. As in the arrangement of Figs. 1 and 2 the switchboard and distributing frame extend in parallel relation with the verticals of the distributing frame positioned directly back of the corresponding jack stiles of the switchboard. Otherwise the arrangement of the equipment is the same as that shown in Figs. 1 and 2 and the cabling is also the same except instead of being dropped vertically from the switchboard to the frame it must be mounted as shown in dotted lines at 23.

The wiring between the different pieces of equipment in the two modifications is the same as shown in Fig. 4 wherein it is represented that cables 24 connect answering terminal strips 18 in the intermediate distributing frame to the line relay rack (not shown) but the connection is indicated to the line relays 25. The line relay rack is then connected to the main distributing frame not shown in Figs. 2 and 3 but represented at 26 in Fig. 4. Cables designated 30 connect the primary answering jacks and the ancillary answering jacks to the terminals 18 and 19 of the intermediate distributing frames while jumpers 27 connect the primary answering jacks to corresponding terminals of the multiple jacks. Other jumpers such as 28 serve to cross-connect the primary answering jack terminals and the ancillary answering jack terminals at the intermediate distributing frame to permit staggering of the ancillary answering jacks.

It will thus be seen that the present invention provides an improved arrangement of telephone exchange equipment and the method of interconnecting it which simplifies installation and permits easy rearrangement of the equipment to meet changing traffic requirements.

What I claim, is:

Telephone exchange equipment including a switchboard mounted on one floor, said switchboard being provided with panels, each panel having a plurality of primary answering jacks and ancillary answering jacks, an intermediate distributing frame on a second floor directly beneath said switchboard and extending in the same direction as said switchboard, said intermediate distributing frame having verticals spaced on the same centers as the sides of said panels, terminals on each panel, cables connecting the primary answering jacks and ancillary answering jacks to terminals on associated verticals and jumpers for cross-connecting said terminals whereby the appearances of lines in said ancillary jacks may be varied by interchanging said jumpers.

In witness whereof, I hereunto subscribe my name this 14th day of March A. D. 1927.

MELVIN J. ARNDT.