

April 27, 1943.

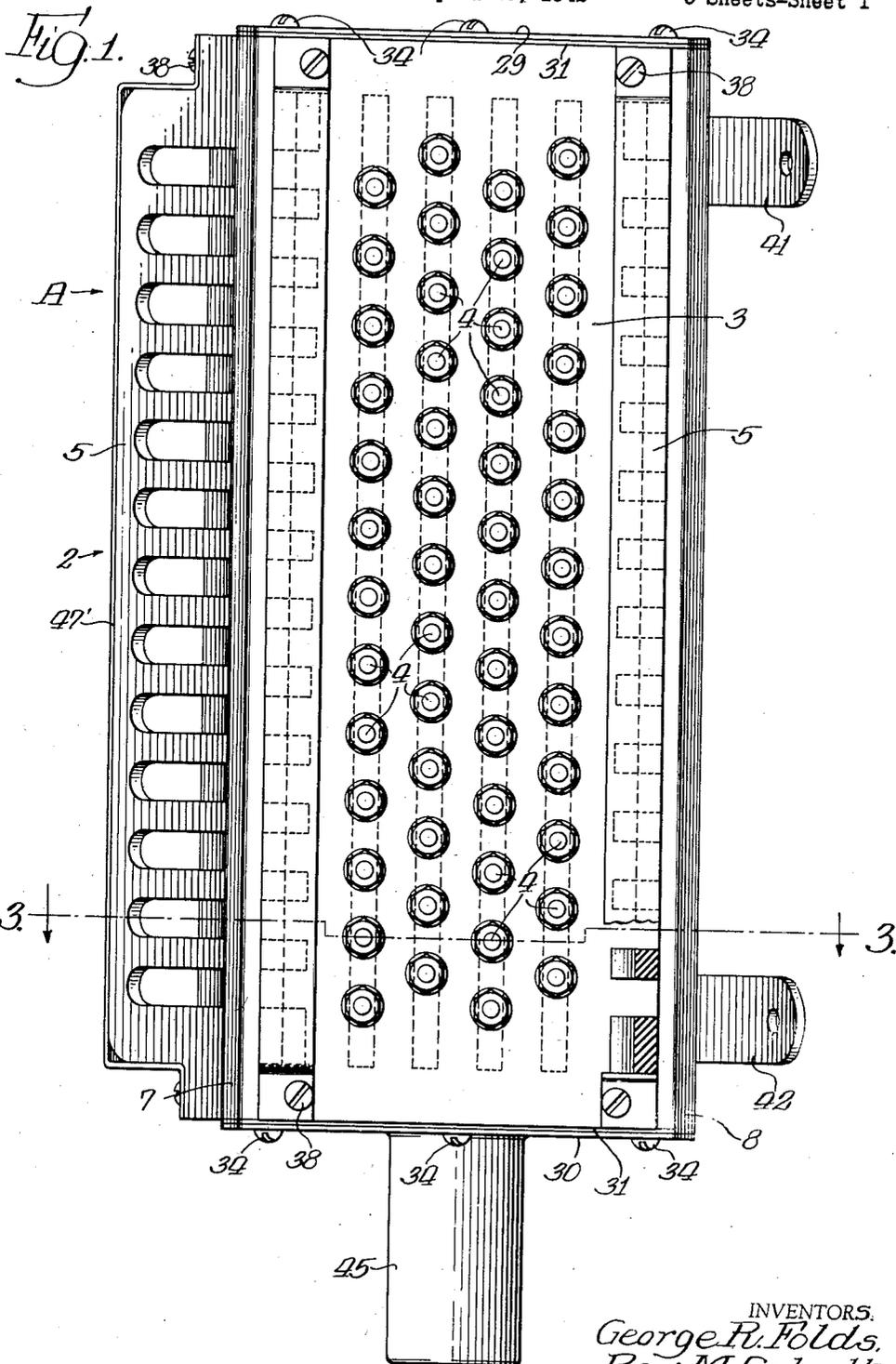
G. R. FOLDS ET AL

2,317,450

TERMINAL BOX

Filed April 25, 1942

5 Sheets-Sheet 1



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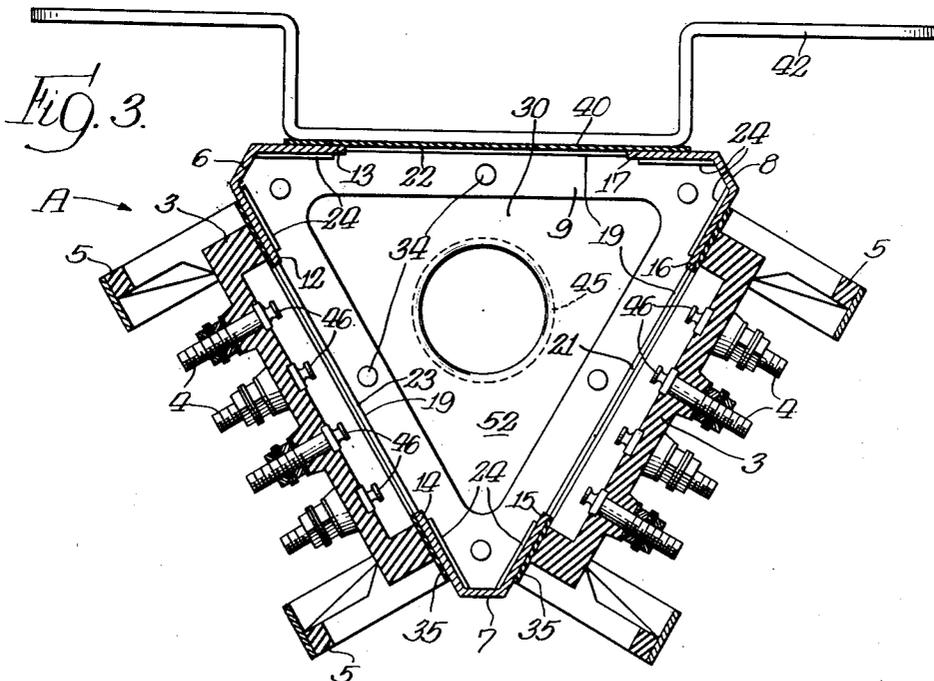
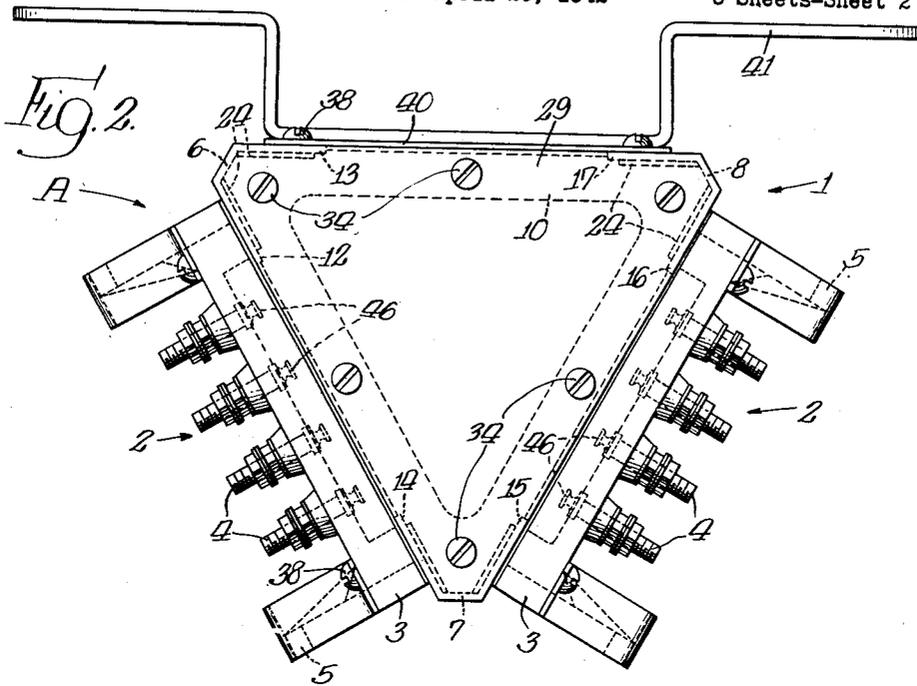
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5 Sheets-Sheet 2



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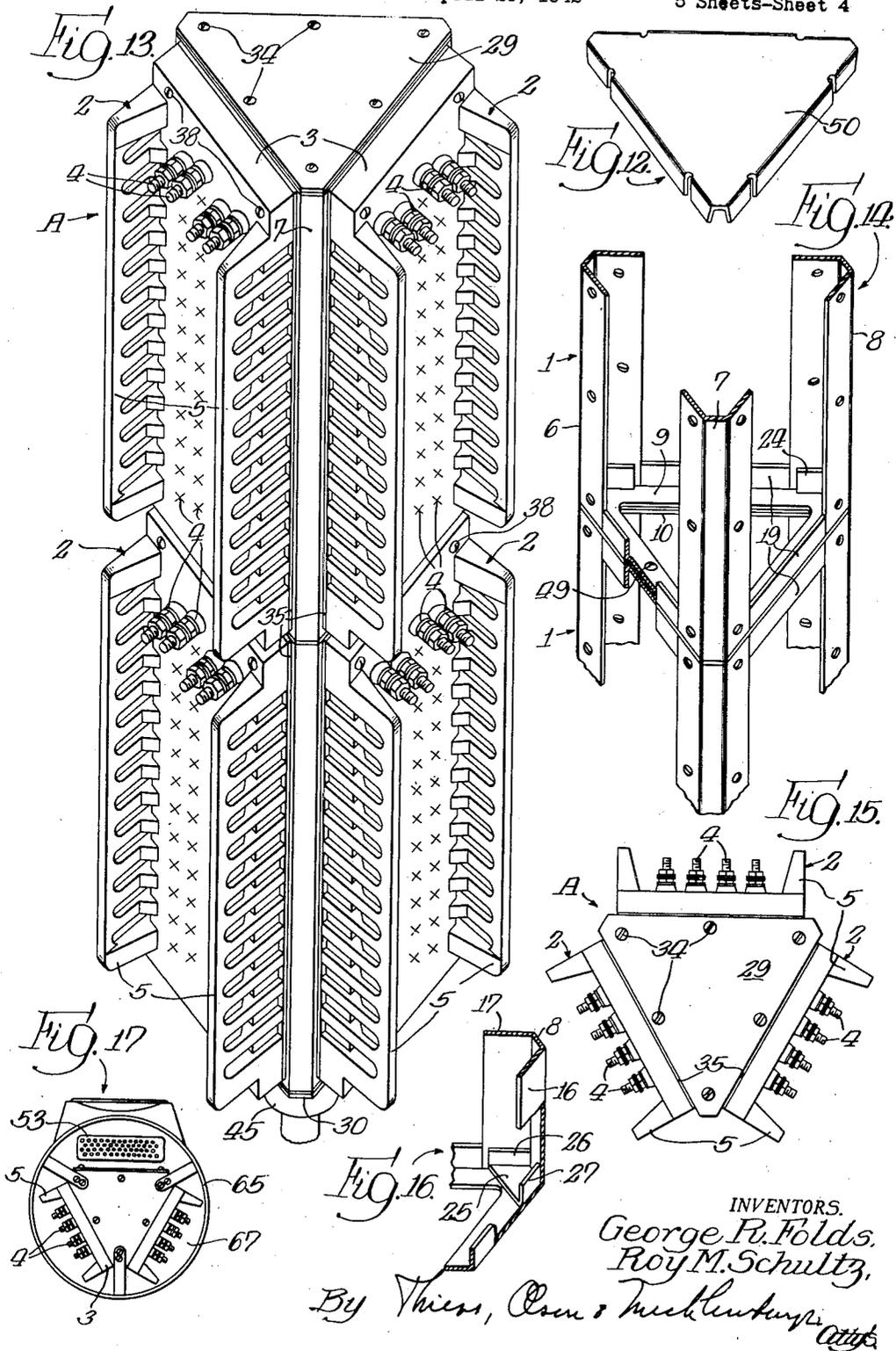
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TERMINAL BOX

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5 Sheets-Sheet 4



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FIG. 18.

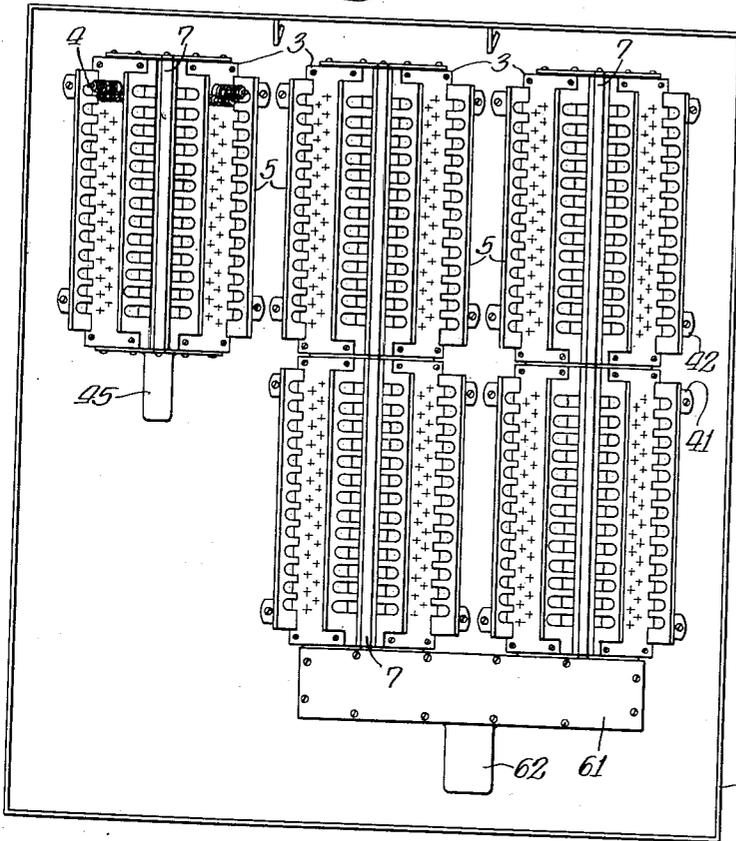


FIG. 20.

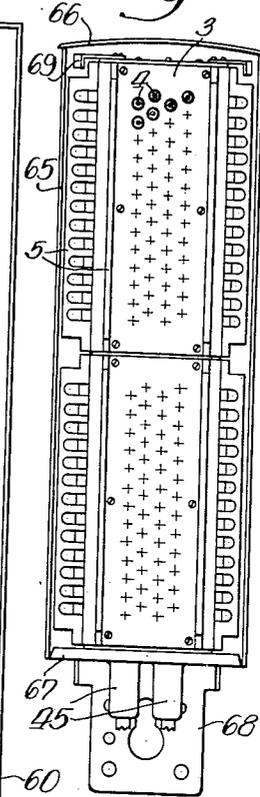


FIG. 19.

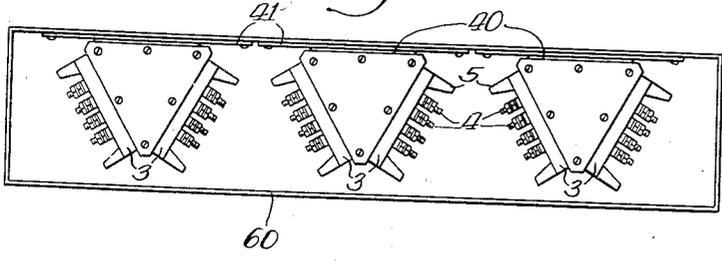
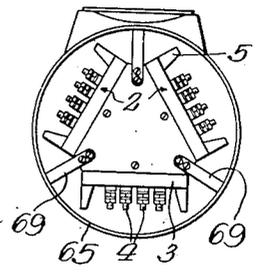


FIG. 21.



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UNITED STATES PATENT OFFICE

2,317,450

TERMINAL BOX

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14 Claims. (Cl. 174—60)

This invention relates to terminal boxes and more particularly to devices of this type particularly adapted for use in telephone, telegraph or like systems.

The principal objects of the invention are to provide a terminal box which is compact, durable and simple in construction; to provide improved means in a terminal box construction and particularly in the framework of the housing thereof; to utilize this improved means for the purpose of securing greater flexibility in the assembly of the parts and increasing or varying the capacity of the unit to secure greater flexibility of use; and to provide improved means for securing greater efficiency in a terminal box having these improved characteristics.

The terminal box herein disclosed provides for utmost flexibility in terminating, distributing, looping and cross-connecting communication or like cable. It is adaptable to a wide variety of uses and occupies approximately one-half of the space required by terminal boxes, binding post chambers or pot heads heretofore used for the same purpose. The invention is directed to providing the terminal box in basic units that may be added together with ease and speed to furnish cable termination or cross-connecting equipment of any desirable capacity at unusually low cost, both as to initial investment and as to maintenance, and with minimum labor and inventory requirements. The structure is advantageously suited for wall or pole mountings and may be used on pedestals in underground cable distribution. It further provides for economy of space required for the housing or hood and the space necessary to provide access to the terminals.

Other objects and advantages of the invention will be apparent from the following detail description when taken in connection with the accompanying drawings in which

Figure 1 is an elevation of a terminal box embodying the invention;

Fig. 2 is a top view of this terminal box;

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1;

Figs. 4 to 11, inclusive, represent an exploded view of the various parts used in a single unit of the terminal box;

Fig. 12 illustrates a slightly modified form of end frame member that may be used in lieu of the end frame member shown in Fig. 5 to eliminate the cover plate shown in Fig. 6;

Fig. 13 illustrates several units connected to-

gether in endwise relation to form a terminal box;

Fig. 14 illustrates how these several units are connected together in this end to end relation at their frame structures;

Fig. 15 illustrates distributing panels on all sides of the terminal box such as might occur if increased capacity is desired and adequate mounting means is provided at the ends instead of at one side by the mounting plate shown in Fig. 11;

Fig. 16 is a detail sectional view illustrating a modified form of securing means between the longitudinal frame members and the end frame members;

Fig. 17 illustrates the structure shown in Fig. 12 within a hood, the cap thereof being omitted;

Fig. 18 illustrates a multiple arrangement of a number of units in a cabinet to show the flexibility of use of these units to obtain practically any conductor capacity that may be desired in a limited space, this arrangement affording a wider variation of crossovers between conductor connections;

Fig. 19 is a section through the cabinet shown in Fig. 18 to illustrate the unit arrangement shown therein in the form of a top plan view;

Fig. 20 illustrates two units arranged in endwise relation and mounted within a hood capable of being mounted on a pole; and

Fig. 21 is a view similar to that of Fig. 17, but showing the structure illustrated in Fig. 20.

The terminal box illustrated in the drawings is of a type particularly adapted for many uses and is of a construction novelly permitting both inside and outside use in communication systems and generally wherever cable termination and distribution is desired.

The terminal box designated generally as A comprises a frame structure 1 (Fig. 4) carrying distributing plates 2 at its sides, each distributing plate comprising a molded resinous body 3 having terminals 4 carried therein and fanning strips 5 provided along its vertical sides. The frame structure 1 comprises longitudinally extending corner frame members 6, 7 and 8, and end frame members 9 and 10. These corner frame members are connected to end frame members 9 and 10 and may be channel shape in cross section. Each may have angularly related flanges designated broadly as B, but specifically as 12 to 17, inclusive. Corner frame member 6 may be provided with flanges 12 and 13, corner frame member 7 with flanges 14 and 15, and corner frame member 8 with flanges

16 and 17. End frame members 9 and 10 may each be provided with a central opening 18 and may have inturned flanges 19 along their side edges. These end frame members 9 and 10 are adapted to be connected to the opposite ends of the corner frame members 6 to 8, inclusive, so that inturned flanges 19 will lie in the plane of angularly related flanges B that oppose each other to form the framework of each side of the terminal box. Both angularly related flanges B and inturned flanges 19 define the margins of these open sides that are designated 21, 22 and 23 in Fig. 4, and provide in effect a planar surface to which the distributing plates or panels 2 are attached.

End frame members 9 and 10 are also provided with offset fastening lugs 24. The extent of the offset of these lugs 24 equals the thickness of the material out of which the angularly related flanges B are made, so that lugs 24 will lie or engage against the inside face of the flanges B, as shown in Fig. 4. Spot welding or other suitable securing means may be used to fix said lugs to these flanges B. End frame members 9 and 10 may be formed by simple stamping operations and said flanges 19 and offset lugs 24 may then be provided in an extremely simple and quick manner. The construction of these end frame members is indeed simple. In one forming operation both the securing means 24 as well as margin-forming flanges 19 may be provided. Moreover, the construction of end frame members 9 and 10 facilitates the assembly of the corner frame members. The offset relation of lugs 24 with respect to flanges 19 predetermines the positioning of the corner frame members. In other words, these parts are so formed that they uniquely permit ready positioning of the corner frame members, this being obtained by placing the ends of the corner frame members against lugs 24 and between adjacent inturned flanges 19, the cut-back due to the offsetting of lugs 24 being just sufficient to receive the ends of the corner frame member. While the provision of inturned offset lugs 24 provides a very simple and effective way to secure the corner frame members in the assembly operation, it is to be understood that some other suitable fastening means may be employed, such as the bracket 25 shown in Fig. 16, with ears 26 and 27 welded or otherwise suitably secured to the angularly related flanges B of each corner frame member and to the end frame member. After these end frame members 9 and 10 and the corner frame members are secured together in the manner described, the frame structure thus formed is provided with a galvanized coating by a hot dipping operation, which assures that such joints as indicated at 28, for example, in Fig. 4, between these corner frame members and the end frame members are filled, and consequently, sealed in order to provide an air and watertight seal.

Suitable cover plates for the end frame members 9 and 10 are shown, for example, at 29 in Fig. 6 and at 30 in Fig. 8. Cover plate 29 may somewhat resemble the shape of the end frame members 9 and 10 and be adapted to serve as a sealed closure for central opening 18 thereof. To effect this sealed closing relation, a rubber gasket 31 or the like, as shown in Fig. 7, may be provided between the outside face of end frame member and the inside face of cover plate 29. Suitable tapped openings 32 may be provided in these end frame members and openings 33 may be provided in cover plate 29 to receive screws

34, as shown in Figs. 1 and 2. A hermetical seal could be provided by this form of attachment if so desired.

Similar rubber gaskets 35 may be provided between insulation distributing plates 2 carrying terminals 4 and the angularly related flanges B and the inturned flanges 19. Tapped openings 36 may also be provided in angularly related flanges and openings 37 may be provided in distributing plates 2, as shown in Fig. 9, to receive screws 38 for attaching these distributing plates 2 over the openings 21, 22 and even 23, as shown in Fig. 3, to form sealed closures therefor. In case the terminal box disclosed therein is used as a single unit and only two distributing plates 2 are desired to supply the number of terminals 4 necessary for the conductor distribution of the installation, a mounting plate 40 having suitable mounting brackets 41 and 42 may be provided for one of these open sides, say, for side 22. A rubber gasket 35 may be used so that this mounting bracket will act as a sealed closure for the open side 22 of the frame structure. Screws similar to those designated 38 for holding distributing plates 2 in position may be used to secure mounting plate 40 upon corner frame members 7 and 8.

Whether a single unit is to be used as shown in Fig. 2, or several units connected end to end are to be used as shown in Fig. 13, in order to increase the distribution capacity to meet the requirements of the installation, cover plate 30 may be secured to the bottom end frame member 9 in a manner similar to that described in connection with top cover plate 29. A rubber gasket 31 may be used and bolts 34 may be employed to hold this end plate 30 tightly in position to form a sealed closure for the central opening 18 of this bottom end plate 9. If so desired, a self-soldering nozzle 45 may be formed on bottom end plate 30, as illustrated in Fig. 8, to permit the termination of a cable end therein in sealed relation in a well known manner. The conductors are then distributed upwardly into the interior chamber 52 of triangular formation and connected to the inside heads 46 of terminals 4, as indicated in Fig. 3. These connections may be soldered or made in any other suitable way before the distributing plates 2 are attached by the screws 38. The construction of the distributing plates 2 forms no essential part of the present invention but the design disclosed herein uniquely provides a structure that is exceptionally efficient and desirable. The side fanning strips 5 are provided with openings 47 through which the customer's wires or other conductors leading from terminals 4 may pass for proper distribution from the terminal box through insulating knockout strips 53 that may be provided anywhere on the hood 65 or base 67 carrying the hood. In case it may be desirable to make a convenient notation in the form of a record identifying the conductor connections made at and between respective terminals 4, a strip 47' finished with white paint or enamel, or some other suitable material, may be connected over the outer edges of fanning strips 5 so as to extend over and against the face of plates 2 and be secured in place by the screws 38, as shown in Fig. 1. The white paint or other suitable material will receive any pencil or chalk notations that the service men may inscribe thereon and remain indefinitely but still be capable of erasure is so desired.

The invention is designed to provide equipment flexibility and standardization so that time and labor economies will effect greater efficiency in as-

sembly and use, as well as lower maintenance cost. The construction of the corner frame members with their angularly related flanges B and the end frame members 9 and 19 with their turned flanges 19, together with their offset fastening lugs 24, provide equipment of a character and kind that allows a number of different capacity arrangements of parts and still provides for a minimum of inventory. If conductor distribution of greater capacity than is provided for by a single unit is required, bottom end plate 30 may be omitted from the lower end frame member 9 and this lower end frame member 9 may be connected to the top end frame member 10 of another unit with a gasket 31 inserted therebetween, as shown in Figs. 13 and 14. Inasmuch as these end frame members are standard in construction, the corner frame members will align as well as the openings 32 in the end frame members to receive fastening screws 49. In this simple manner the frame structure of two units may be readily attached and the distributing plates 2 thereafter assembled in the manner above described so as to provide a multiple unit terminal box carrying a larger number of distributing plates 2.

Fig. 12 illustrates a solid top end frame member 50 that may be substituted for the centrally open top frame member 10, if so desired. Thus, the top plate 29 may be omitted. However, this is desirable only when a single unit is to be assembled or when it is to be used as the top end plate of the top unit of the multiple arrangement shown in Fig. 13.

The flexibility of the apparatus disclosed and the ease and speed by which it may be assembled to furnish simple and inexpensive equipment, that may be compactly arranged in minimum space, for terminating, distributing, looping or cross-connecting communication or like conductors of a cable will be further apparent in Figs. 18 to 20, inclusive. We have already shown two units connected together in Fig. 13 and the unique frame structure in Fig. 14 illustrating how a multiple arrangement may be obtained in a most simple and inexpensive manner without in the least sacrificing the sealed cable connecting chamber 52 that should be provided in a manner to prevent seepage of moisture therein and even the passage of air. Moisture in air has been found to condense and cause considerable trouble by creeping along the cable conductors and breaking down the insulation provided therefor. In Figs. 18 and 19, we also show our improved apparatus used within a cabinet 60 and illustrate how any number of units might be assembled to secure additional terminal capacity. Five units are shown for the purpose of illustration only. The arrangement includes four units that have been grouped in two pairs and connected at the bottom to a common core box 61 which may have a self-soldering cable nozzle 62 similar to the one shown in Fig. 1. This core box 61 may be connected to bottom end frame member 9 of each bottom unit in the same manner as cover plate 30 having the cable nipple 45, no extra connections being necessary due to the simple and unique construction of these end frame members. The cable chambers will remain sealed in the manner described above and two units may be arranged in each vertical row. The single unit to the left of Fig. 18 illustrates how a single unit may also be used in cabinet 60 to meet additional requirements of a certain number of terminal connections and also the fact that the terminal connecting capacity of a cabinet like that shown at 60 may be readily

changed by adding or removing units and that due to flexibility of coupling these units together and the further fact that no additional parts are required, inventory stock may be kept at a minimum. Moreover, the sides of the units carrying the distributing plates 2 are purposely disposed at an angle permitting minimum spacing of the units and still provide access to the terminals 4 by means of socket wrenches and other tools that can be used perpendicularly to the front faces of the plates 2 without interfering with the terminals on the adjacent unit. In this respect we wish to point out that the invention herein disclosed provides a unique structure that advantageously allows varying capacities of conductor connections including crosswise, looping, etc., to be obtained in an exceedingly simple manner and at no extra cost. This feature is important because greater flexibility of crossovers is procured due to the simple and compact arrangement of a greater number of available terminals.

Figs. 20 and 21 illustrate the structure shown in Fig. 15 within a hood 65, while Fig. 17 illustrates the structure shown in Fig. 13 within substantially the same hood. It will be observed from these figures that the space occupied by hood 65 is exceptionally small for the number of terminals used and the connections and crossovers that may be made upon the structure contained within the same. Hood 65 is of the type adapted for pole mounting or elsewhere and has a cap 66 thereon suitably protecting the terminal equipment within the hood against undesirable weather conditions. The hood 65 fits upon base 67 carried by bracket 69 in any suitable way. Arms 69 may be connected to top plates 29 or 50 and guide the hood 65 in its up and down movements over the terminal apparatus. As previously mentioned, insulating knockout strips 53 may be provided in base 67. These knockout strips may be furnished in any suitable location and in any cabinet or hood that may be used.

Without further elaboration, the foregoing will so fully explain the gist of our invention that others may, by applying current knowledge, readily adapt the same for use under varying conditions of service, without eliminating certain features, which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to us by the following claims.

We claim:

1. A terminal box comprising longitudinal frame members disposed at the corners and having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members being open centrally and having inwardly extending flanges and lugs at their sides, said flanges lying between said angularly related flanges at the ends of said longitudinal frame members, said lugs being offset inwardly and engaging against the inside faces of said angularly related flanges, end plates carried by said end frame members, and distributing plates secured to said angularly related flanges to form closures for said open sides.

2. A terminal box comprising longitudinal frame members disposed at the corners and having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members

having inwardly extending flanges and lugs at their sides, said flanges lying between said angularly related flanges at the ends of said longitudinal frame members, said lugs being offset inwardly and engaging against the inside faces of said angularly related flanges, and distributing plates in sealed relation with said angularly related flanges and said end frame flanges, said distributing plates forming closures for said open sides.

3. A terminal box comprising longitudinal frame members disposed at the corners and having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members having inwardly extending flanges and lugs at their sides, said flanges lying between and in the plane of said angularly related flanges at the ends of said longitudinal frame members, said lugs being offset inwardly and engaging against the inside faces of said angularly related flanges, and distributing plates in sealed relation with said angularly related flanges and said end frame flanges, said distributing plates forming closures for said open sides.

4. A terminal box comprising longitudinal frame members having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members having inwardly extending flanges at their sides, said flanges lying between and in the plane of said angularly related flanges, means for securing said end frame members to said longitudinal frame members, and distributing plates in sealed relation with said angularly related flanges and said end frame members, said distributing plates forming closures for said open sides.

5. A terminal box comprising longitudinal frame members disposed at the corners and having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members being open centrally and having inwardly extending flanges lying between said angularly related flanges at the ends of said longitudinal frame members, lug means disposed between said corner frame members and said end frame members for securing the same together, end plates carried by said end frame members, and distributing plates in sealed relation with said angularly related flanges and said end frame flanges, said distributing plates forming closures for said open sides.

6. A terminal box comprising longitudinal frame members disposed at the corners and having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members being open centrally and having inwardly extending flanges lying between said angularly related flanges at the ends of said longitudinal frame members, means for securing said end frame members to said longitudinal frame members, end plates carried by said end frame members, and distributing plates in sealed relation with said angularly related flanges and said end frame flanges, said distributing plates forming closures for said open sides.

7. A terminal box comprising longitudinal frame members having angularly related flanges

that extend in planes defining a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members being open centrally and having inwardly extending flanges lying between said angularly related flanges at the ends of said longitudinal frame members, lug means disposed between said longitudinal frame members and said end frame members for securing the same together, means for sealing said end frame members and said longitudinal frame members at their points of contact, end plates for said end frame members, said end plates forming sealed closures for the central openings of said end frame members, and distributing plates for said longitudinal and end frame members forming sealed closures for the open sides of said terminal box.

8. A terminal box comprising longitudinal frame members having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members having inwardly extending flanges lying between said angularly related flanges at the ends of said longitudinal frame members, lug means disposed between said longitudinal frame members and said end frame members for securing the same together, means for sealing said end frame members and said longitudinal frame members at their points of contact, and distributing plates for said longitudinal and end frame members forming sealed closures for the open sides of said terminal box.

9. A terminal box composing longitudinal frame members having angularly related flanges that extend in planes defining a number of open sides for said terminal box, end frame members having inwardly extending flanges lying between said angularly related flanges at the ends of said longitudinal frame members, lug means disposed between said longitudinal frame members and said end frame members for securing the same together, means for sealing said end frame members and said longitudinal frame members at their points of contact, distributing plates forming sealed closures for certain of the open sides of said terminal box, and a mounting plate for at least one of the open sides and forming a sealed closure therefor.

10. A terminal box comprising longitudinal corner frame members having angularly related flanges that form a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members having inwardly extending flanges and inwardly turned offset lugs, said inwardly extending flanges lying between said angularly related flanges of said longitudinal frame members, said lugs lying inside of said angularly related flanges and serving as the securing means for fastening said end frame members to said longitudinal frame members, and a side plate forming a sealed closure for each of said open sides of said terminal box, and terminal connections on at least certain of said side closure plates.

11. A terminal box comprising longitudinal corner frame members having angularly related flanges that form a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members being open centrally and having inwardly extending flanges and inwardly turned offset lugs, said inwardly extending flanges lying between said angularly related flanges of said longitudinal frame members, said lugs lying inside of said angularly related flanges and serving as the secur-

ing means for fastening said end frame members to said longitudinal frame members, an end plate forming a sealed closure for each end frame member at its said central opening, and a side plate forming a sealed closure for each of said open sides of said terminal box, and terminal connections on at least certain of said side closure plates.

12. A terminal box comprising longitudinal frame members having angularly related flanges that form certain of the margins of a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members being interchangeable for mounting at the opposite ends of said longitudinal frame members, said end frame members each having inwardly turned flanges along its sides lying between and in the plane of opposed angularly related flanges of said longitudinal frame members and forming the remaining margins of each of the said open sides, the outside faces of said flanges of each open side comprising a substantially planar surface for a sealing closure therefor, securing means between said longitudinal frame members and said end frame members, said securing means being constructed and arranged so as to lie outside of said planar surface, and a closure plate for each open side, means for fastening said closure plates in sealed relation upon said planar surfaces about said open sides, and terminal connections on at least certain of said closure plates.

13. A terminal box comprising longitudinal frame members having angularly related flanges that form certain of the margins of a number of open sides for said terminal box, end frame members for said longitudinal frame members, said end frame members each having inwardly turned

flanges along its sides lying in the plane of opposed angularly related flanges of said longitudinal frame members and forming the remaining margins of each of the said open sides, the outside faces of said flanges of each open side comprising a substantially planar surface for a sealing closure therefor, said end frame members being secured to and in sealed relation with said longitudinal frame members at their points of contact, a closure plate for each open side, means for fastening said closure plates in sealed relation upon said planar surfaces about said open sides, terminals for said closure plates, and a sealed conductor connection at one of said end frame members providing a sealed passage for conductors adapted to be connected to said plate terminals.

14. A terminal box having a frame structure carrying distributing plates at a number of its sides, said frame structure comprising metal end members and metal channel members to which said end members are connected and carried thereby, said end members being constructed and arranged to predetermine the position and spacing of said channel members in the assembly thereof and having intumed flanges lying between said channel members and providing with said channel members a surface to which said distributing plates are attached to form a sealed closure at said sides of the frame structure, at least one of said end members being open centrally through which conductors may be passed for distribution to said terminals, closure means for said open end member, and means for securing said closure means to said open end member.

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