

April 10, 1962

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3,029,320

SWITCH

Filed Aug. 25, 1958

4 Sheets-Sheet 1

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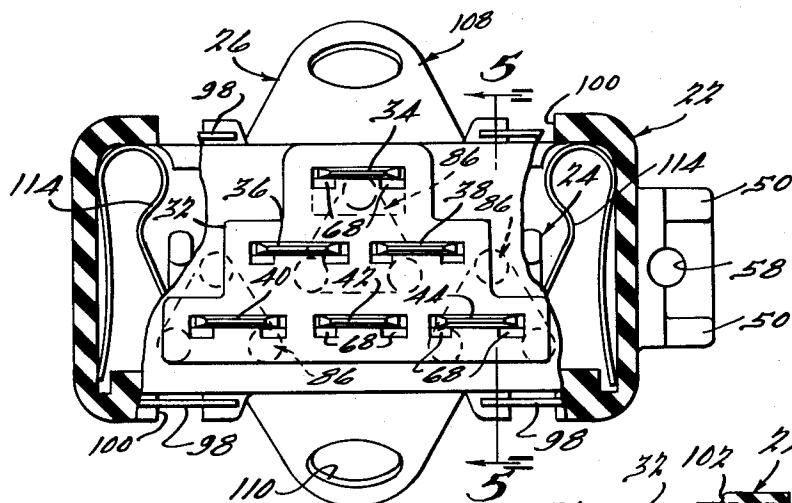
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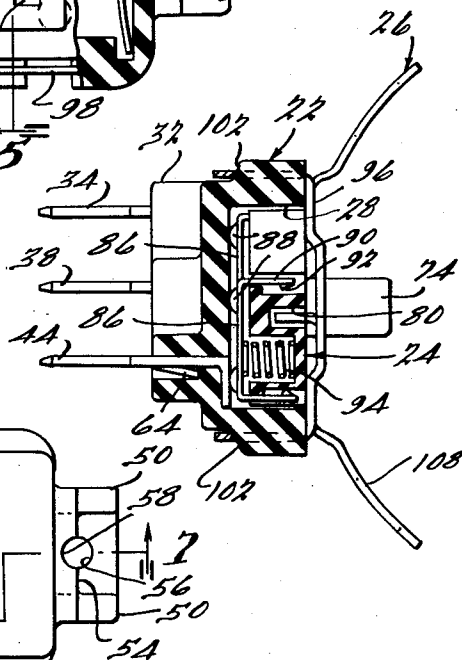
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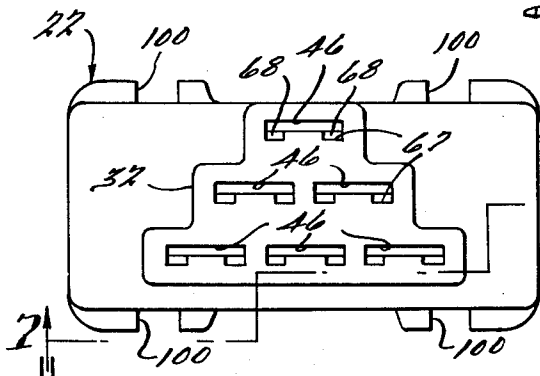
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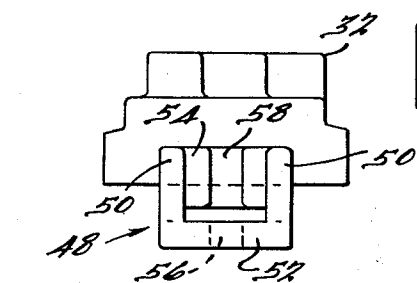
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FILE 5.



F I. E.



File.

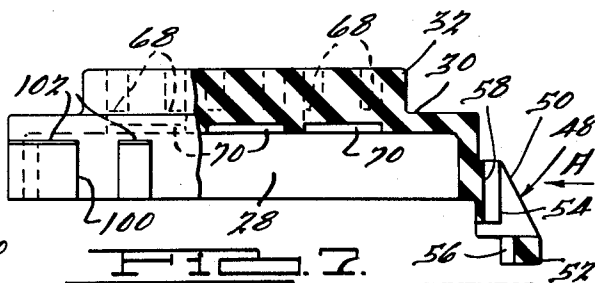


Fig. 2

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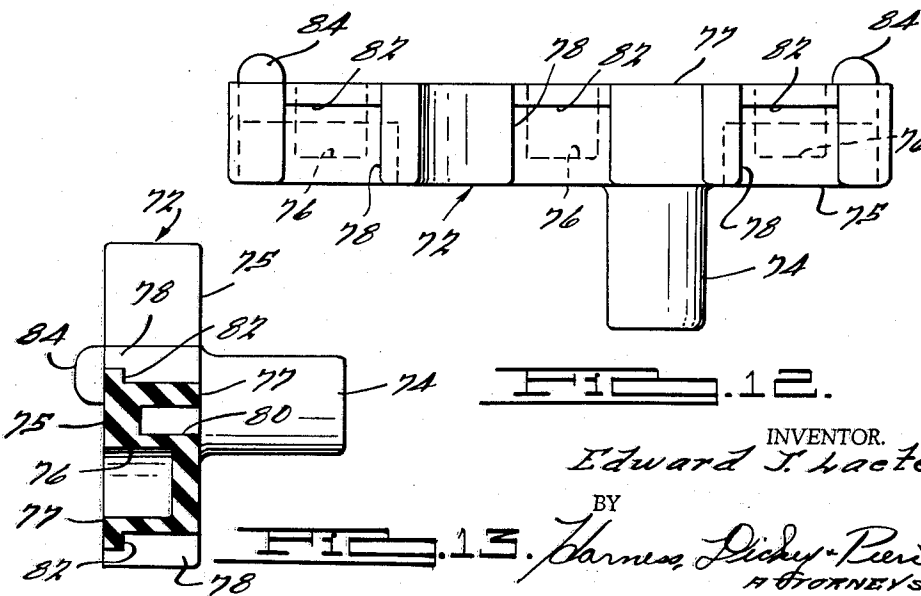
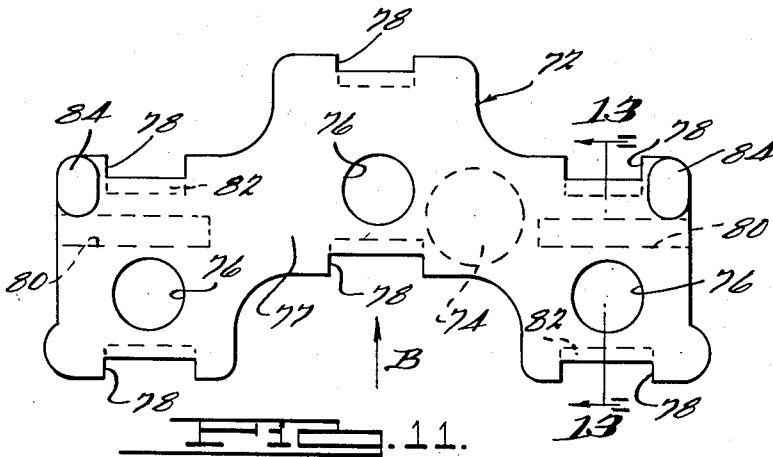
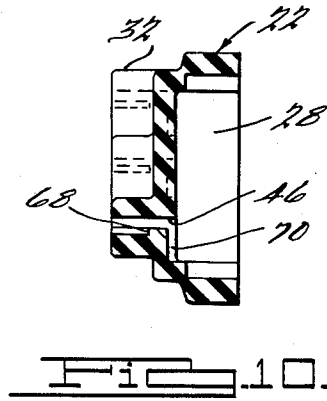
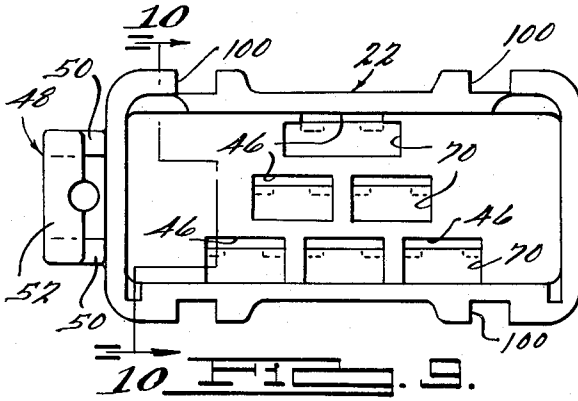
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SWITCH

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4 Sheets-Sheet 3



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SWITCH

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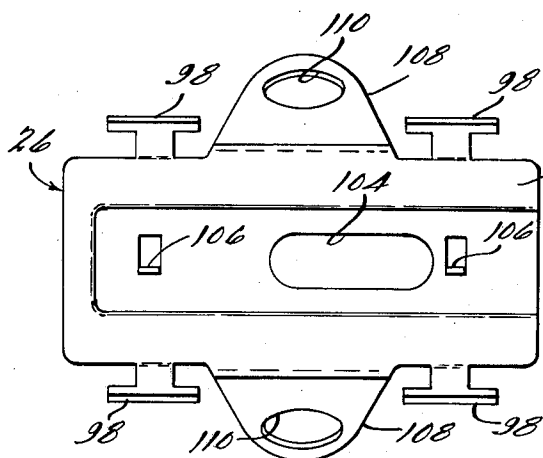


FIG. 14.

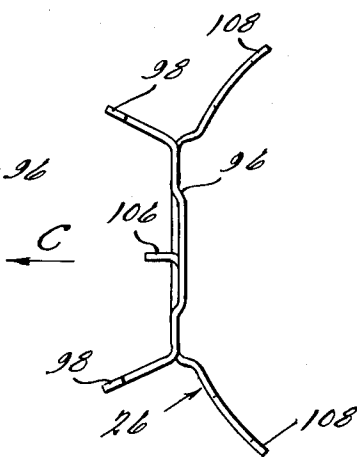


FIG. 15.

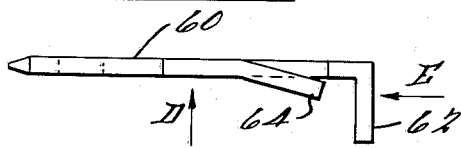


FIG. 16.

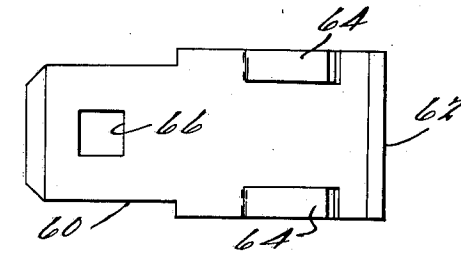


FIG. 17.

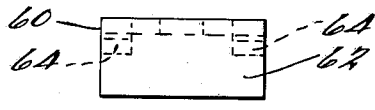


FIG. 18.

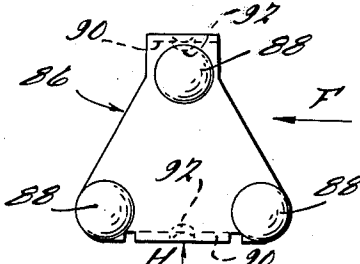


FIG. 19.

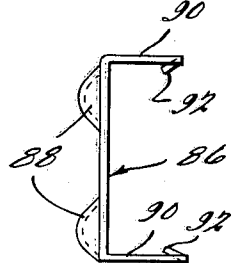


FIG. 20.

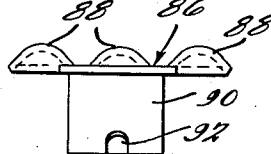


FIG. 21.

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3,029,320
SWITCH

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Filed Aug. 25, 1958, Ser. No. 756,863
7 Claims. (Cl. 200-16)

This invention relates to improvements in electric switches and more particularly to switches for use with direction indicating systems for automobiles or the like.

In switches of the type set forth in Patent No. 2,748,207 granted to David P. Clayton and George W. Onksen on May 29, 1956, there are two rows of stationary contacts or terminals of at least three contacts per row with the contacts of each row being arranged in a slightly arcuate pattern. The center contact of the first row is connected with a current source through a stop switch which is actuated to a closed position when the brakes are applied, and the end contacts of the first row are connected respectively with the right and left rear stop light lamps. The center contact of the second row of stationary contacts is also connected with the current source and the end stationary contacts are connected respectively with the right and left front turn signal lamps. The switch provides four movable contacts or bridging members, two for each row, which are simultaneously actuated. The bridging members associated with the contacts of the first row are adapted to bridge two contacts at a time, while the bridging members associated with the contacts of the second row have three triangularly spaced contact bosses and are adapted to bridge two adjacent contacts of the second row and in certain positions of the switch to simultaneously engage a contact in the first row, as well as simultaneously bridging two contacts in the second row.

An important object of the present invention is to provide a turn signal switch having three rows of stationary contacts arranged in triangular fashion with one contact in the first row, two contacts in the second row and three contacts in the third row, the second and third row being parallel with one another, and wherein the contacts are contacted by only three slidable bridging members moved in linear fashion as contrasted with the arcuate movement required of the bridging members in the aforementioned Patent No. 2,748,207.

Other objects of the invention are to provide a switch which operates smoothly at all times, which is dependable in operation, which is simple and inexpensive in construction, and in which all of the bridging members make positive contact with the stationary contacts at all times.

Other objects, features and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a wiring diagram of a directional signal in a stop-light system including the switch of the present invention and showing the switch in its neutral position;

FIGS. 2 and 3 show the system under different operating conditions;

FIG. 4 is a bottom view of the switch partially broken away;

FIG. 5 is a sectional view of the switch taken along the line 5-5 of FIG. 4;

FIG. 6 is a reduced bottom view of the insulator housing of the switch;

FIG. 7 is a sectional view taken along the line 7-7 of FIG. 6;

FIG. 8 is an end view looking in the direction of the arrow A of FIG. 7;

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FIG. 9 is a reduced top view of the insulator housing of the switch;

FIG. 10 is a sectional view taken along the line 10-10 of FIG. 9;

FIG. 11 is an enlarged bottom view of the slide block of the switch;

FIG. 12 is a side view of the slide block looking in the direction of the arrow B of FIG. 11;

FIG. 13 is a sectional view taken along the line 13-13 of FIG. 11;

FIG. 14 is a plan view of a mounting bracket for the switch;

FIG. 15 is an end view looking in the direction of the arrow C of FIG. 14;

FIG. 16 is an enlarged side view of a spade type terminal used in the switch;

FIG. 17 is a bottom view of the spade type terminal looking in the direction of the arrow D of FIG. 16;

FIG. 18 is an end view of the spade type terminal looking in the direction of the arrow E of FIG. 16;

FIG. 19 is an enlarged plan view of a bridging member used in the switch;

FIG. 20 is a side view of the bridging member looking in the direction of the arrow F of FIG. 19;

FIG. 21 is another side view of the bridging member looking in the direction of the arrow H of FIG. 19;

Referring to FIGS. 4 and 5, one embodiment of the switch of the present invention is comprised of a nonconductive insulator housing 22 having a nonconductive slide block 24 slidably retained therein by a mounting bracket 26.

Referring to FIGS. 6-10, as well as FIGS. 4 and 5, it will be observed that the insulator housing 22 has a chamber 28 opening on one face thereof and a wall portion 30 forming the floor of the chamber 28. It will be observed that the wall portion 30 has a stepped portion 32 projecting outwardly therefrom to provide sufficient material for retaining spade-type terminals 34-44 in slot-like apertures 46 extending therethrough.

The housing 22 is also provided with an integral projecting portion 48 having spaced reinforcing ribs 50 joined by an integral connecting portion 52 at the lower end thereof which is spaced from the side portion 54 of the housing. It will also be observed that the connecting portion 52 and side portion 54 have semicylindrical recesses 56 and 58 formed therein respectively which cooperate to define a cylindrical aperture in plan view as illustrated in FIG. 6. The projecting portion 48 together with the mounting bracket 26 provides a means for adapting the housing for mounting with a stationary column post of an automobile and to be located under the steering wheel. Reference is made to Patent Nos 2,731,525, 2,739,196 and 2,728,825, for examples, of an electric switch mounted in such a position beneath the steering wheel.

Referring to FIGS. 16-18 one of the spade type terminals is illustrated which is adapted to be inserted in one of the apertures 46 in the housing 22. It is briefly comprised of a flat metal body 60 bent to form a flat rectangular contact portion 62 on one end thereof with spaced-apart tabs 64 punched out of and projecting from the sides of the body 60 adjacent the contact portion 62. An aperture 66 is formed adjacent the other end of the body 60 for engaging a suitable detent in a female socket adapted to receive said other end of the body as completely described in a copending application of Jasper Long, Serial No. 656,359, filed on May 1, 1957 and cases referred to therein, and assigned to the assignee of the present invention. Reference is made to this copending application for a more detailed description of the spade type terminal illustrated in the drawings as well as the manner in which they cooperate with the apertures 46 in the housing 22.

Briefly, each of the slot-like apertures 46 of the housing is formed with spaced grooves 67 adjacent the ends thereof which terminate in spaced shoulders 68, as most clearly illustrated in FIGS. 6 and 7. The terminals 34—44 are inserted in their respective apertures 46 from beneath as viewed in FIG. 7, so that the body portions 60 thereof extend through the apertures until they reach their final position wherein the contact portions 62 thereof are disposed within suitable recess portions 70 so as to lie flush with the floor of the chamber 28. In this position the tabs 64 of each of the terminals 34—44 snap over the shoulder 68 of each of the apertures 46 to lock the terminals in position and prevent their removal. Thus, with each of the contacts 34—44 in position the contact portions 62 thereof form the triangular pattern illustrated in FIG. 9.

The slide block 24 which is adapted to be slidably retained within the chamber 28 and support bridging members for engaging the contact portions 60 of the terminals is illustrated most clearly in FIGS. 11—13. It is comprised of an insulator body 72 having a cylindrical lug 74 projecting from one face 75 thereof, and triangularly spaced cylindrical recesses 76 opening on the other face 77 thereof. The slide block also has opposed pairs of cut-away portions 78 adjacent to and on either side of each of the cylindrical recesses 76, and a pair of transversely extending, elongated slots 80 on either side thereof and opening on the face 75. It will also be observed that each of the cut-away portions 78 is formed with an internal shoulder 82 for a purpose which will be described in greater detail hereinafter.

The slide block is adapted to be inserted in the chamber 28 with the face 77 thereof adjacent the floor of the chamber, and is provided with projecting bosses 84 at either side thereof for engaging the floor in a bearing relationship. As most clearly illustrated in FIG. 5, it will also be observed that a plurality of bridging members 86 are disposed between the slide block and floor of the chamber 28 and slidably connected to the slide block. As most clearly illustrated in FIGS. 19—21, each of the bridging members is triangular in shape and has three spaced contact bosses 88, one at each corner thereof, and an opposed pair of legs 90 projecting therefrom in a direction opposite to the direction in which the contact bosses 88 project. Each of the legs 90 has an inwardly projecting tab punched therefrom so that the legs can be slidably disposed within each of the recesses 78 of the slide block 24, the tabs 92 snapping over the shoulders 82 to retain the bridging member on the slide block as more fully described in Patent 2,840,650 assigned to the assignee hereof.

A coil spring 94 (FIG. 2) is also disposed within each of the recesses 76 to engage the center of member 86 and urge it against the floor of the chamber 28. With this arrangement, there are three triangularly spaced bridging members, one at each side and one at the center of the slide block, and each of the legs 90 of each bridging member is slidably disposed within the cut-away portions 78 on either side of each cylindrical recess and retained thereon by the tabs 92 snapping over the internal shoulders 82 as previously described.

The slide block 24 is retained within the chamber 28 in a manner to maintain the coil spring 94 under compression by the central portion 96 of the mounting bracket 26 which provides a top cover enclosing the chamber 28. As most clearly illustrated in FIGS. 14 and 15, the mounting bracket 26 has flanged lugs 98 projecting from the top and bottom thereof which are adapted to be bent over the sides of the housing 22 to secure the mounting bracket to the housing. The lugs fit within the notched portions 100 formed in the sides of the housing and the flanges thereon hook over the bottom shoulders 102 of each of the notched portions, as most clearly illustrated in FIG. 5.

The mounting bracket 26 also has an elongated slot

104 in the center portion 96 thereof and aligned tabs 106 punched out of and projecting from the center portion 96 on either side of the elongated slot 104. Each of the tabs 106 is adapted to project within one of the elongated slots 80 on the slide block 24, as most clearly illustrated in FIG. 5, to guide sliding movement of the slide block relative to the housing 22. It will be observed that the mounting bracket 26 is also provided with curved ear portions 108 on both sides thereof having enlarged apertures 110 therein for mounting the switch for cooperation with a suitable turn signal actuating means (not shown), the actuating means being adapted to be connected to the lug 74 projecting through the elongated slot 104 to move the slide block 24 from left to right, as viewed in FIG. 4.

It will also be observed in FIG. 4 that a pair of bent leaf springs 114 are positioned within the housing on either side thereof so as to bear against the adjacent sides of the slide block 24 to normally urge the slide block to a medial or neutral position. When the slide block 24 is in the medial position, the contact bosses of each of the bridging members 86 are in the position illustrated in FIG. 1 wherein only the center bridging member bridges more than one of the flat contact portions of the terminals 34—44, the center bridging member bridging the terminals 34, 36 and 38. Consequently, when stop light switch 116 is closed by actuating the brake pedal of the automobile, current will flow from battery 118 to left rear stop light 120 and right rear stop light 122 to indicate that the brakes are being applied.

When the aforementioned turn signal actuating means (not shown) is moved to the right turn position, the lug 74 of the slide block is actuated to shift the bridging members to the position shown in FIG. 3 to indicate a right turn. When in this position current will flow from the battery 118 through a flasher 124, lead 126, terminal 42, the left-hand bridging member, terminals 40 and 36, causing right rear stop light 122 and the right front signal lamp 128 to light. When switch 116 is closed current will also flow from the battery 118, switch 116, lead 130, terminal 34, the center bridging member, and terminal 38 to cause the left rear stop light 120 to light.

The flasher indicated by the numeral 124 may be of any suitable type. For example, it may be one which includes a hinge blade, a hot wire attached to the blade, a resistor, and a pair of normally separated contacts, one of the contacts being carried by the hinged blade. When current is flowing through the flasher 124 the hot wire expands to permit closing of the normally separated contacts, thereby short-circuiting the resistor and the hot wire. As the temperature of the hot wire decreases, it contracts to separate the contacts thereby causing current to again pass through the hot wire and resistor to close the contacts. The above cycle is repeated through the flasher 124 so long as the flasher is connected with the battery or current source.

When the turn signal actuating means is turned to the left turn position, the bridging contact members 86 are shifted to the position shown in FIG. 2 to indicate a left turn. When in this position, current will flow from the battery 118, through flasher 124, lead 126, terminal 42, the right-hand bridging member, terminals 44 and 38 to a left front signal lamp 132 and the left rear stop light 120. It will also be observed that the contact portion 60 of the terminal 34 is wider than the remaining terminals to insure that the uppermost contact boss of the center bridging member 86 will always make electrical contact therewith in both the extreme left and right-hand positions of the slide block.

From the foregoing description, it will be apparent that the present invention provides a turn signal switch requiring only three bridging members and three springs for urging them against the terminals as compared with the four bridging members and four springs required by

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the aforementioned Patent 2,748,207. In addition, each of the bridging members provide the desirable three point contact, and are moved in linear rather than arcuate fashion across the terminals. Each of the terminals also have relatively wide contact surfaces 62 which, together with the aforementioned three point contact, decrease the possibility of a poor electrical connection being made. The insulator parts are each of such design that they can be readily formed in simple molds having axially extending core pins. All of these advantageous features cooperate to provide a smoothly operating, rugged, dependable switch which is relatively inexpensive to manufacture.

While it will be apparent that the preferred embodiments of the invention herein disclosed are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. A switch having a plurality of terminals therein arranged in three rows in triangular fashion, the first row having one terminal therein, the second row having two terminals therein and the third row having three terminals therein, and three triangularly shaped bridging members arranged in a triangular pattern and adapted to contact said terminals by movement parallel to said rows, the bridging member at the apex of the triangle being adapted to simultaneously engage terminals in said first and second rows and the bridging members at the two sides of the triangle being adapted to simultaneously engage terminals in said second and third rows when said bridging members are in either of their extreme positions.

2. A switch comprising an open-sided housing, three rows of terminals arranged in triangular fashion with one terminal in the first row, two terminals in the second row and three terminals in the third row, a slide block disposed within the housing and movable in a direction parallel to said rows of terminals, three triangularly spaced bridging members carried on said slide block, each bridging member having three triangularly spaced contact bosses thereon, one bridging member being adapted to contact two terminals in said third row and one terminal in said second row in one extreme position of said slide block within said housing, a second bridging member being adapted to simultaneously contact two terminals in said third row and one terminal in said second row in the other extreme position of said slide block within said housing, a third bridging member being adapted to simultaneously contact the two terminals in said second row and the terminal in said first row in the medial position of said slide block within said housing, said third bridging member maintaining contact with the terminal in said first row in both extreme positions of said slide block within said housing and with one or the other of the terminals in said second row depending on the extreme position of said slide block.

3. The subject matter as claimed in claim 2 including a mounting bracket having a relatively flat center portion with an elongated slot therein and aligned tabs projecting outwardly therefrom on either side of said slot, said mounting bracket being adapted to be clinked to said housing to provide a top cover therefor and having ear portions projecting therefrom for mounting said switch to other members, said slide block having a lug projecting through said slot and adapted to be connected to external means for actuating said slide block, said projecting tabs being disposed within aligned slots in the adjacent face of said slide block to guide the sliding movement of said slide block along the line defined by the tabs.

4. The subject matter as claimed in claim 3 wherein springs are inserted between each side of said slide block and said housing to normally urge said slide block to said medial position.

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5. A switch comprising a housing having a floor and six terminals projecting through the floor and outwardly of said housing, each of said terminals having a flat shaped contact portion on the end thereof within said housing, said contact portions substantially lying flush with the floor of said housing and being arranged in three rows in triangular fashion with one contact in the first row, two contacts in the second row and three contacts in the third row, and a slide block slidable on said floor and carrying three identical triangularly shaped bridging members mounted within said housing for sliding movement parallel to said rows, said bridging members being arranged in a triangular pattern, a first member overlapping the first and second rows of contact and the other members overlapping the second and third rows of contacts, said first one of said bridging members being adapted to simultaneously bridge and contacting the terminals in said first and second rows in the medial position of said slide block and one or the other of the terminals in said second row in either of the extreme side positions of said slide while maintaining contact with the terminal in said first row, another of said bridging members bridging and contacting one terminal in said second row and two in said third row in one extreme position of said slide block and the remaining bridging and contacting member bridging the other of said terminals in said second row and two terminals in said third row in the other extreme position of said slide block.

6. The invention as defined in claim 5 wherein each of said bridging members comprises a flat body having triangularly spaced contact bosses projecting therefrom in one direction and an opposed pair of legs projecting therefrom in a direction opposite to the direction in which the contact bosses project, each of said legs having an inwardly projecting downwardly presenting tab thereon, the legs of each of said bridging members being slidably disposed over a portion of said slide block with the tabs thereon snapped over shoulders on the slide block to limit the sliding movement of the bridging members in a direction away from the slide block.

7. A switch having a plurality of terminals therein arranged in triangular fashion with one terminal in a first row, two terminals in a second row, and three terminals in a third row, a slide block disposed within said switch and movable in a direction parallel to said rows of terminals, and three triangularly spaced bridging members slidably carried on said slide block, each bridging member comprising a flat body having triangularly spaced contact bosses projecting therefrom in one direction and an opposed pair of legs projecting therefrom in a direction opposite to the direction in which the contact bosses project, the legs of each of said bridging members being slidably disposed over a portion of said slide block and having portions thereof adapted to engage the slide block in a manner to limit sliding movement tending to separate the bridging members from the slide block, and resilient means disposed between each of said bridging members and the slide blocks for resiliently urging the bridging members in a direction away from the slide block.

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