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2,848,568

VARIABLE CIRCUIT CONSTRUCTION DEVICES AND SWITCHES THEREFOR

Filed March 12, 1956

2 Sheets-Sheet 1

FIG. 1.

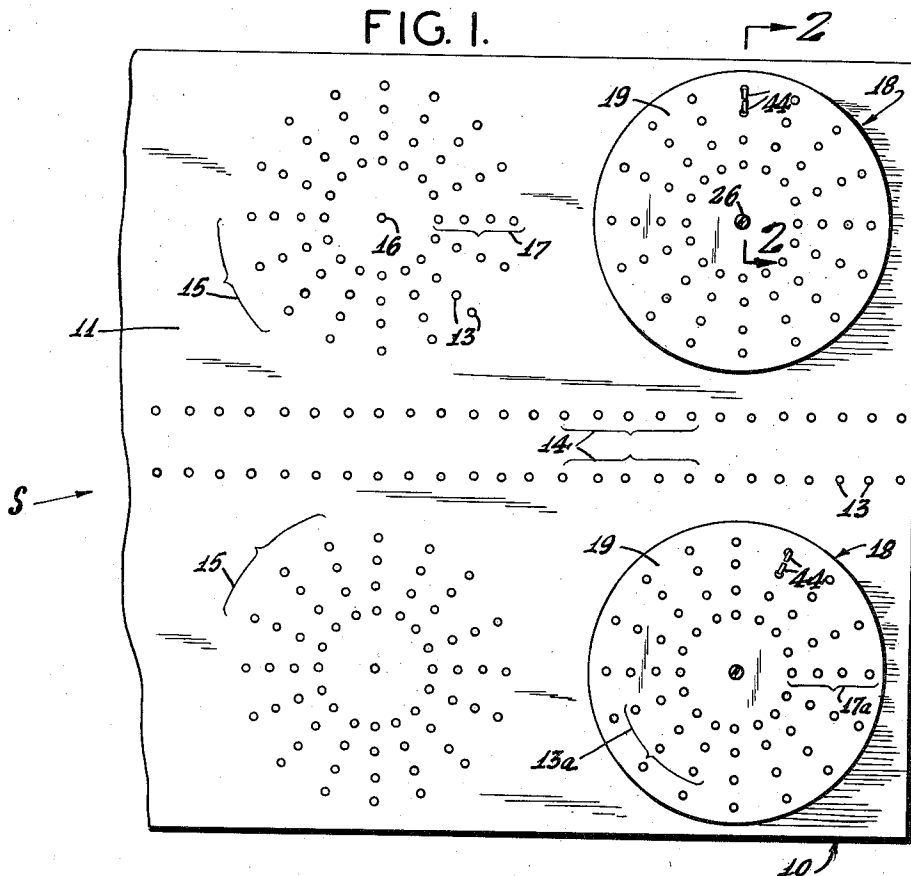


FIG. 2.

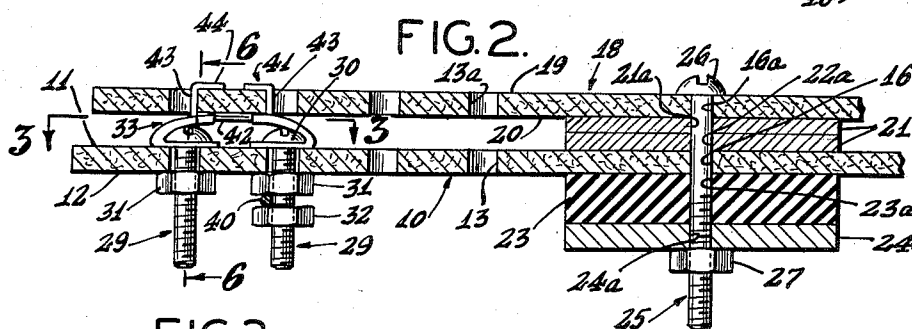
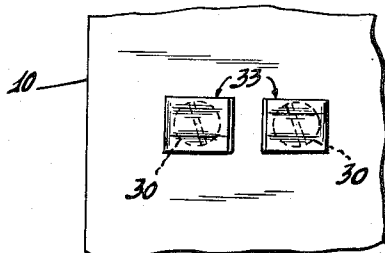


FIG. 3.



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FIG. 4.

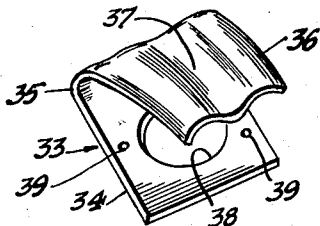


FIG. 5.

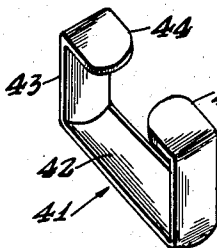


FIG. 6.

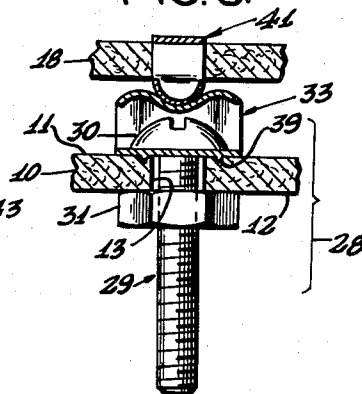


FIG. 7.

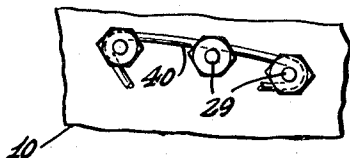


FIG. 8.

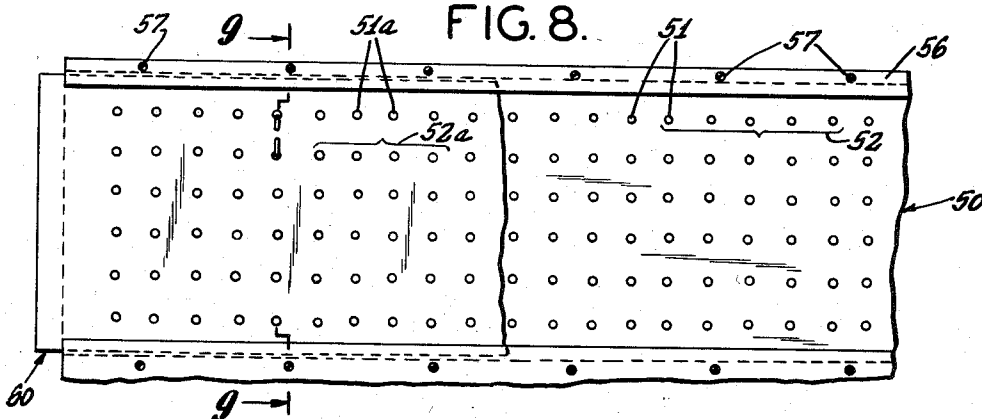
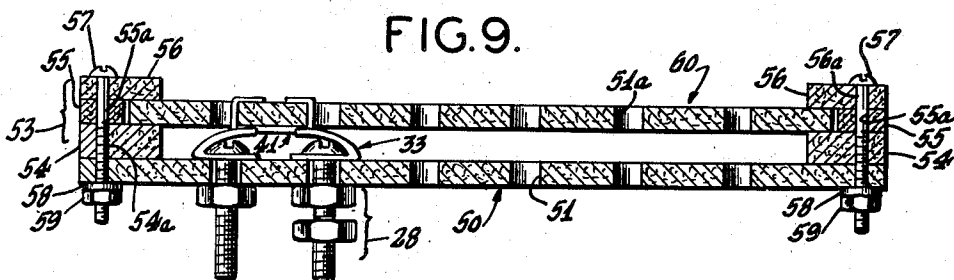


FIG. 9.



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VARIABLE CIRCUIT CONSTRUCTION DEVICES
AND SWITCHES THEREFOR

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Application March 12, 1956, Serial No. 571,001

16 Claims. (Cl. 200—11)

This invention relates to variable circuit construction devices and switches therefor.

An object of this invention is to provide a highly improved device of the character described that may be issued in kit form and capable of being disassembled and reconstructed to form many different circuits.

Another object of this invention is to provide a perforated master panel board on which may be movably mounted one or more switch panels as desired.

Still another object of this invention is to provide improved circuit connectors which may be re-arranged at will and which will provide a good and secure contact with each other, and an improved and simplified switch panel mounting means.

Yet another object of this invention is to provide in a device of the character described, a terminal having an arm attachable to a panel, and a spring arm transversely corrugated, forming a channel so that a jumper on the second panel parallel to the first panel may snap into the channel to make a good connection which will not easily or accidentally disconnect.

The invention accordingly consists of the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the construction hereinafter described and of which the scope of invention will be indicated in the following claims.

In the accompanying drawings in which is shown various illustrative embodiments of this invention,

Fig. 1 is a front plan view of the master panel board partly cut away, bearing two circular switch panels and provided with circuit and switch means embodying the invention;

Fig. 2 is a partly cut away enlarged cross-sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a partly cut away plan view taken on the line 3—3 of Fig. 2;

Fig. 4 is a perspective view of an improved brush contact embodying the invention;

Fig. 5 is a perspective view of a jumper contact used in the present embodiment of the invention;

Fig. 6 is a cross-sectional view taken on the line 6—6 of Fig. 2;

Fig. 7 is a plan view of a portion of the backside of the master panel showing the connection of three terminals;

Fig. 8 is a top plan view of a second possible embodiment of the invention showing a master panel with slide type switch panel; and

Fig. 9 is a cross-sectional view taken on the line 9—9 of Fig. 8.

Referring now in detail to the drawings, Fig. 1 illustrates a device S embodying the invention and comprising a master panel board 10 of insulating material. Board 10 may be rectangular in shape and has a top surface 11 and a bottom surface 12. The master panel board 10 is formed with a plurality of circular openings 13. There are rows of openings 14 running longitudinally across the center of the board, and a number of sets of

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concentric circles 15 of openings. Each set of openings has a central opening 16 and comprises a number of radially extending rows 17 of holes which constitute circles 15. In the illustration there are sixteen radial rows of four holes each in each set.

To the master panel are attached a number of switch panels 18, likewise of insulating material. The switch panels 18 are circular in shape slightly larger than the sets of circles 15. They are formed with a top surface 19 and a bottom surface 20. Each circular switch panel is formed with a set or pattern of circular openings 13a similar to the pattern 15 of openings 13 in the master panel 10 and corresponding thereto in position. Both the master panel and the switch panels are formed of non-conductive material. Any number of switch panels may be used as accommodated by the master switch panel and when used are attached as follows:

A panel switch is placed directly over a circular pattern 15 of holes with the corresponding center hole 16a aligned with the hole 16 of the pattern. A plurality of washers 21, formed with center holes 21a and 22a, respectively, are sandwiched between the switch panel and the master panel plate. A rubber washer 23 formed with central opening 23a and a retaining washer 24 formed with central opening 24a, are placed below the master panel plate with all central holes in alignment. A bolt 25 having a head 26, is inserted through the openings 16a, 21a, 16, 23a and 24a. A nut 27 is screwed onto the bolt. The head 26 of the bolt holds the switch plate down and the nut 27 secures the retaining washer 24. The switch plate is now firmly secured to the master panel and is rotatable about the bolt 25. It is secured firmly but not rigidly through the action of the rubber washer 23 which may be of a soft foam-type of rubber and the switch plate is rotated. The rows 17 and 17a of holes 13 will come to overlie each other and pass out of alignment with each other as panel 18 is rotated. The purpose of this action will become apparent.

To the master panel are secured a number of brush terminals 28. Each brush terminal consists of a bolt 29 having a head 30 thereon passing through any of the holes 13, a securing nut 31 screwed on below panel 10, a fastening nut 32 screwed below nut 31, and a wiper brush 33 secured to the top surface 11 of master panel 10 by the head 30 of bolt 29. Each wiper brush is formed of a strip of resilient sheet metal which may be plated brass and having a lower arm member 34 curved at one end 35 and bent back to form an overhead spring arm 36 which is corrugated and has a central channel 37. The lower arm 34 is formed with a central opening 38. Adjacent the hole 38 are a pair of embossed prongs 39 extending downwardly from the arm 34. A brush is attached by means of the bolt 29 passing through opening 38 and nut 31, to the master panel plate 10. The prongs 39 stick into the top surface 11 of the panel 10 and secure the wiper brush against rotation about the bolt 29. The prongs are embossed close enough to the opening 38 so that the head 30 of the bolt when extending outside the opening 38 and over the arm 34 will overlie the prongs 39 and press them downwardly into the material of panel 10. The brush terminals 28 may be attached to the master panel 10 in pairs with the channels 37 facing each other and with the curved portions 35 opposed. The terminals are attached to any adjacent pair of openings 13 in any row 17 of any pattern 15.

Many different circuits may be determined by placing and wiring of the brush terminals 28. A short length of wire 40, as seen in Fig. 7, may be wrapped around two, or as in the case illustrated, three or more terminal bolts 29 and fastened down securely with the fastening nuts 32. The wire is held between nuts 31 and 32 and should be wrapped around the terminal posts 29. Bare or in-

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sulated wire may be used. The wires 40 may also be led to any other terminal brush on any switch assembly and eventually to a source of electricity such as a battery, or signalling device such as a lamp bulb, or any other suitable electric device. The rows 14 of holes 13 are provided for the central location of lamp sockets which are not illustrated. It may be seen in the illustration that when the wiper brushes 33 are attached to bolts 29, the upper arm 36 overlies the bolt head 30. When the brush terminals are attached in pairs as described, they form the two terminals of a switch and in use are connected in the following manner.

A jumper 41 formed of an elongated strip of metal having an outwardly and downwardly curved central portion 42 and upstanding flat side arm 43 at each end of the portion 42 and an inwardly facing tab 44 at the top end of each side arm 43. The jumpers 41 are clipped to the circular switch plates 18 by passing the tabs 44 and arms 43 through a pair of adjacent holes 13a and bending the tabs down over the top surface 19 of plate 18 so that the curved surface 42 extends downwardly from the lower surface 20 of plate 18. In order to connect a pair of wiper brushes 33, a jumper is placed in a corresponding pair of holes in the plate 18 overlying the holes 13 in plate 10 having the brush terminals. As the switch plate is rotated about its axis, the jumpers will come in contact with a pair of brushes 33 and slip over the corrugation and snap into the channel 37. The upper arm 36 of the brushes overlies the head 30 of the bolt 29 but does not press thereupon. The brush is preferably made of resilient metal and will bend down slightly as the curved portion 42 of the jumper presses against it, and then snap upwardly again as the channel 37 surrounds the curved portion 42 of the jumper 41. The jumpers are placed in the circular switch plate strategically according to the circuit desired. When the switch plate is rotated, the jumpers will snap firmly in and out of the channels in the brush terminal connecting and disconnecting the pairs of brush terminals closing and open circuits according to the placement and wiring of the various parts.

A second embodiment of the invention is seen in Figs. 8 and 9 wherein a rectangular master panel 50 is drilled or otherwise formed with holes 51 arranged in longitudinal rows 52. Arranged across the top surface of panel 50 are slide channels 53. The slide channels are formed with a wide strip of non-conducting material 54 formed with a number of spaced openings 54a, a narrower strip 55 of non-conductive material formed with corresponding longitudinally spaced openings 55a, and a top strip of elongated non-conductive material 56 equal in width to strip 54 and formed with corresponding openings 56a. The strips 54, 55, 56 overlie each other. A number of vertical bolts 57 pass through the openings in the strips and are secured below panel 50 by washers 58 and nuts 59.

Located between each pair of channel strips is a switch slide plate or panel 60 formed with longitudinal rows 52a of openings 51a. Each side of the switch slide panel 60 extends between a pair of strips 54 and 56 and loosely abuts a strip 55. The switch panel therefore may be slid along the length of the master panel 50 on the channel strips 53.

Brush terminals 28 and jumpers 41 may be arranged with the brush terminals attached to the panel 51 and the jumpers attached to the slide panel 60 to form any circuit desired. Progressive switching may be accomplished with a device of this form of the invention leaving any desired section of the circuit disconnected, whereas with the device illustrated in Figs. 1 to 7, each sixteenth turn of the switch plate may form a separate circuit.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved

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and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A perforated panel, a second perforated panel, means for movably mounting said second perforated panel in spaced parallel relation to the first panel, said first and second panels being formed with equally spaced rows of aligned openings, a switch wiper, means extending through an opening of the first panel for attaching the switch wiper to the first panel, said switch wiper including a spring arm corrugated to form a channel, and a contact member on the second panel, means for attaching said contact member to the second panel and extending through one of the openings in the second panel, the contact member on the second panel having a transversely curved portion adapted to snap into the channel of said spring arm.

2. A master panel, said master panel being perforated in circular patterns of radially outwardly going lines, a circular switch plate, said circular switch plate being perforated in matching pattern to said master panel, said switch plate being rotatably mounted on said master panel at the center of the circular patterns, and means to open and close electrical circuits by rotation of said switch.

3. The combination of claim 2, said means comprising wiper means mounted in said patterns of openings and said master panel and jumper means mounted in said openings on said switch plate for engagement with the wiper means.

4. An electrical contact means comprising a wiper adapted to be secured to a piece of non-conductive material by means of a bolt and being formed of a strip of resilient metal having a flat lower arm, a curved portion at one end thereof, and a curved arm extending from said curved portion, overlying said flat lower arm, said curved arm being transversely corrugated and forming a central channel therein extending longitudinally of said arm, and a pair of longitudinally extending humped portions, one on each of the opposite sides of said channel.

5. The combination of claim 4, said lower arm of said wiper means being formed with a central opening to receive the bolt.

6. The combination of claim 5, a pair of embossed points extending downwardly adjacent said opening in said lower arm.

7. Electrical contact means comprising a pair of electrical terminals having wiper arms extending therefrom and a jumper means to connect said arms, said arms being centrally channeled and said jumper means comprising an elongated downwardly curved strip formed with upstanding end arms and inwardly extending tabs at the ends of said arms, said curved portion of said jumper being received in said channel portions of said wipers.

8. In combination, a panel having an opening, a wiper having an arm contacting one side of the panel and formed with an opening, means extending through the openings in said arm and panel for fastening the wiper to the panel, said wiper having an arm extending from the first arm and overlying the first arm and being transversely corrugated, forming a longitudinal central channel extending longitudinally of said arm, and longitudinal, humped portions on opposite sides of said channel.

9. The combination of claim 8, in combination with a second panel movably mounted on the first panel and formed with an opening, a contact member having a portion extending through the opening in the second panel,

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and being formed with a portion adapted to snap into said channel, the means for mounting the second panel on the first panel comprising means to retain said second panel in spaced parallel relationship to the first panel.

10. In combination, a panel formed with a plurality of equally spaced rows of openings, a second panel formed with similar rows of openings, means to movably mount the first panel on the second panel in spaced relation thereto, the openings in the second panel being adapted to be aligned with the openings in the first panel in various positions of the second panel relative to the first panel, a pair of electric terminals each having an arm contacting the first panel, and a spring arm extending from the first arm, bolts passing through a pair of adjacent openings in the first panel and passing through openings in the first arms of said terminals for attaching said terminals to said first panel, said second arms of said terminals being transversely corrugated and formed with channels, a jumper attached to a pair of adjacent openings of the second panel, said jumper having a transversely curved, elongated portion adapted to snap into said channels in said second arms of said terminals.

11. The combination of claim 10, the first arms of said terminals being formed with prongs engaging the first panel to aid in preventing rotation of said terminals relative to said first panel.

12. In combination, an insulating member, a switch wiper attached thereto and formed with a spring arm transversely corrugated, forming a channel, a secure in-

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insulating member movably mounted in spaced parallel relation to said first insulating member, a switch contact member mounted on the second insulating member and movable into engagement with said spring arm and having a transversely curved portion adapted to snap into said channel.

13. A wiper switch made of a single piece of resilient metal and having an arm, and a second spring arm extending from one end thereof and overlying the first arm and being transversely corrugated, and formed with a central channel extending longitudinally of said arm, and longitudinal, humped portions on opposite sides of said central channel.

14. The combination of claim 13, said first arm having a central opening.

15. The combination of claim 14, said first arm being formed with one or more downwardly extending prongs spaced from said opening.

16. The combination of claim 13 in combination with a switch contact member and means for mounting said contact member for movement transversely of the second spring arm and adapted to snap over one or the other of the humped portions and into said central channel.

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UNITED STATES PATENT OFFICE
Certificate

Patent No. 2,848,568

Patented August 19, 1958

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and
Edward Kahan

The United States District Court for the Southern District of New York, having, pursuant to Title 35, Section 256 of the United States Code, ordered that the above identified United States patent be corrected by adding the name of Oliver Garfield as a joint inventor in the patent, it is this 23rd day of May 1961, certified that the name of the said Oliver Garfield is hereby added to the said patent as a joint inventor with Edmund C. Berkeley and Edward Kahan.

[SEAL]

ARTHUR W. CROCKER,
First Assistant Commissioner of Patents.

UNITED STATES PATENT OFFICE
Certificate

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[SEAL]

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