

May 29, 1934.

L. H. ROVERE ET AL

1,961,111

SWITCHBOARD TERMINAL BLOCK

Filed March 24, 1930

3 Sheets-Sheet 1

FIG. 1.

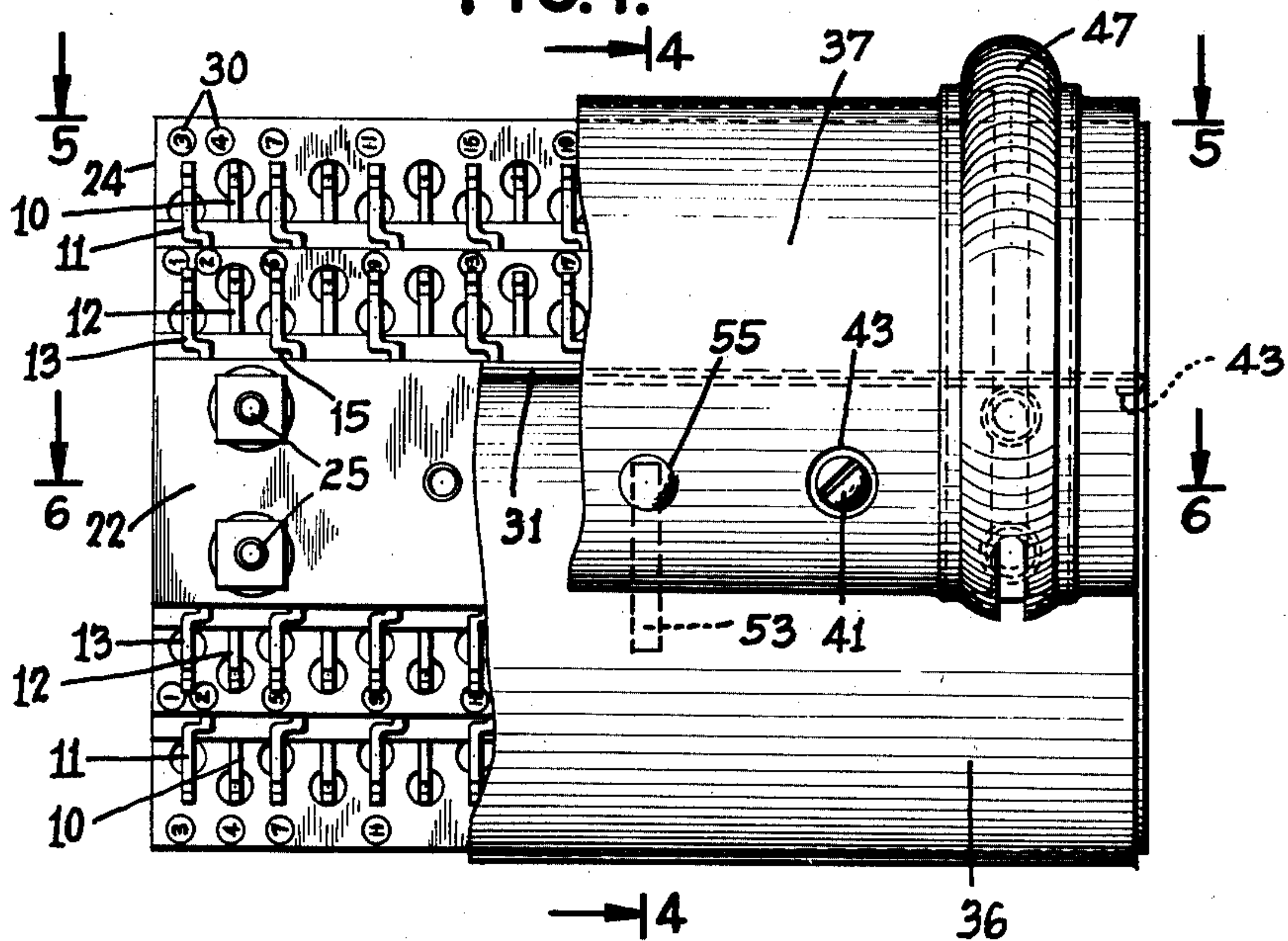
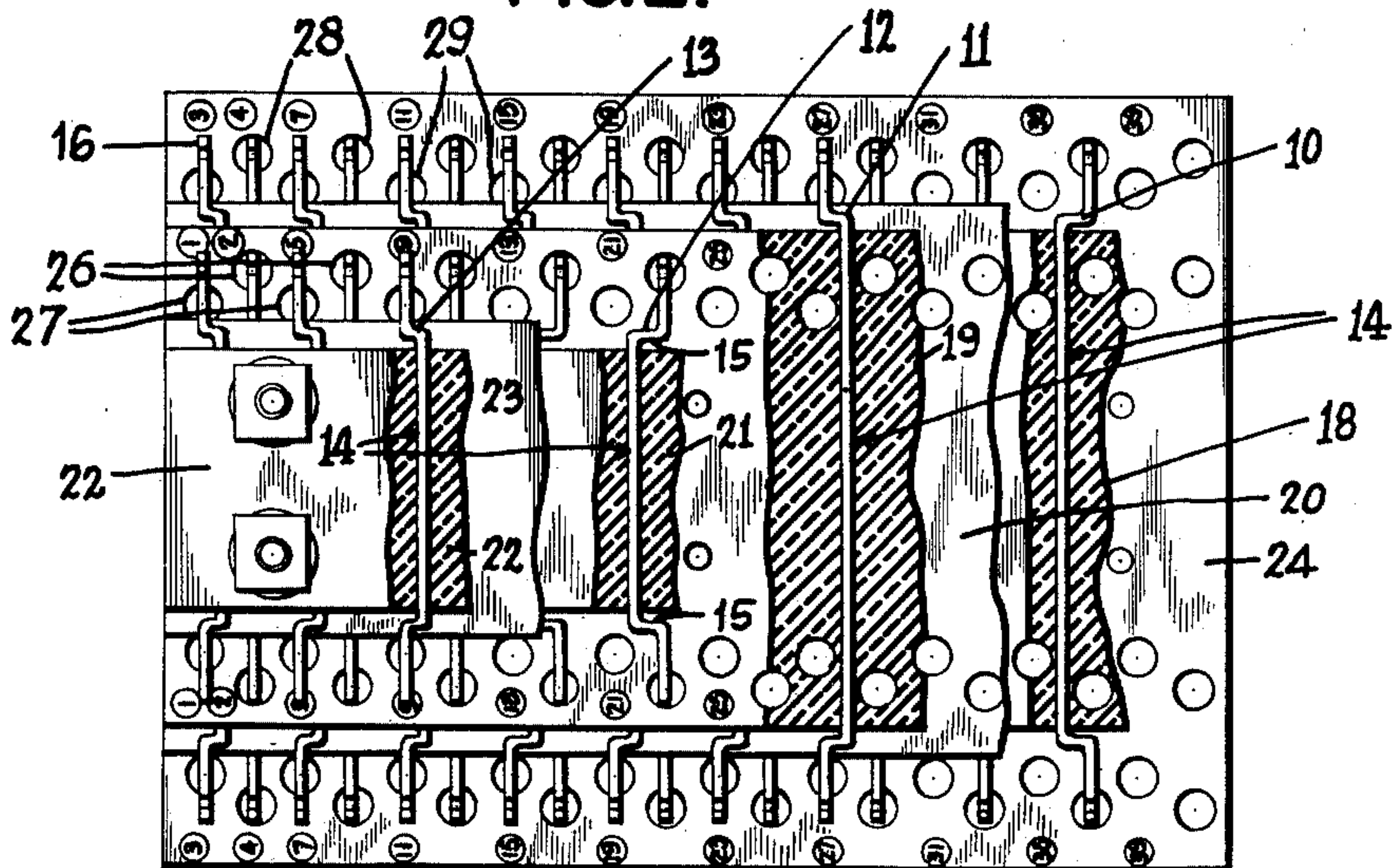


FIG. 2.



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FIG. 3.

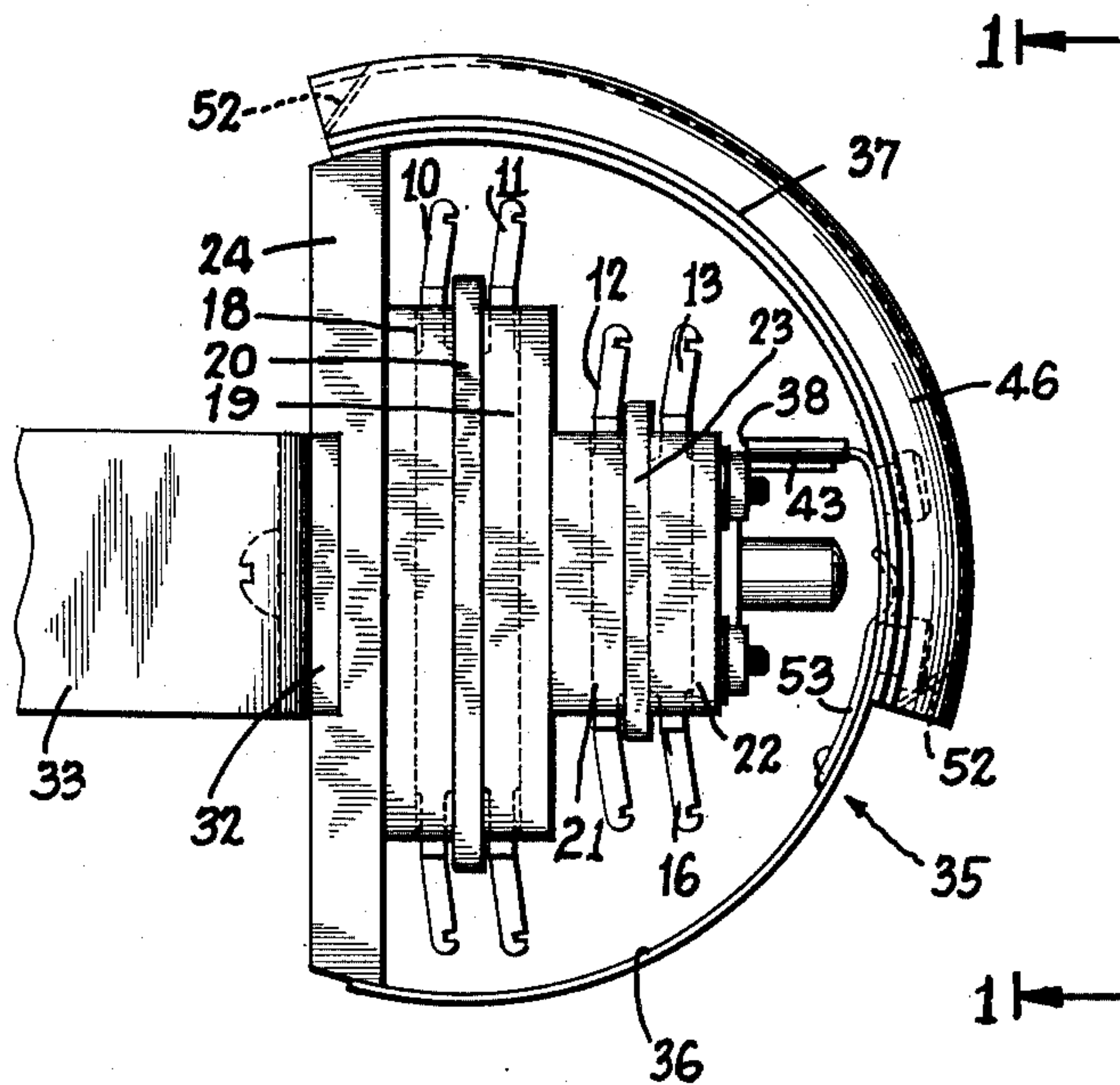
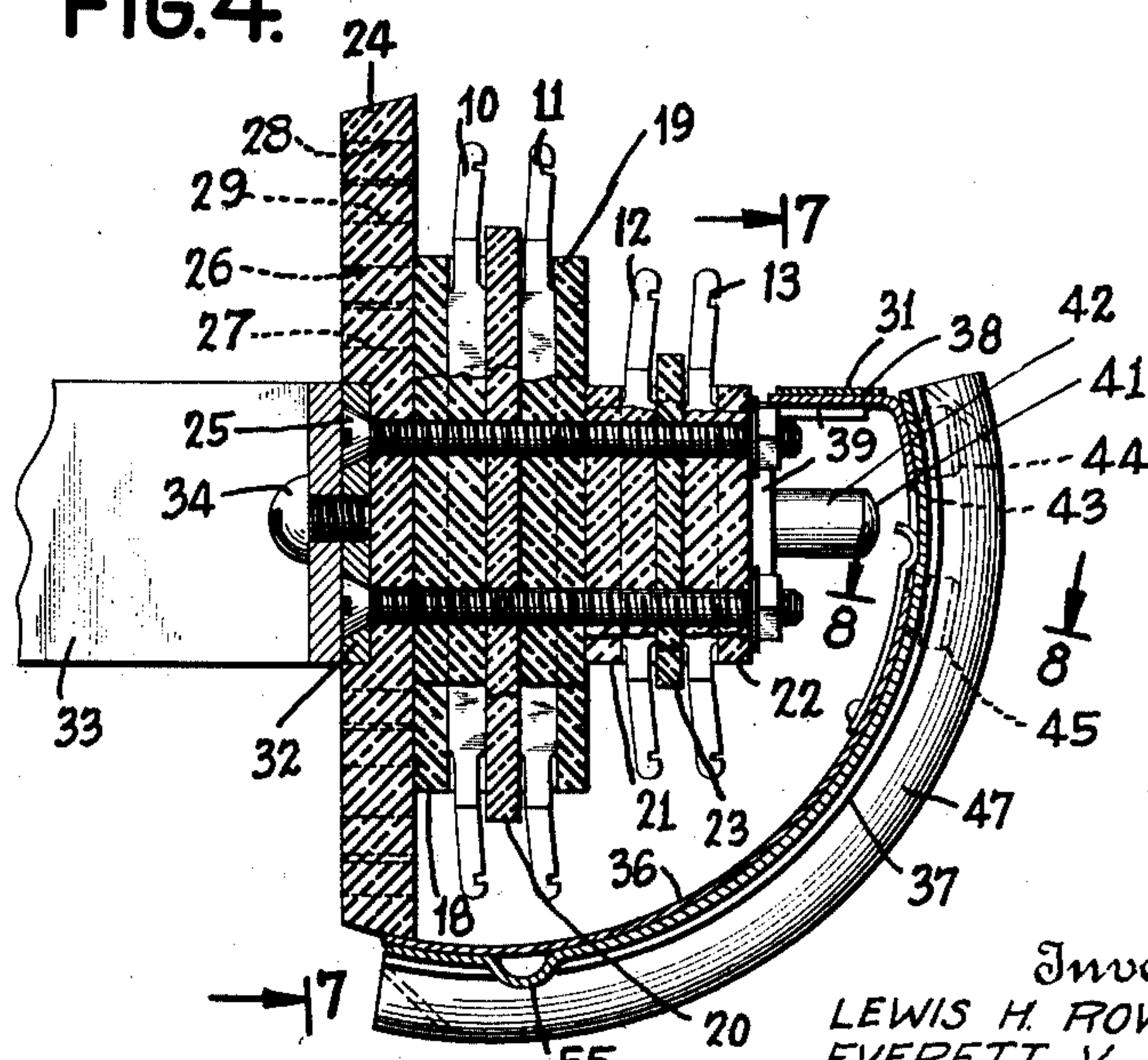


FIG. 4.



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FIG. 5.

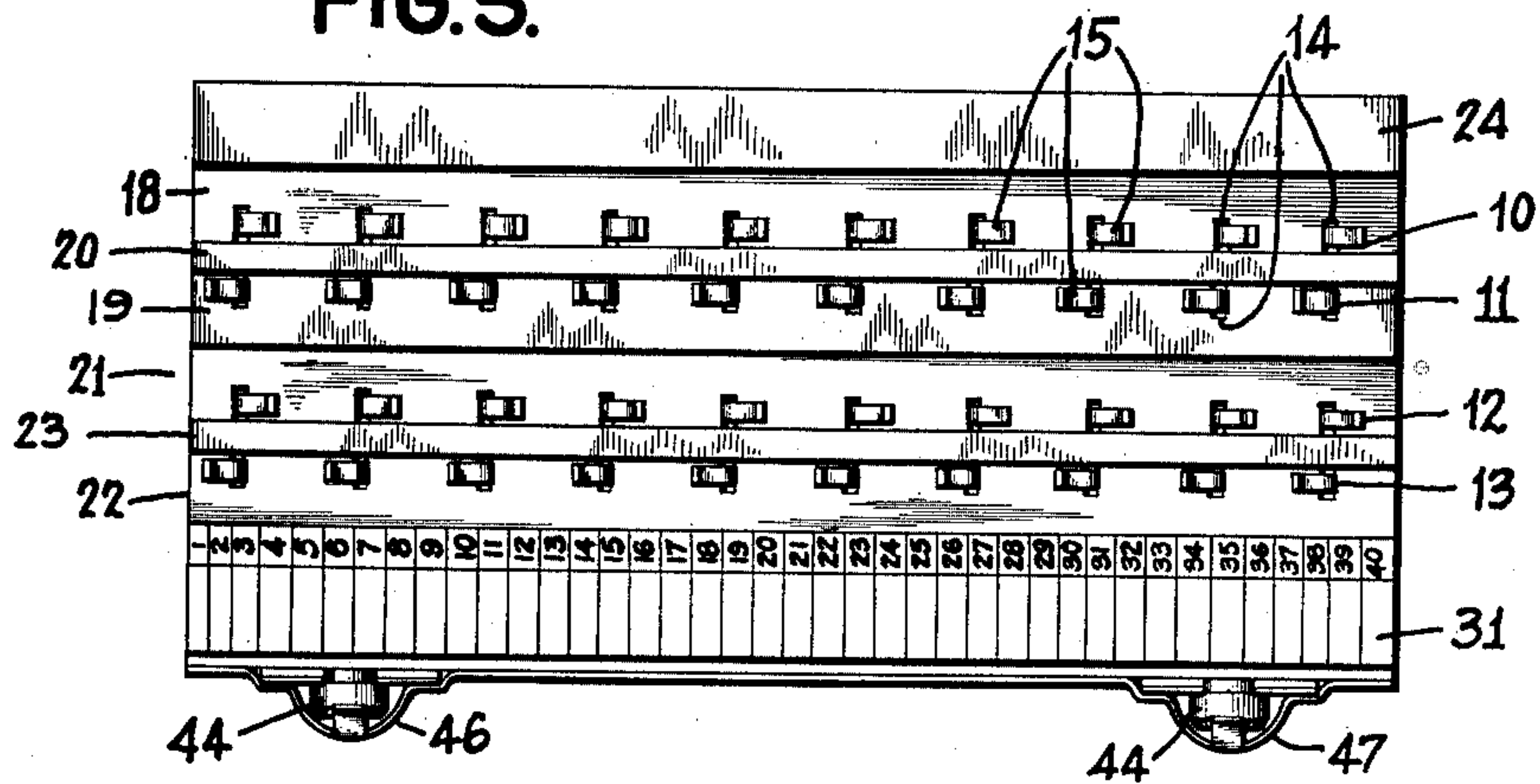


FIG. 6.

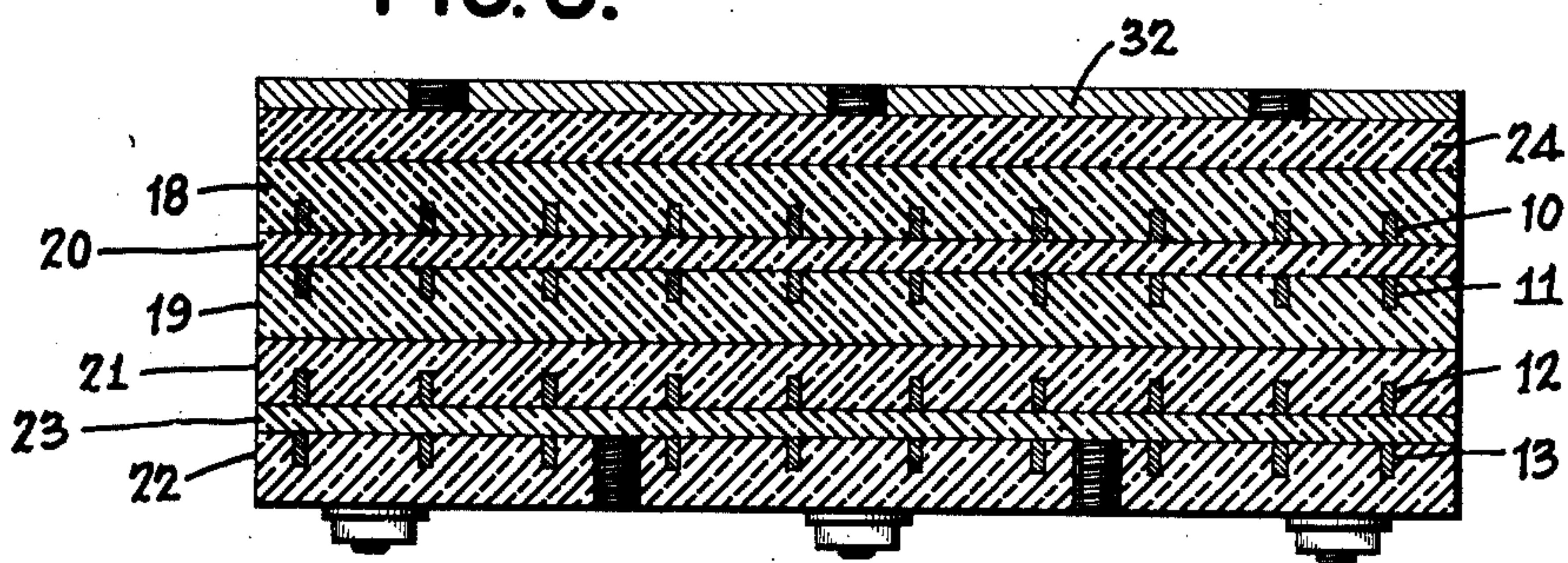


FIG. 7.

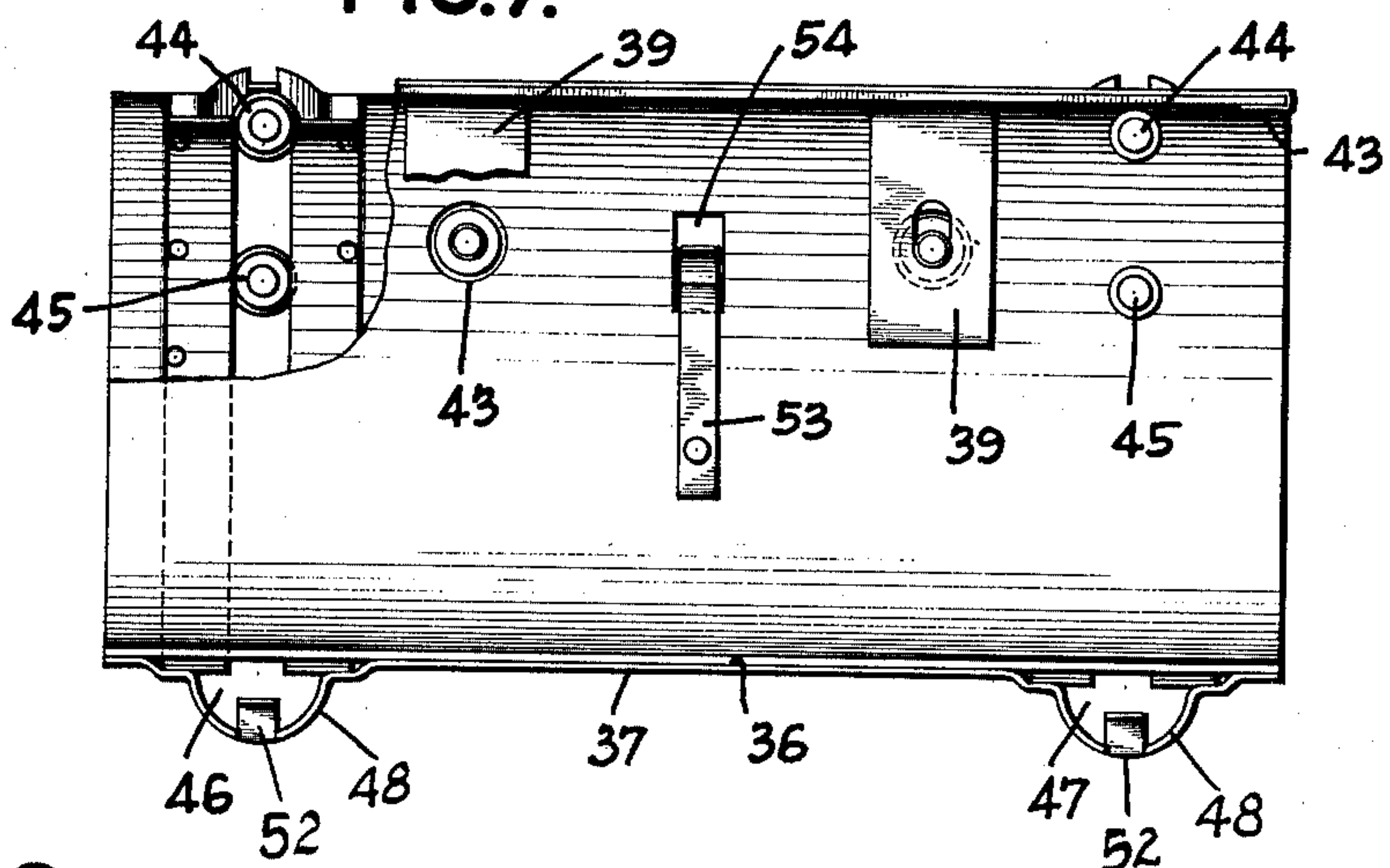
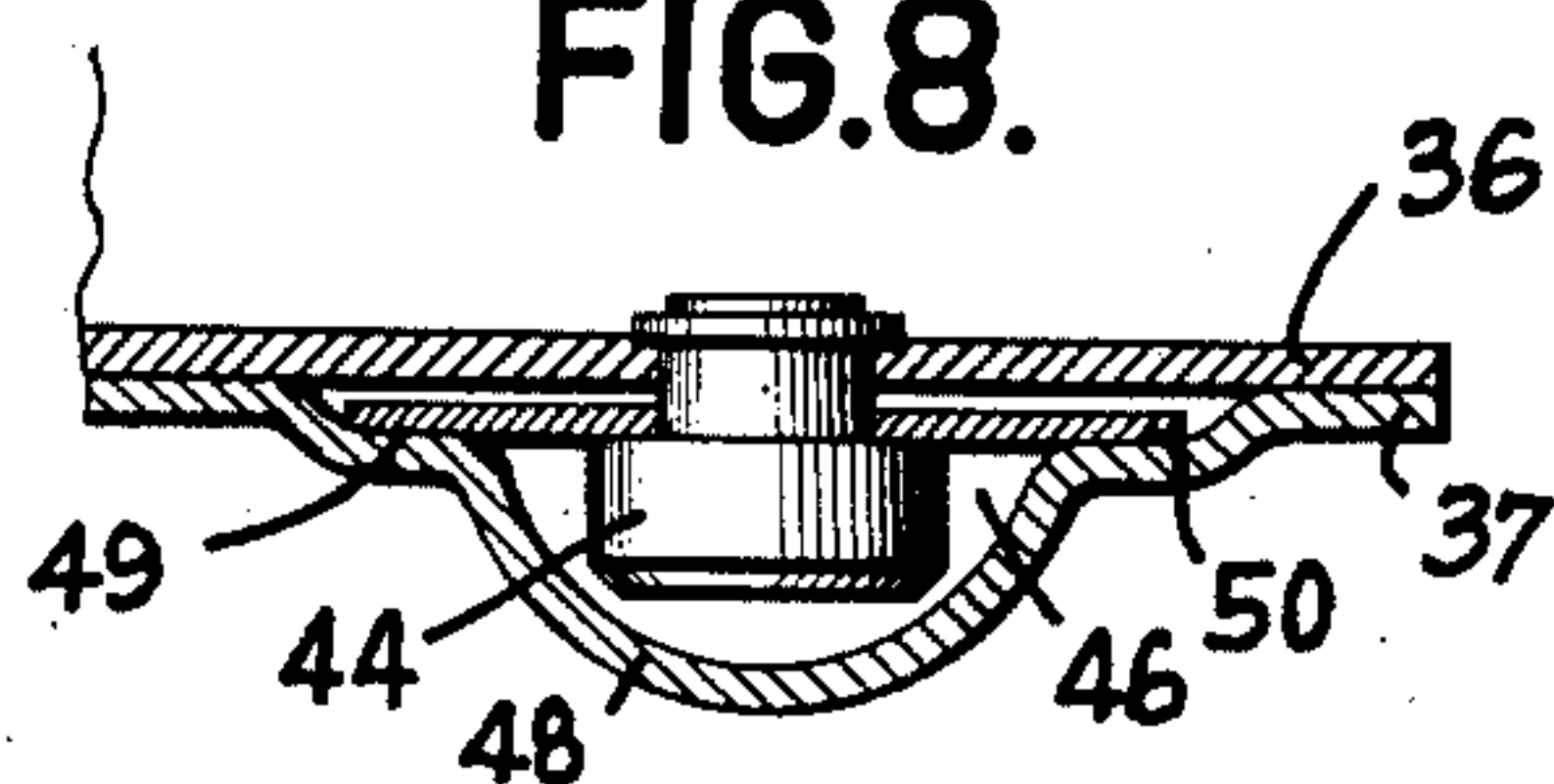


FIG. 8.



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UNITED STATES PATENT OFFICE

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SWITCHBOARD TERMINAL BLOCK

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Application March 24, 1930, Serial No. 438,481

14 Claims. (Cl. 175—306)

This invention relates to a terminal block intended particularly for use in terminating cable conductors and cross connections on distributing frames and similar terminals.

5 In telegraph offices, a telegraph switchboard is provided having facilities for easily and quickly connecting every line wire carried into the telegraph office with every other line wire entering the office. The switchboard also provides facilities for opening, grounding or applying a source
10 of electrical energy to each line or connecting the lines to any desired receiving or transmitting apparatus. The cross connections between lines are effected by providing one or more pin or
15 key jacks on the switchboard for each line wire, apparatus, battery or ground connection, the jacks being connected into groups to accommodate the regular assignments of the wires or apparatus, temporary changes in the assignments
20 being made by patching cords connected between the proper jacks.

With the possible exception of power supply and ground leads substantially all wires leading to an ordinary telegraph switchboard are carried through a distributing frame which provides the equipment for making and changing the necessary permanent connections between the switchboard and the various main lines, loops, receiving or transmitting apparatus, anti-induction sets, and the like. In order that the
30 cable connections between the distributing frame and the switchboard may be as short as possible, it is usual to mount the distributing frame directly behind the switchboard. The distributing
35 frame may be composed of two sides known as the horizontal side and the vertical side. All of the incoming line wires, outside loops and other conductors coming from the outside of the office terminate at one side of a number of terminal blocks disposed on the vertical side of
40 the frame. The horizontal side of the frame also comprises a number of terminal blocks arranged in horizontal rows to one side of which blocks all of the connections from the switchboard pin jacks terminate. The lugs on the opposite sides of the terminal blocks on the horizontal and vertical sides of the frame are connected together by jumpers or cross connecting wires.

The connections of the incoming lines to the
50 terminal blocks on the vertical side of the frame and the connections between the switchboard and the terminal blocks on the horizontal side of the frame are usually of a substantial permanent nature and changes in the wire assignments are ordinarily made by changing the sol-

dered cross connections between the blocks on the vertical and horizontal sides of the distributing frame.

The present invention is concerned with the terminal block for use on the distributing frame
60 of a switchboard assembly, one of the objects being to provide a terminal block having a large number of terminals disposed within restricted dimensions, in which the individual terminals are spaced a substantial distance apart. 65

A further object is to provide a construction having an individual fanning opening for each conductor terminating at the block.

A still further object is to produce a terminal block having a large number of soldering lugs
70 disposed in a plurality of rows in which all of the lugs are readily accessible for making the soldered connections thereto.

Other objects are to provide a novel means for securely locking the terminal lugs in position in the block, to provide a convenient and readily visible index on the block for the terminal connections and to provide a protective cover for the block arranged to permit quick access to one side of the terminal lugs without the necessity
80 of removing the cover from the terminal block.

Other objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings.

In accordance with our invention we provide a
85 plurality of rows of terminal strips, the rows extending longitudinally of the block and being superimposed one above the other. The terminal strips extend transversely of the block and each strip is provided with a soldering lug at each
90 end thereof, the corresponding strips of each row being in alignment one over the other and the soldered lugs of each successive row being offset in opposite directions from the mid-portion thereof. The offsetting of the lugs serves
95 to lock the strips in the insulating portions of the block and staggers the lugs of the adjacent rows so as to render the individual lugs more readily accessible for making the connections thereto. 100

Each pair of rows of the terminal strips are shorter than the preceding pair and are pyramided with respect thereto, thus separating the terminal lugs in such manner as to permit a separate fanning opening to be provided for each
105 lug.

A cover of substantially semi-cylindrical shape is provided for the terminal block assembly, the cover being formed in two sections, one section being fixedly secured over the lugs of one side of 110

the block and the other section sliding upon the fixed section so as to cover or uncover the lugs on the opposite side of the block, thus permitting ready access to the lugs for making or changing the soldered connections.

The terminal blocks may be arranged on the horizontal and vertical side of the distributing frame in such manner that the switchboard and incoming line connections are made to the lugs on the side of the blocks beneath the fixed portion of the cover, since these connections seldom require changing, and the cross connections between the horizontal and vertical sides of the frame, by which changes are ordinarily made in the permanent assignments of the lines, are secured to the lugs on the side of the terminal block beneath the movable portion of the cover. The cover is secured to the block, however, in such manner as to be quickly and readily removable in its entirety should it be necessary to make changes in the connections from the switchboard or from the incoming lines.

The cover serves to eliminate the possibility of the lugs being accidentally bridged, as by the dropping or setting of a metallic tool or object on the blocks and serves as a protection against the accumulation of dirt and foreign material on and between the soldered connections.

In order that the invention may be more fully understood reference will be had to the accompanying drawings in which:

Figure 1 is an elevation of the block with the cover partially cut away to show the arrangement of the terminal lugs;

Figure 2 is an elevation of the terminal block with the cover entirely removed and the successive terminal strip retaining members partially cut away;

Figure 3 is an end view of the block with the movable cover in closed position;

Figure 4 is a sectional view on the line 4—4 of Figure 1, showing the movable portion of the cover in open position;

Figure 5 is a side elevation of the block as viewed from the top in Figure 4;

Figure 6 is a central section on the line 6—6 of Figure 1, with the cover removed;

Figure 7 is an interior view of the cover as viewed from the line 7—7 of Figure 4, the terminal strip assembly being removed; and

Figure 8 is a detailed sectional view on the line 8—8 of Figure 4.

Referring first to Figure 1 and 3 it will be seen that the terminal block comprises four rows of terminal strips 10, 11, 12 and 13, the strips extending through transverse slots 14 in the various insulating members and having their ends offset at each side of the slots, as at 15. Each strip terminates at each end in a soldering lug 16. The terminal block assembly comprises a pair of wide insulating terminal strip retaining members 18 and 19 separated by an insulating spacer 20, and a pair of narrow insulating terminal strip retaining members 21 and 22 separated by an insulating spacer 23. The assembly is mounted upon an insulating base 24 by means of clamping bolts 25 extending through the various retaining and spacing members.

Each terminal strip retainer is provided with a plurality of the transverse parallel slots 14, opening towards the spacers 20 and 23 and the slots of each row are in vertical alignment, as viewed in Figures 5 and 6. The soldering lugs 16 of each terminal strip, of rows 10 and 12, are offset to the right of the slots in the retaining members 18 and

21 and the lugs of the rows 11 and 13 are offset to the left of the slots in their respective retaining members, thus securely locking the strips against movement in the slots and positioning the lugs of each succeeding row in staggered relation. The lugs 16 also diverge away from the base 24 and from the exposed face of retaining member 19 so as to increase the spacing between these members and the ends of the lugs. The lugs are, therefore, rendered more accessible for making the soldered connections thereto.

The positioning of the corresponding strips of rows 10 and 11 in vertical alignment provides a relatively wide portion of the retaining members 18 and 19 and the spacer 20 between adjacent terminal strips, through which two rows 26 and 27 of fanning openings are formed to provide an individual opening for each terminal lug of rows 12 and 13. Two rows of fanning openings 28 and 29 are also formed in the base plate 24 beneath the offset ends of the terminal strips of rows 10 and 11. It will be noted that the offsetting of the lugs relative to the body portion of each terminal strip, in addition to locking the strips in their slots, also positions the lugs directly over the fanning openings.

The pyramided construction of the lugs enables individual sets of fanning openings to be provided for the lugs of rows 12 and 13 from those of rows 10 and 11 so that every wire terminating at the block approaches one of the lugs in an individual opening and is thus maintained entirely segregated from every other wire. Accidental contact of the exposed parts of adjacent conductors is thereby eliminated and the connecting of the wires to the terminal lugs is facilitated.

The wide retaining members 18 and 19, it should be noted, are identical in form and interchangeable, merely being reversed relative to the intermediate spacer and the same is true of the narrow retaining members 21 and 22. Likewise the long terminal strips 10 and 11 are identical in form as are the short strips 12 and 13. Therefore, the complete assembly is composed of a relatively few (6) parts of different sizes or construction and these parts are of simple form. The assembly, therefore, is relatively inexpensive to manufacture and easy to assemble. At the same time the staggering and pyramiding of the lugs provides a relatively wide spacing between adjacent lugs and renders each lug readily accessible for making a soldered connection thereto.

In order to reduce the electric leakage between the terminal strips in each vertical row, the spacing members 20 and 23 are extended outward beyond the sides of the retaining members, and the terminal strips are shaped so as to be held out of contact with the extended portion of the spacer. Referring to Figure 4 it will be noted that the end portions of the strips are of less width than the mid-portions, whereby the end portions are held out of contact with the spacer and the leakage path between adjacent terminal lugs in each vertical row, as for instance, lugs 10 and 11 of Figure 4, extend from a point within the slots 14 of the retaining members, around the projecting portion of the spacer to a point within the slots immediately above. The thickness and extent of projection of the spacer beyond the retaining members is such as to provide a leakage path between the adjacent lugs in each vertical row substantially equal to the leakage path between the adjacent lugs in each horizontal row.

In order to facilitate the connecting of the

various conductors to the correct lugs and for indexing the connections we have provided a numerical designation 30 for lugs 1, 2, 3 and 4 and each succeeding odd numbered lug, the designations being arranged on the face of the base member 24 and on the retaining member 19, in plain view. The terminal block is also provided with an index strip 31 having spaces within which each circuit connection made to the block may be recorded.

A metallic mounting strip 32, extending lengthwise of the base 24 in a recess therein, serves to secure the terminal block to the bracket or rack 33 of a distributing frame or other support by means of screws 34.

A substantially semi-cylindrical cover 35 extends over the terminal block and protects the lugs from contact with foreign objects. The cover has a fixed arcuate portion 36 covering the lugs on one side of the block and a movable portion 37 arranged to slide on the fixed portion so as to cover or expose the lugs on the opposite side of the block. The fixed portion 36 of the cover terminates over the vertex of the block in a wall 38 extending substantially normally to the retaining member 22 and the cover is secured to the block by a pair of angle brackets 39 having one side welded or otherwise suitably secured to the wall 38 and the other side secured to the retaining member 22, as by machine screws 41. Collars 42 serve to space the heads of the screws 41 adjacent to the cover and thereby render them readily accessible through aligned openings 43 provided in the overlapping portions of the cover. The designation or index strip 31 is supported in contact with the wall portion 38 of the cover by bending the ends of the strip around the ends of the wall portion, as indicated at 43.

A pair of buttons 44 and 45, having enlarged heads are riveted to the fixed portion 36 of the cover near each end thereof in circumferential alignment and cooperate with a pair of circumferential slideways 46 and 47 formed in the movable portions of the cover. The slideways, shown in section in Figure 8, comprise corrugations or beads 48 having arcuate guide plates 49 and 50 secured to the inside thereof, as by welding. The plates 49 and 50 are spaced apart and extend beneath the head portions of the buttons 44 and 45. A portion 52 (see Figure 3) of each of the beads is bent inwardly towards the guide plates at each end of the guideway to limit the movement of the movable cover plate in each direction.

A detent spring 53 secured to the inside of the fixed cover 36 and extending through an opening 54 therein, engages in a depression 55 in the movable cover portion, when in closed position, to retain the same closed.

When the terminal blocks are employed on the distributing frame, the covers are bodily removed from the blocks to permit the connections to be made from the switchboard to one side of the blocks on the horizontal side of the frame and from the incoming lines to one side of the blocks on the vertical side of the frame. These connections are of a substantially permanent nature and when the block is employed in connection with the switchboard construction described in a copending application of W. S. Wood et al, Serial Number 483,650, filed September 22, 1930, and entitled Switchboard, the switchboard connections to the terminal blocks on the horizontal side of the frame may all be made in the shop before the distributing frame and

switchboard assembly is set up in the switchboard room. When these connections have been made the covers may be replaced with the fixed portion thereof covering the lugs connected to the switchboard and to the incoming lines and access to the opposite ends of the lugs of the terminal blocks, for making the cross connections between the horizontal and vertical sides of the frame, may be obtained by merely sliding the covers to open position.

It is obvious, of course, that various changes and modifications may be made in the construction of the terminal block without departing from the invention and, therefore, we do not desire to be limited to the exact details shown and described.

What we claim is:

1. A terminal block comprising a plurality of rows of terminal strips with the corresponding strips of each row in alignment, soldering lugs at each end of said strips, the lugs of each adjacent row being staggered longitudinally of the block, and each adjacent pair of lugs being offset transversely of the block, and an insulating support for said strips, having individual fanning openings, disposed in alignment with each of said lugs.

2. A terminal block comprising an insulating base, a plurality of insulating terminal strip retaining members mounted on said base one above the other, a plurality of terminal strips carried by each of said retaining members, said base and certain of said retaining members being perforated to provide individual fanning openings for each of said strips.

3. A terminal block comprising an insulating base, a wide insulating retaining member mounted on said base, a plurality of long terminal strips extending transversely through said retaining member, a narrow retaining member mounted above said wide retaining member, a plurality of short terminal strips extending transversely through said narrow retaining member, said base and wide retaining member having openings therethru providing individual fanning openings for each end of each of said strips.

4. A terminal block comprising an insulating base, a pair of wide insulating retaining members mounted on said base, and a pair of narrow insulating retaining members mounted on said wide retaining members, a row of long terminal strips extending transversely of each of said wide retaining members, and a row of short terminal strips extending transversely through each of said narrow retaining members, the ends of said long terminal strips being staggered with respect to each other, and the ends of said short terminal strips being staggered with respect to each other.

5. A terminal block comprising an insulating base, a pair of wide insulating retaining members mounted on said base, and a pair of narrow insulating retaining members mounted on said wide retaining members, a row of long terminal strips extending transversely of each of said wide retaining members, and a row of short terminal strips extending transversely through each of said narrow retaining members, the ends of said long terminal strips being staggered with respect to each other, and the ends of said short terminal strips being staggered with respect to each other, said base and wide insulating members having fanning openings therein individual to each end of each of said terminal strips.

6. A terminal block comprising an insulating terminal strip retaining means having a plurality

- of rows of transverse openings, terminal strips disposed in said openings and having their ends protruding therefrom and offset to one side of the openings, whereby the strips are locked in the openings, the ends of the strips of adjacent rows being offset in opposite directions.
7. A terminal block comprising a plurality of insulating retaining members of decreasing widths arranged one above the other in pyramidal form, terminal strips extending through said retaining members, and a substantially semi-cylindrical cover disposed over said retaining members and terminal strips.
8. A terminal block comprising an insulating terminal strip retaining member, a plurality of terminal strips carried thereby and extending outwardly from each side thereof, and a cover for said block comprising a fixed portion covering one end of said strips, and a movable portion adapted to be moved to either cover or expose the opposite ends of said strips.
9. A terminal block comprising an insulating terminal strip retaining member, a plurality of terminal strips carried thereby and extending outwardly from each side thereof, and a cover for said block comprising a fixed portion covering one end of said strips, and a movable portion arranged to slide upon said fixed portion to either cover or expose the opposite ends of said strips.
10. A terminal block comprising a plurality of insulating retaining members of decreasing widths arranged one above the other in pyramidal form, terminal strips extending through said retaining members and projecting outwardly from each side thereof, a substantially semi-cylindrical cover disposed over said retaining members and terminal strips, said cover having a fixed arcuate portion covering one end of said strips, and a movable arcuate portion sliding upon the fixed portion to either cover or expose the opposite ends of said strips.
11. A terminal block comprising a plurality of rows of terminal strips disposed one above the other, insulating means for supporting said strips, said block having fanning openings extending through one side thereof, and a removable cover extending over the remaining sides of said block and enclosing said terminal strips.
12. A terminal block comprising a plurality of rows of terminal strips disposed one above the other, insulating means for supporting said strips, designating characters on said insulating means disposed adjacent the ends of said strips, and a designation strip extending longitudinally of said block.
13. In combination, a terminal block of substantially pyramidal form having a plurality of rows of terminal strips extending therethrough, said block having individual fanning openings for each end of each of said strips, and a substantially semi-cylindrical cover supported by said block and extending over said terminal strips.
14. A terminal block comprising a pair of insulating terminal strip retaining members, an insulating spacing member therebetween, and a plurality of terminal strips extending through each of said retaining members and projecting outwardly therefrom, said spacing members extending beyond the sides of said retaining members between said terminal strips and out of contact therewith.
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