

March 2, 1948.

O. J. J. BRACKE

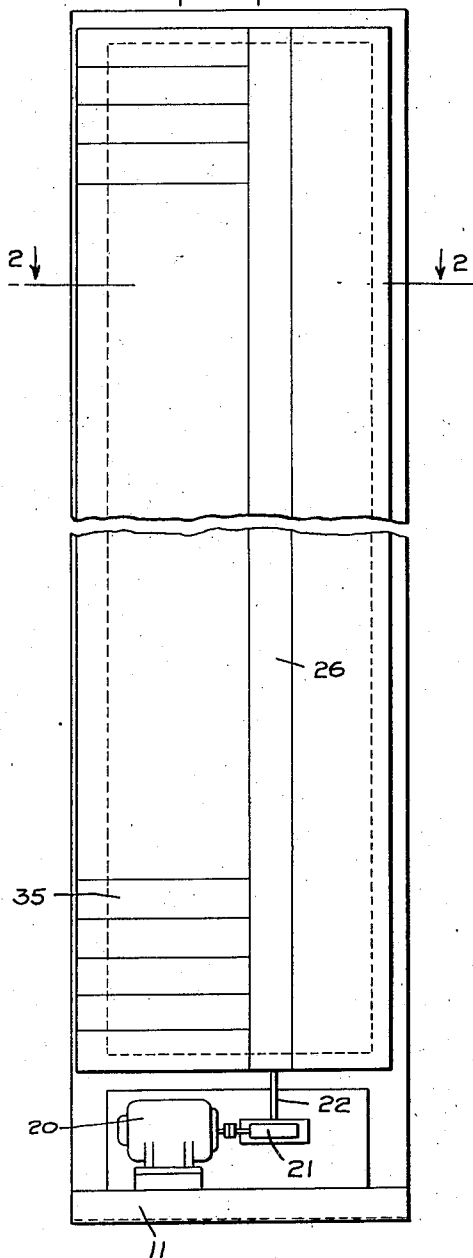
2,436,786

SELECTOR SWITCH MOUNTING FOR TELECOMMUNICATION SYSTEMS

Filed March 1, 1943

2 Sheets-Sheet 1

FIG. 1.



INVENTOR

OSCAR J. J. BRACKE

BY

Edward W. Hines
ATTORNEY

March 2, 1948.

O. J. J. BRACKE

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2 Sheets-Sheet 2

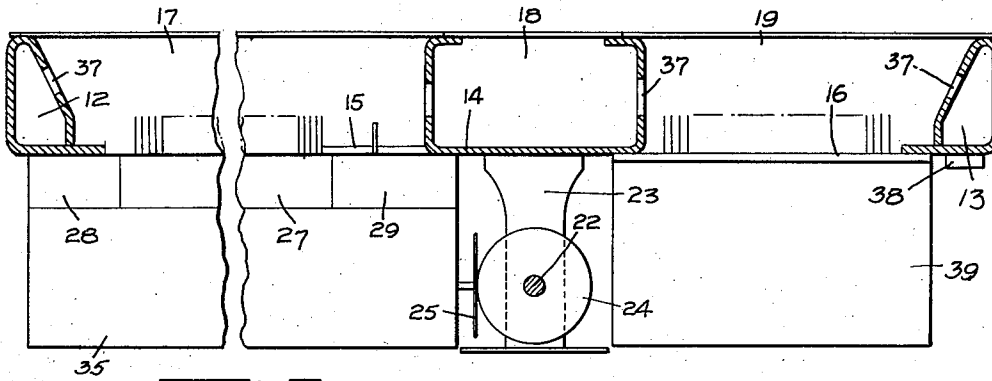


FIG. 2.

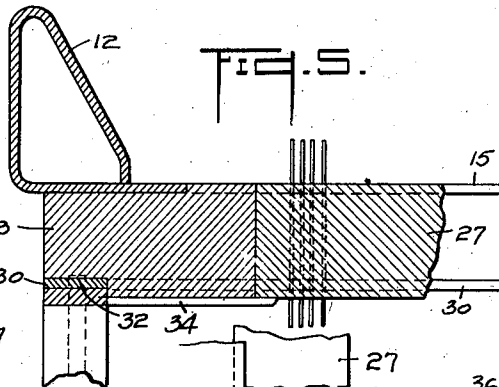


FIG. 5.

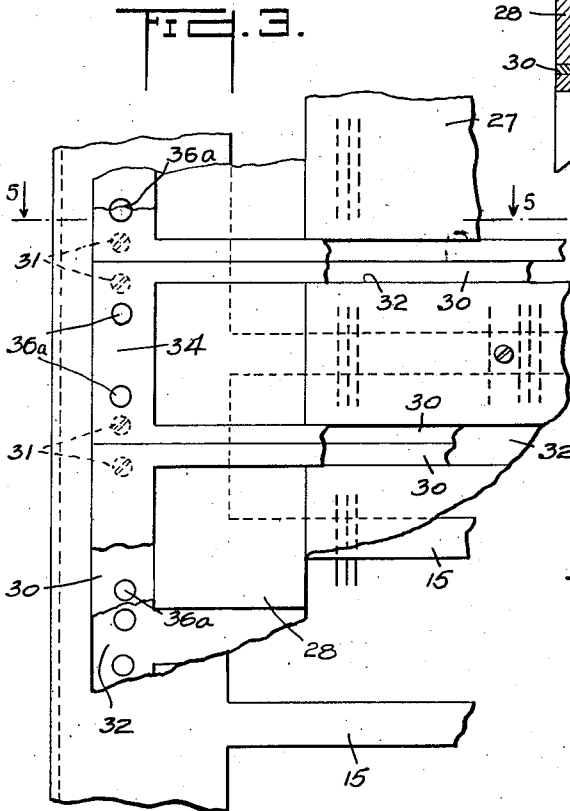


FIG. 3.

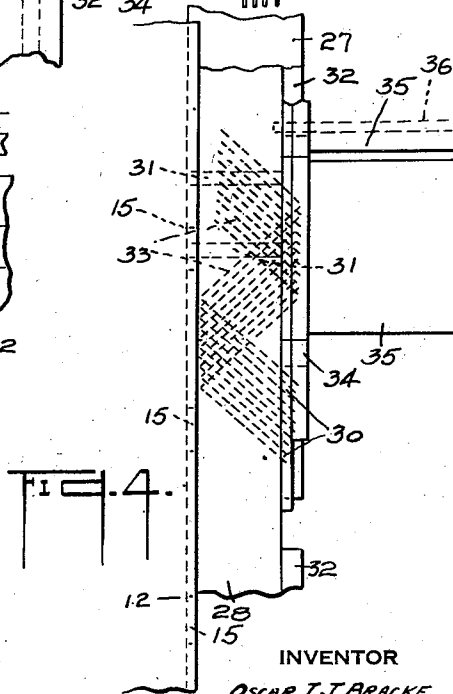


FIG. 4.

INVENTOR
OSCAR J. J. BRACKE

BY
Edward W. Kinney
ATTORNEY

UNITED STATES PATENT OFFICE

2,436,786

SELECTOR SWITCH MOUNTING FOR TELE-COMMUNICATION SYSTEMS

Oscar J. J. Bracke, Antwerp, Belgium, assignor to
International Standard Electric Corporation,
New York, N. Y., a corporation of Delaware

Application March 1, 1943, Serial No. 477,645
In Great Britain June 20, 1939

7 Claims. (Cl. 179-27.5)

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This invention relates to a combined selector switch and relay bay for automatic telephone systems and to the mountings of groups of switches in such bay.

In an automatic telephone system questions of the physical lay-out of equipment, such as the amount of floor space occupied, the ceiling height necessary, and accessibility for replacement, are of considerable importance; and it is an object of the present invention to provide switches and mountings for groups of switches which shall offer improvements in these and similar respects.

The nature of the invention will be understood from a description of one of its embodiments, reference being made for this purpose to the accompanying diagrammatic drawings, in which:

Fig. 1 is a front view of a combined switch and relay bay in accordance with this invention;

Fig. 2 is a horizontal section, on a larger scale, on the line 2—2 of Fig. 1;

Fig. 3 is a front view on a still further enlarged scale and with parts broken away, showing the mounting of the multiple contact banks;

Fig. 4 is a side view of the parts shown in Fig. 3; and

Fig. 5 is a horizontal section on the line 5—5 of Fig. 3.

The combined switch and relay bay shown in the drawing has a framework of sheet iron folded and welded, comprising a base 11, uprights 12 and 13 of triangular section, and a central upright 14 of channel iron.

In Fig. 1 the switch bay is on the left and the relay bay on the right with the vertical driving shaft arranged between the two. The left hand upright 12 and the central upright 14 are spanned by horizontal switch-supporting bars 15 welded to the uprights at their ends; while the central upright 14 and the right hand upright 13 are joined by a relay-mounting plate 16, which may be in two or more sections. At the rear there are provided three enclosed compartments, i. e. a switch terminal compartment 17, a cable (outside cables) compartment 18 and a relay-wiring compartment 19. At the bottom of the combined bay is located the switch motor 20, individual to each bay. Attached to the motor is the necessary reduction gear 21. Under the relay bay are the motor fuses and motor starting equipment. The motor 20 drives the vertical shaft 22 which can be selectively clutched to any individual switch shaft to cause movement of the switch brushes (not shown) through a precise range determined by the duration of the clutch-engagement.

As separate terminal strips are not required, the bay with all outside cabling can be easily located in a room having a minimum ceiling height. The vertical shaft 22 is supported by ball bearings (not shown) which in turn are attached to brackets 23 welded to the central upright 14. Up the shaft 22 on a level with each switch is a drive gear 24 which meshes with a flexible gear 25 individual to the switch when the switch is to be driven. The driving gears 24 are diecast and split so that they may be fixed in any position at any time, thus making it unnecessary to provide a full equipment of drives for a partial equipment of switches. It is evident that the two halves of the gear must come tightly together so that the gears may mesh properly; but this may not be possible if the two parts come into a tight grip with the shaft. Accordingly pads of rubber (not shown), or other suitable material which can be heavily compressed, may be provided between the shaft 22 and the inner surfaces of the central hole in the gear 24. A removable guard 26 is placed in front of the drives.

The switches are made in two separate parts, namely the contact bank and the brush carriage assembly. In a group of switches fulfilling the same function the corresponding contacts in all the individual switch banks are multiplied together and connected to one outlet. It has been proposed to form the set of corresponding contacts for a number of similar switches as an integral metal strip, a number of such strips being assembled together in a molding form to form a unitary element which constitutes the bank of all the switches. The present invention makes use of this principle as will be apparent from what follows. Thus the multi-switch unitary contact-bank is made a semi-permanent fixture in the bay, whilst a separate brush-carriage assembly for each switch is simply plugged into position.

Referring now to Figs. 3 to 5, it will be seen that the molding multiple bank molding 27 is easily placed in position on the bay, transverse grooves on the back of the molding fitting over the horizontal bars 15 of the framework. The molding 27 is placed in the central part of the switch bay; to the right and to the left are placed end blocks 28 and 29, likewise engaging the bars 15, so as to extend the width of the banks to that of the switch bay. The block 28 at the left may be a dummy block. The block 29 at the right may contain for instance the jacks for the plug-in contacts on the switch for the feeder wires and the clutch magnet. The latter block

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will also mount such local contacts as may be necessary.

The multiple bank molding 27, together with the blocks 28 and 29 that flank it, is held in place from the front by means of iron strips or frames 30 through which pass screws 31 into the frame upright 12. The frames 30 fit into grooves 32 in the front of the molding 27 and blocks 28 and 29, and they include cross pieces like the bars 15 which are, however, vertically staggered with respect to the latter because the contact multiple strips are of expanded metal, and therefore, as indicated at 33 in Fig. 4, the contact-projections from one side of the bank are at different levels from the terminal projections on the other side.

Above each fixing frame 30 is a correspondingly shaped dust gasket 34 and against this gasket is clamped the "plug-in" brush-carriage-assembly including the clutch, the cover thereof being indicated at 35 and the fixing screws at 36. Of these screws there are four for each switch, passing through the gaskets 34 and frames 30 into threaded bores 36a in the blocks 28, 29, and they are of such a design that the brush-carriage-assembly can be released merely by a quarter or half-turn.

The assembly includes a shockless clutch (not shown) and is capable of being plugged in or out without disturbing any part other than the four holding screws. It is particularly important that the flexible gear 25 shall not be touched or disturbed during this operation. The whole construction is such that, when the "plug-in" brush carriage assembly is secured in position, the meshing of the vertical and horizontal gears is correct. No adjustment after mounting is necessary. The plug-in contacts are simple and reliable, and provision is made for the maximum number of contacts, including for instance 10 for the feeder wires and 2 for the clutch magnet. Preferably all plug-in contacts and jacks are at that end of the switch next to the drive. The clutch assembly may include the entire spark quencher, with the coil and condenser.

As already mentioned, the multiple terminal bank consists of expanded strips of drawn metal molded into a solid block, thus eliminating ribbon cabling. A maximum of ten multiples of the same switch terminals of 8 or 10 terminals each appear vertically arranged on the front face. At the rear the soldering terminals for each multiple are brought out once every three switches, the first, second, third vertical rows etc., appearing behind the first, second and third switches, etc. The entire multiple bank is molded in three sections of 17 vertical multiples each, thus one complete molded bank has a maximum capacity for 10 switches of 100 x 4 or 100 x 5 points and at the rear each multiple is brought out three times. One set of soldering terminals is spread out over 3 switch spaces and congestion is avoided.

The bank multiple strips are of brass, punched out of drawn stock. The contacting edges are drawn round and not milled. The rubbing surface of the spring shoe contacts of the brush carriage (not shown) is silver, sufficient silver being rubbed off these shoes so as to ensure a non-microphonic talking contact. Each brush has two independently sprung shoes so that the movement of one does not affect the other. The brushes are pretensioned and suitably formed so that the work of replacing a set of shoes will be merely that of picking out the old shoes and replacing them by new shoes. The molded support

for the shoes will be held in position by two pins with keyhole washers or their equivalent.

The three uprights 12, 13 and 14 are perforated as at 37 so that the cable forms and wiring may pass easily from one compartment to the other with simple wiring. The right-hand upright 13 supports one fuse 38 per circuit and the inside of the folded and welded triangle is available through perforations for threading the power, tone, motor and other similar wires.

The relays, of which one of the covers is indicated at 39 are placed in the most convenient manner opposite the associated switches or groups of switches; for example, the line and cut-off relays will be connected to the nearest adjacent bank terminals by short horizontal forms with such short vertical runs as are unavoidable. No larger common cable forms are necessary.

Thus it will be seen that the entire front of the molded bank is available for switches and that the entire rear is available for wiring, cabling, cross-connecting and other purposes for which separate robust terminals are usually necessary. The plan eliminates completely a separate ribbon cable, and separate terminal strips and provides for a moisture-proof type of construction.

I claim:

1. A selector switch bay and mounting comprising three spaced apart hollow uprights disposed between a vertical front plane and a vertical rear plane both being tangential to all said uprights and extending parallel to each other, transverse vertically spaced cross bars extending substantially in said front plane and connecting one of the two outer uprights with the central upright, a relay mounting plate disposed substantially in said front plane and connecting the other outer upright with the central upright, a plurality of vertically spaced brackets projecting forwardly from said central upright at right angles to said front plane, a vertical drive shaft carried by said bracket, vertically spaced gear wheels on said drive shaft, a multiple bank switch molding containing a plurality of superposed contact banks, said molding having contact projections on its front face and being provided on its back face with horizontal rows of terminal projections alternating with transverse grooves fitting over said cross bars, means to secure said molding without interference with the accessibility of said contact projections firmly to said first outer and central uprights, and means removably secured to said molding and adapted to carry for each contact bank a sliding brush and drive mechanism therefor, the latter including a flexible gear capable of meshing with one of the gears on said drive shaft.

2. A switch bay and mounting, as claimed in claim 1, in which said two outer uprights have triangular cross-sections and said central upright is a rearwardly open channel iron.

3. A switch bay and mounting, as claimed in claim 1, in which said means to secure said molding to said uprights includes sheet metal frames seated in grooves provided in the front face of said molding.

4. A switch bay and mounting, as claimed in claim 1, in which said contact projections are arranged in horizontal rows, and said means to secure said molding to said uprights includes sheet metal frames seated in grooves provided in the front face of said molding, said frames comprising transverse bars extending across the front of said molding and being vertically staggered

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with respect to the cross bars received in the transverse grooves on the back of the molding.

5. A switch bay and mounting, as claimed in claim 1, in which said brush carrying means comprises for each contact bank a separate removable cover to accommodate the brush and its drive mechanism.

6. A switch bay and mounting, as claimed in claim 1, in which said means to secure said molding to said upright includes, for each contact bank, a sheet metal frame seated in grooves provided in the front face of said molding, said

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brush carrying means comprises for each contact bank a separate cover supported with its edge upon the corresponding sheet metal frame and removably secured to the latter and to the molding underneath the frame, and a gasket of a shape corresponding substantially to that of the frame interposed between each frame and cover.

7. A switch bay and mounting, as claimed in claim 1, in which all wiring and cable connections are arranged rearwardly of said front plane in the spaces between and inside of said uprights.

OSCAR J. J. BRACKE.