Aug. 25, 1964 D. C. BURCH ET AL 3,146,052

VEHICLE-PANEL CONNECTOR

Filed Sept. 12, 1960 3 Sheets-Sheet 1

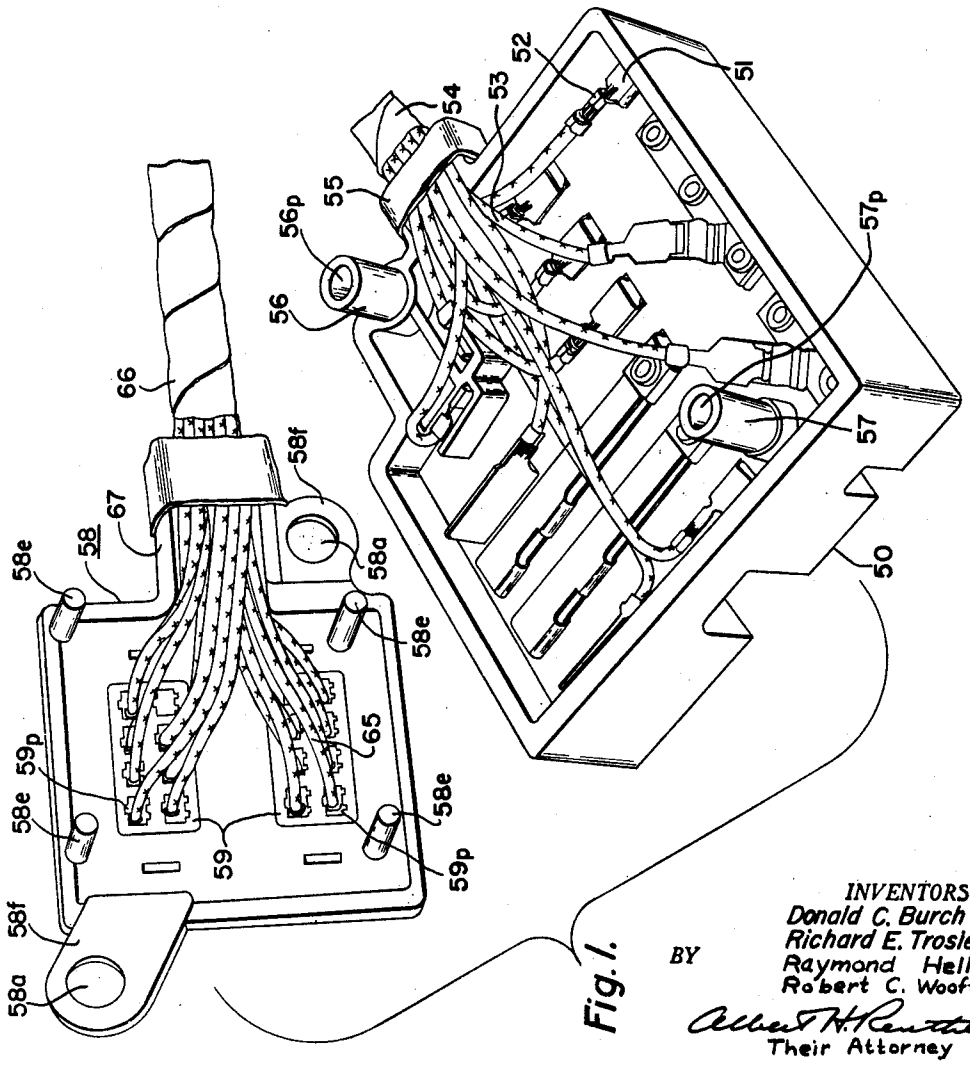

Fig. 1.

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VEHICLE-PANEL CONNECTOR

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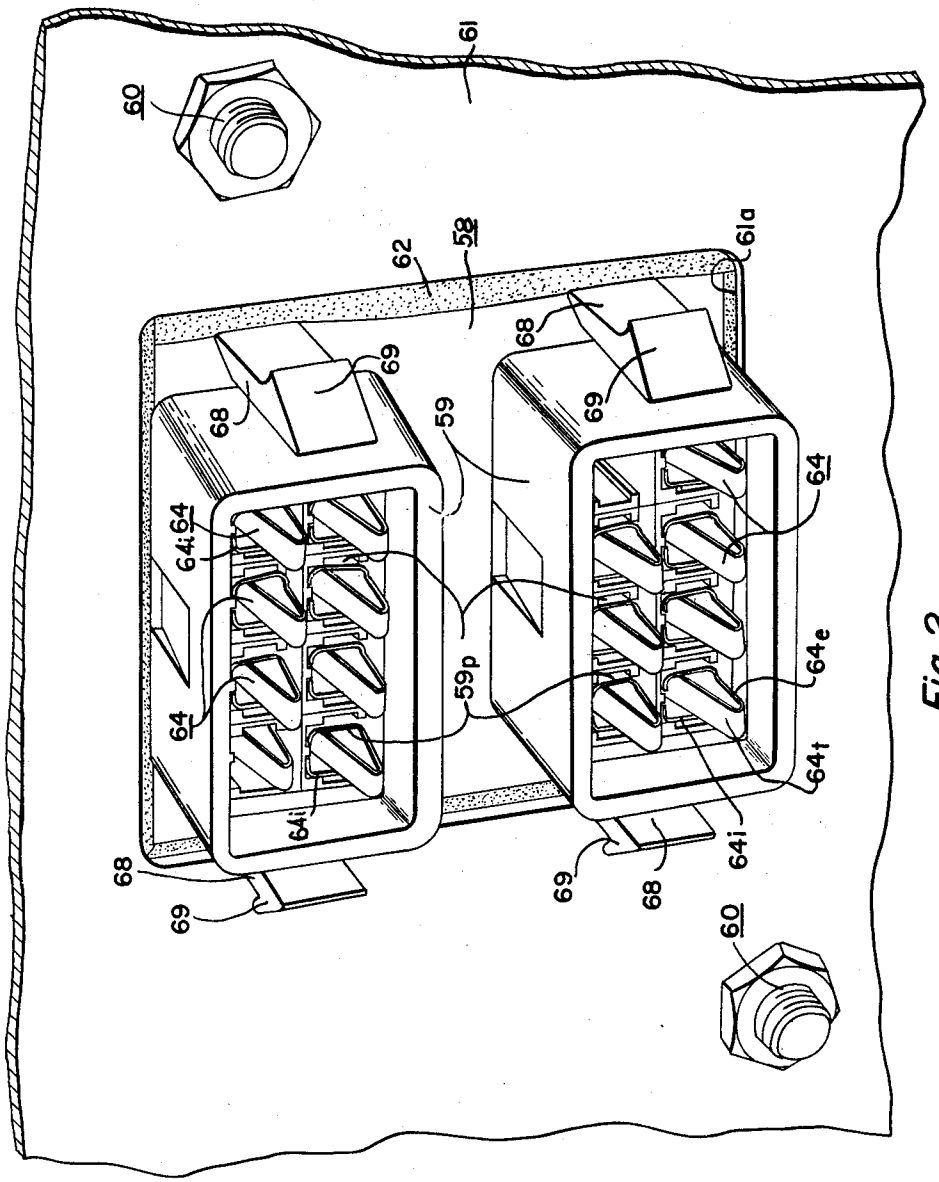

Fig. 2.

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VEHICLE-PANEL CONNECTOR

Filed Sept. 12, 1960 3 Sheets-Sheet 3

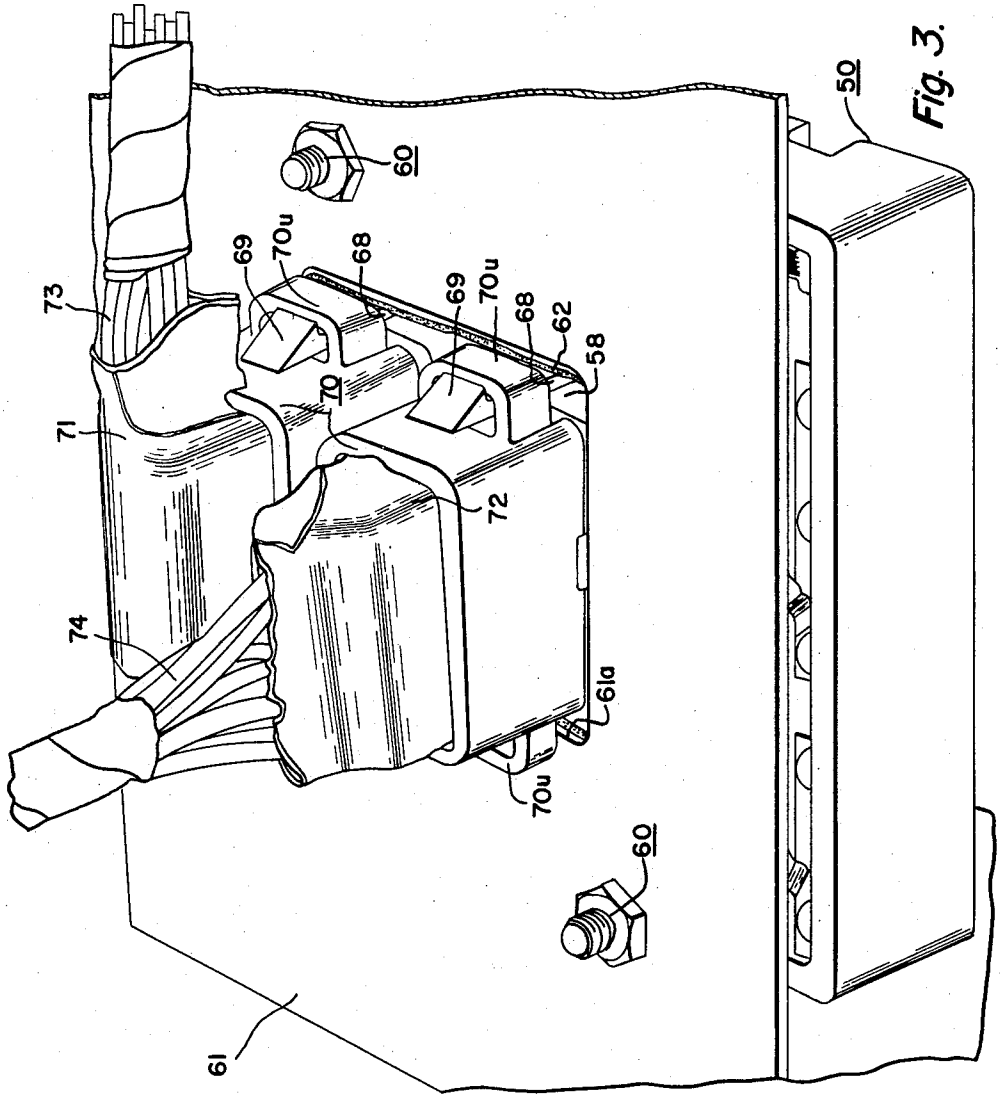

Fig. 3.

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3,146,052

VEHICLE-PANEL CONNECTOR

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4 Claims. (Cl. 339—91)

This invention relates to electrical connections on vehicles and, particularly to terminal and mounting means specifically adapted to establish multiple electric contacts through an apertured panel.

An object of this invention is to provide a new and improved vehicle-panel connector adapted to establish multiple electric contacts through a single aperture of a vehicle panel on opposite sides of which identical terminal means are used and housed in mating insulating body portions.

Another object of this invention is to provide a vehicle-panel connector including a pair of housing portions at least one of which projects through an aperture of a vehicle mounting panel such as a storage compartment wall, dashboard wall, floor board, firewall and the like and which is adapted to mate and interlock with the other housing portion, both the housing portions having terminal means retained therein identical to each other including contacts resiliently engageable in contiguous relation to each other.

Another object of this invention is to provide a vehicle-panel connector means including in combination a vehicle firewall panel having an aperture therein on one side of which one of a pair of housing portions of insulating material is adapted to be fastened in sealing engagement to the firewall panel such that a body of insulating material thereof projects with locking means through the aperture and is engageable by another housing portion that mates with the other housing portion including the locking means for maintenance of electrical contact between pairs of identical terminal means having resilient spring portions in face-to-face contiguous relation.

A further object of this invention is to provide a combined vehicle-panel connector means including a pair of housing portions of insulating material each having plural parallel rows of rectilinear passages therein to receive terminal means identical in all respects such as a conductor engaging end on one side of a box-like intermediate portion integral with a blade-like floor extension joined to one end of a spring tongue portion angularly disposed and projecting to within confines of the box-like intermediate portion, one of the housing portions having a pair of U-shaped extensions integral on opposite sides thereof and adapted to lock in engagement with a pair of arms with hook ends adapted to be flexed into and out of the U-shaped extensions and integral with the other of the housing portions which is secured to the vehicle panel and on which a fuse block means can be carried.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 is an exploded perspective view of vehicle panel connector means in accordance with the present invention.

FIGURE 2 is a perspective view of one insulating housing portion of FIGURE 1 and terminal means therein mounted on an apertured panel and having features in accordance with the present invention.

FIGURE 3 is a perspective view of an assembly of vehicle panel connector means in accordance with the present invention.

In mass production of motor vehicles, there is a progressive assembly of various parts and components in a succession of work stations where a predetermined time interval is allowed to fit together or assemble certain parts. In some instances, a vehicle body and a frame or chassis means are subassembled to a predetermined extent prior to being joined along a main assembly line. Wiring means such as insulated harnesses having a predetermined grouping of electrical conductors must be interconnected in predetermined locations such as inside a vehicle body and in an engine compartment which is insulated and separated from a passenger compartment of the body. The perspective view of FIGURE 2 includes a fragmentary showing of a support or panel **61** having an aperture or passage **61***a* therethrough. This support or panel **61** can be part of a floorboard, a firewall, dash panel, trunk wall and the like on at least one side of which a layer of insulating material such as a fibreglass pad is fitted. In some installations, a strain relief grommet of resilient material is wedged into an opening such as the aperture **61***a* and a wiring harness is retained in tight assembly relative to the support or panel **61**. It is possible for such a grommet to be damaged during assembly so as to obviate any weather seal which the grommet was designed to provide. Furthermore during servicing of electrical components on a vehicle on which a wiring harness is fitted through such a grommet, there is often considerable difficulty in attaining access to wiring grouped as part of such a harness.

FIGURE 1 includes a perspective view of a fuse panel means including snap-in clips in accordance with a disclosure of co-pending application S.N. 741,599, filed June 12, 1958, now Patent 2,955,178 issued October 4, 1960, and belonging to the assignee of the present invention. This fuse panel means in FIGURE 1 is designated by reference numeral **50** and includes substantially U-shaped clip portions **51** integral with conductor fastening portions **52**. Conductor or wiring means **53** are fastened to various combination terminal means **51–52** and the like and are grouped adjacent to an end of a wiring harness **54** which is retained at least in part in a channel **55** integral with the fuse panel means **50**. The fuse panel means **50** has a pair of projections **56** and **57** extending laterally to one side thereof. These projections **56** and **57** are substantially cylindrical in shape so as to include passages **56***p* and **57***p* extending axially therethrough to an opposite side of the fuse panel means **50**. These hollow projections **56** and **57** are adapted for use in mounting the fuse panel means **50** directly on one side of an insulating body **58** also shown in perspective in the exploded view of FIGURE 1. The insulating body **58** is substantially rectangular in shape and has a pair of insulating housing portions **59** with passages **59***p* integral

therewith. The body 58 further includes fastening flange portions 58*f* each provided with an aperture 58*a* through which fastening means generally indicated by numeral 60 visible in FIGURES 2 and 3 can be inserted for mounting the body portion 58 on one side of a vehicle panel such as 61 having a rectangular opening or aperture 61*a* therein. The fastening means 60 can include nuts and bolts secured to the panel 61 such as a fire wall of a motor vehicle.

A seal or gasket means 62 is tightly engaged between a periphery of the aperture 61*a* and one side of the body portion 58. Each of the insulating housing portions 59 integral with the body 58 can be viewed in greater detail in FIGURE 2. Each of the passages 59*p* is substantially parallel to an adjacent grouping of passages formed in pairs of clusters or plural parallel rows rectilinearly spaced to receive terminal means generally indicated by numeral 64. These terminal means 64 include a box-like intermediate portion 64*i* as well as an integral floor extension portion 64*e* and a resilient tongue portion 64*t* adapted to mate with identical components of an identical terminal means 64 in accordance with a disclosure of application S.N. 55,483-Woofter, et al., filed September 12, 1960, to be co-pending herewith and belonging to the assignee of the present invention. These identical terminal means 64 each have conductor engaging portions to which wires or conductors 65 are secured. The wires or conductors 65 can be seen in FIGURE 1 and have ends passing into individual passages 59*p* and extend from a grouping of conductors or wiring harness 66 which is retained at least in part in a substantially U-shaped channel portion 67 integral with the body 58 laterally to one side thereof.

The body 58 includes stud-like substantially cylindrical extensions 58*e* located substantially diagonally from each other and engageable in diagonal pairs by projections such as 56 and 57 of the fuse panel means 50 adapted to be mounted directly on one side of the body 58. Preferably, the fuse panel means will be so mounted on the extensions 58*e* so that the combination clip and terminal means 51–52 will have their U-shaped legs or arms extending to a side of the firewall inside a vehicle passenger compartment and the like where access can be gained to suitable fuse means inserted therein and replaceable when necessary. The perspective view of FIGURE 3 illustrates mounting of the fuse panel means 50 on one side of the body 58. It is to be understood that a telescopic press fit between projections 56 and 57 onto extensions 58*e* can suffice but also that a suitable fastening means such as screws can be inserted through the passages 56*p* and 57*p* to fit into central bores of the extensions 58*e* if necessary. These bores can be self-tapping or pre-threaded depending upon the resiliency of the insulating material used for the body 58 and extensions 58*e*.

Also integral with the insulating body 58 there are a plurality of resilient arms 68 each having hook-like ends or inclined abutments 69 integral therewith and engageable with U-shaped lateral projections 70*u* extending in opposite directions from a pair of female housing portions generally indicated by numeral 70 each having a plurality of parallel passages similar to passages 59*p* therein and each including a plurality of substantially parallel mounted identical terminal means similar to terminal means 64 noted earlier. The abutments 69 are adapted to be flexed into locking engagement with the U-shaped extensions 70*u* as seen in FIGURE 3. Each of the arms 68 is spaced laterally to one side of the particular housing portion 59 between a pair of such arms and the abutments or ends 69 can be pressed laterally toward each other against a side wall of a particular housing portion 59 to permit removal of one or more of the housing portions 70 from the assembly of the housing portions on the vehicle panel 61. A weather resistant boot means made of plastic material or a resin punting compound indicated by numerals 71 and 72 can be provided to insulate grouped conductors 73 and 74 adjacent to one side of the housing portion 70 which are individually removable from the housing portions 59 of body 58. Thus the housing portion 70 can be interlocked and engaged with housing portions and terminal means preassembled to a vehicle body adjacent to a panel aperture such as 61*a* at a time when a body joins a chassis or engine assembly from which wiring or conductors 73 and 74 extend together with the housing portions 70. Since the fuse panel or fuse block means 50 can be carried directly on one side of the body 58, there is a compact grouping and assembly of electrical components on a vehicle panel such a firewall. The arms or projections 68 with abutment ends 69 are engageable with the U-shaped extension 70*u* to form locking means extending through the aperture 61*a* and adapted to hold housing portions together while face-to-face contiguous electrical contact occurs between pairs of electrical terminal means such as 64 having resilient spring tongue portions such as 64*t*. In the assembly of FIGURES 1, 2 and 3 there can be a total of 16 or more electrical contacts and connections established by identical terminal means such as 64.

While the embodiments of the present invention herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A combined vehicle-panel connector means, comprising, housing portions of insulating material each having plural parallel rows of rectilinear passages therein, a pair of U-shaped lateral non-metallic extensions purposely integral with at least one of said housing portions, and a pair of non-metallic arms with hook ends adapted to be flexed into and out of said U-shaped extensions and purposely integral with another of said housing portions, a plurality of identical terminal means each including a box-like intermediate portion retained in each of said rectilinear passages of said housing portions and each having a spring contact portion adapted to engage a corresponding spring contact in contiguous relation as well as projecting at least in part into said box-like intermediate portion of said mating identical terminal means to be in compact array and alignment.

2. The connector means of claim 1 wherein a separate gasket-like seal means is provided directly between an edge of a panel aperture and one of said housing portions and fastening means hold said seal means and housing portions snugly in place to permit mating fit of said terminal means and other housing portion axially of both said seal means and one housing portion.

3. The connector means of claim 1 wherein one of said housing portions includes annular extensions on one side thereof, and a fuse-panel means having projections axially complementary to said extensions as separably mounted directly on said one housing portion in combination therewith.

4. In combination with a vehicle mounting panel such as a storage compartment wall, dashboard wall, floor board, firewall and the like having an aperture therethrough and subject to differing atmospheric conditions of dust, moisture and the like as well as vibration, sudden shock and the like, improvements in a vehicle-panel electrical connector means, comprising, housing portions of insulating material at least one of which projects through the aperture of the vehicle mounting panel, said housing portions each having plural banks of substantially parallel terminal mounting passages therethrough, a plurality of identical terminal means each including a box-like intermediate portion as well as integral spring contact portions projecting laterally beyond one side of each housing portion as adapted for face-to-face contiguous electrical engagement between said identical spring contact portions which in mating extend at least in part into said box-like intermediate portion of said mating identical terminal

means to be in compact array and axial alignment with each other, a separate gasket-like seal means provided directly between edging of the panel aperture and one of said housing portions in snug mating fit therebetween, and locking means including at least one pair of non-metallic hooked-end arms integral with one housing portion though spaced laterally and substantially parallel thereof, and at least one pair of non-metallic U-shaped extensions integral and projecting laterally outwardly from another of said housing portions to mate in direct interlocking engagement with said non-metallic hooked-end arms.

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