Oct. 14, 1952 P. T. NIMS 2,614,156

INSTRUMENT PANEL

Filed Dec. 30, 1950 3 Sheets-Sheet 1

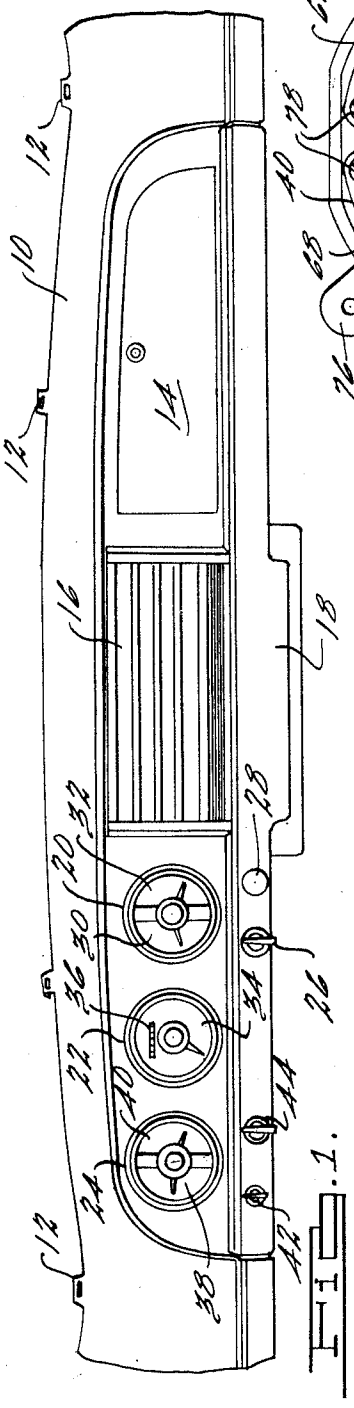


Fig. 1.

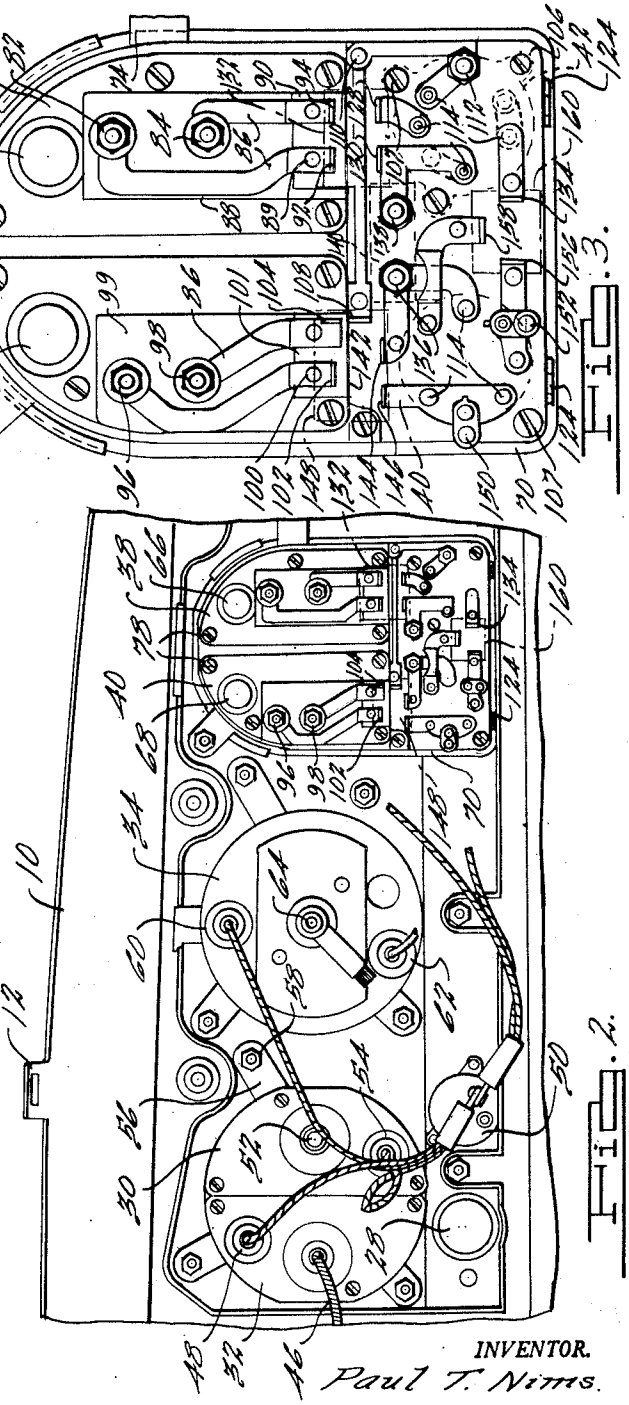


Fig. 2.

Fig. 3.

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INSTRUMENT PANEL

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Fig. 4.

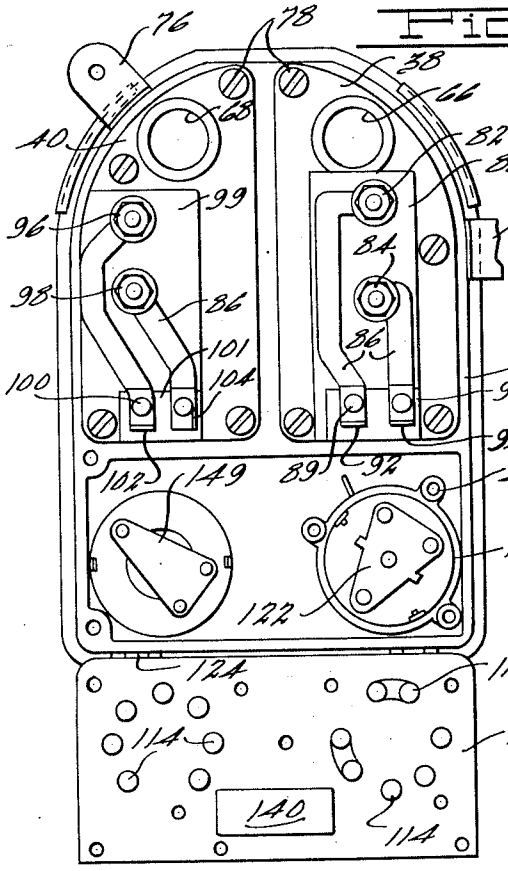


Fig. 5.

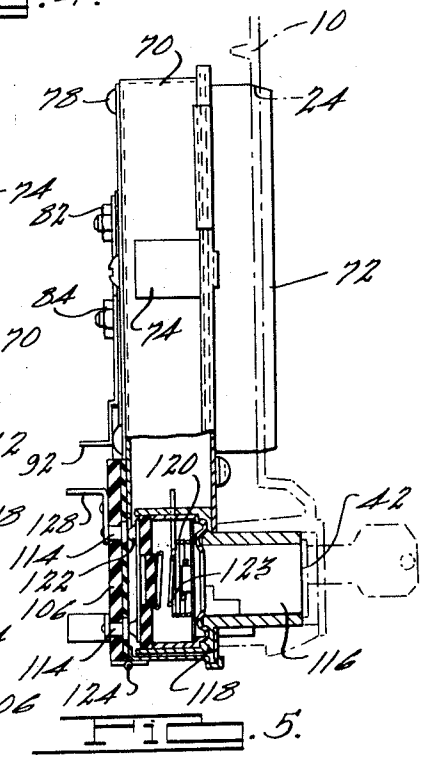
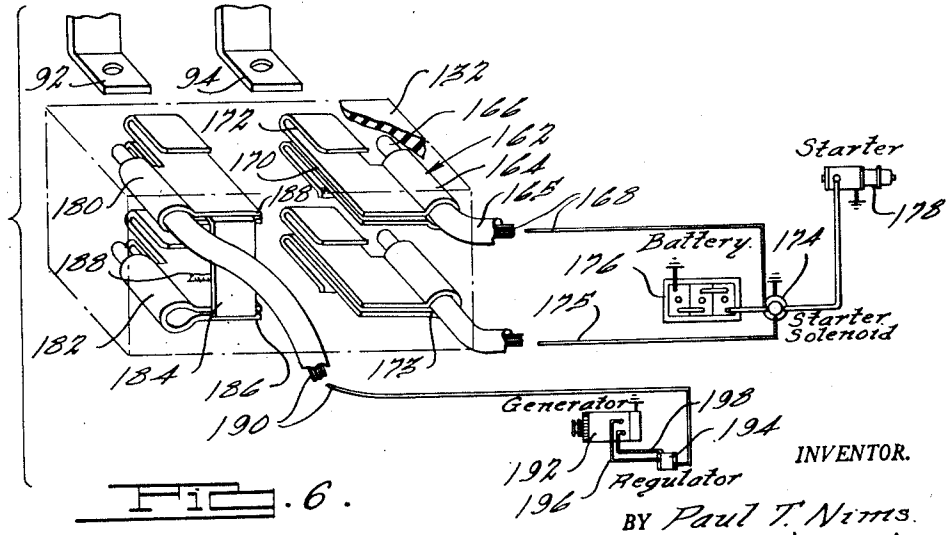


Fig. 6.



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Fig. 7.

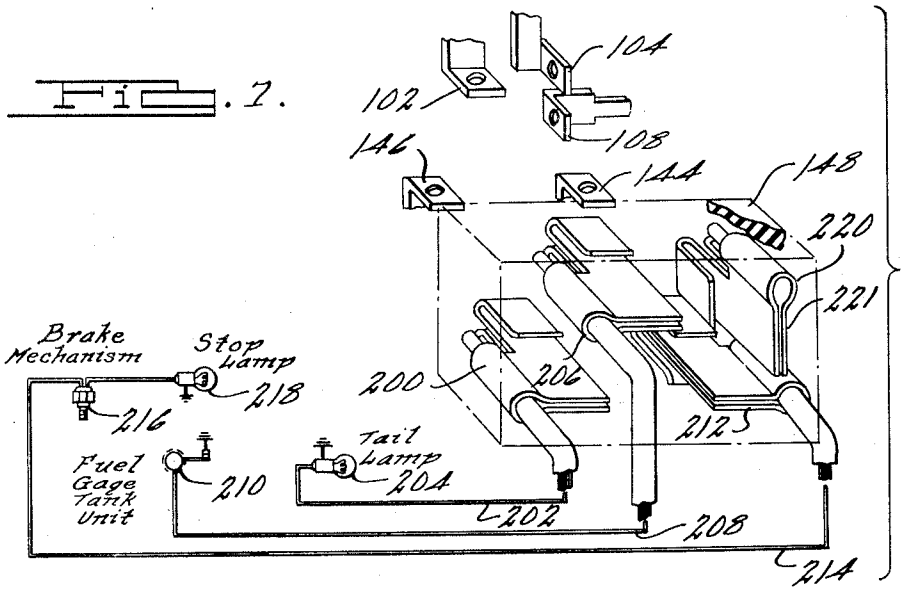
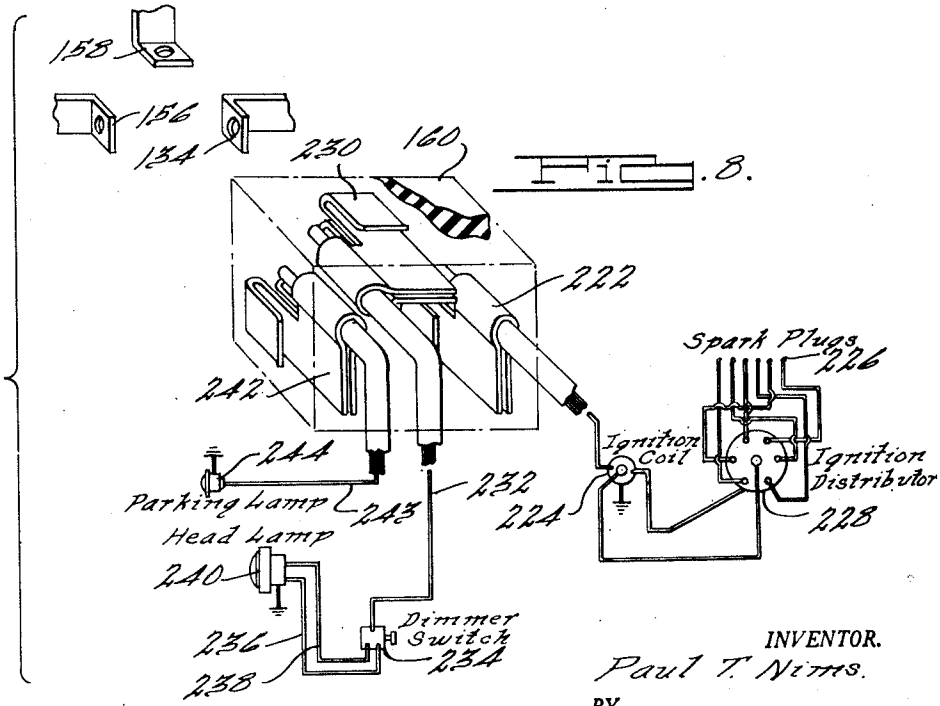


Fig. 8.



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UNITED STATES PATENT OFFICE

2,614,156

INSTRUMENT PANEL

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Application December 30, 1950, Serial No. 203,703

17 Claims. (Cl. 175—298)

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The present invention relates to electrical control units for instrument panels and the like, particularly instrument panels for automotive vehicles.

According to a feature of the present invention, an instrument panel is provided in which electrically conductive straps are generally used to form connections between the individual electrical units of the panel which in practice heretofore have been interconnected largely by wire conductors. The strapping not only simplifies the appearance of a panel but also is more easily manufactured and installed in panels and with less manual installation labor.

According to another feature, a switch-carrying instrument panel is provided with an insulating board having rivet-supported conductive strapping thereupon, groups of the rivets of which penetrate the board and serve as fixed contacts for the individual switches.

According to still another feature, a switch-carrying instrument panel is provided with an insulating board upon which not only fixed contacts for the switches are mounted, but also a circuit breaker is mounted thereon between switches and included in a circuit connecting energized and unenergized fixed switch contacts.

According to a further feature of the invention there is provided in a switch-carrying instrument panel a series of conductors including conductive strapping and having upstanding tabs by means of which the switch and instrument or instruments may be interconnected through the expedient of a plug type disconnect.

According to still a further feature, provision is made to mount one or more instruments of an instrument panel and one or more switches for the instruments in a single common container in a manner such that either instrument may separately be removed and the switches may be removed independently of the instruments, all in a greatly simplified fashion. Use of a single common container contributes to compactness and the further expedient of a plug-type disconnect between instrument and switch contributes to an uncomplicated and quick manner of disassembly as and when desired.

According to an additional feature of the invention an automotive instrument panel well suited for production methods, is provided with the panel conductors being of a form permitting them to be stamped out of sheet metal and mounted to panel structure well in advance of final line assembly of the automotive vehicle for which the structure is intended. The panel conductors are tabbed as hereinabove pointed out and, being carried in the vehicle body, are thus adapted readily to receive plug-type disconnects connected to vehicle devices in the engine chassis, the actual connection of plug to tabs being a relatively simple matter which can be accomplished with speed and ease during final line assembly.

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Other features, objects, and advantages will either be specifically pointed out or become apparent when reference is made to the following detailed specification taken in conjunction with the accompanying drawings, in which:

Figure 1 is a front elevation of an instrument panel embodying the instant invention;

Figure 2 is an elevation showing the rear of the instrument cluster in the panel;

Figure 3 is an enlarged showing of a portion of the structure shown in Figure 2;

Figure 4 is a view similar to Figure 3 with a part of the control unit uncovered;

Figure 5 is a side view in section of the control unit; and

Figures 6, 7, and 8 are schematic wiring diagrams showing how plug-type disconnects are employed in conjunction with the upstanding tabs on the control unit.

In Figure 1 an instrument panel 10 is provided having supporting lugs 12 suited for attachment to the cowl and window structure of, for example, an automotive vehicle. Panel 10 provides a glove compartment 14 at one side thereof, and at the mid portion a radio speaker grille 16 and a panel 18 for the radio control knobs. Panel 10 has on the opposite side of radio grille 16, a plurality of dial openings 20, 22, and 24 for a cluster of instruments particularly suited to automotive use for instrument panels and the like. A dial illuminating switch handle 26 is provided near the bottom edge of panel 10, as is also located a cigar lighter opening 28 in general adjacency thereto. In the instrument opening 20 is received a pair of instruments comprising an oil pressure gage 30 and an engine temperature gage 32. In instrument opening 22 a speedometer 34 is provided having an odometer dial 36. An ammeter 38 and a fuel gage 40 are located in the instrument opening 24. Beneath instrument opening 24 there is located a key-controlled ignition switch 42 for the vehicle engine and a handle-operated light switch 44.

With respect to Figure 2, the temperature gage 32 is shown to have connected thereto a capillary tube 46 to provide pressure actuation for the engine temperature indicating needle of the temperature gage. A dial illuminating light 48 is pro-

vided in the top of temperature gage 32 and the intensity of illumination thereof is controlled by the above mentioned switch handle 26 controlling a resistor element 50. The oil pressure gage 30 has a fitting 52 adapted to receive an oil-pressure-connected line. A dial illuminating light 54 is received in the bottom of oil gage 30. A plurality of apertured lugs 56 is provided for mounting the instruments to the panel structure and is detachably connected thereto by means of fasteners 58. A dial illuminating light 60 controlled by resistor 50 is located in the speedometer 34 having a shaft 64 mounting an internal gear and adapted to be driven by a flexible shaft driven by the transmission of the vehicle. A lamp 62 may be provided in the speedometer which is useful in indicating the degree of brightness of say deflectable beam head lights for the vehicle. The ammeter 38 and fuel gage 40 are provided with openings 66 and 68 for dial illuminating lights which may be used if desired. Instruments 38 and 40 are mounted in a common container 70.

In Figure 3, adjacent the dial illuminating openings 66 and 68 will be seen fasteners 78 which in cooperation with other fasteners around the edge of instruments 38 and 40 serve detachably to secure the instruments to the container 70. Container 70 is in turn secured to the panel structure by apertured lugs 74 and 76. Ammeter 38 has a pair of terminal posts 82 and 84 to which is connected conductive strapping 86 mounted on an insulative layer 88 which may be paper-like. The ends of ammeter strapping 86 are riveted as at 89 to a small block of insulating board 90 and terminate in a generator-connected upstanding tab 92 and a battery-connected upstanding tab 94. Fuel gage 40 has a pair of terminal posts 96 and 98. Connected to these posts is conductive strapping 86 mounted on a layer 99 of insulating paper-like material. The ends of the strapping 86 connected to the fuel gage are riveted as at 100 to a small block 101 of insulating board and have at their terminals an upstanding pair of tabs 102 and 104. Tab 102 is adapted to be connected to a fuel gage tank unit in a manner hereinafter pointed out in detail.

Generally adjacent the respective tabs 102, 104, 92, and 94 is located an insulating board or panel 106 particularly shown in Figures 3, 4, and 5 respectively. Board 106 is detachably secured by fasteners 107 to the container 70 for the ammeter and fuel gage serving as a cover plate to a portion of the container and having an edge 142 closely spaced relative to the upstanding tabs, above mentioned. An arrangement of strapping is mounted to the insulating board 106, a portion thereof including an upstanding tab 108 generally aligned with the tab 104. The strapping portion which mounts the tab 108 is held by rivet 110 of one general type used on board 106 and is connected to an accessory terminal 112. A plurality of rivets 114 of another type penetrates the insulating board 106 to form the fixed contacts for the key-controlled ignition switch 42 and the handle-controlled switch 44. The switch 42 comprises a lock cylinder 116 mounted to rotate and respect to a switch casing 118 secured in the instrument container 70. The key-controlled ignition switch 42 may be of the type generally in use wherein the lock cylinder 116 in being held in one position is yieldably opposed by a spring, as spring 120. The common arrangement is that the opposing spring acts to return the ignition switch from the start position to the run position. Mounted for rotation with the cylinder 116 is a rotatable switch element 122, the embossed contact portions of which are urged into electrical contact with the fixed contact rivets 114 by a spring 123. Insulating board 106 may desirably be hinged at the bottom thereof at 124 to the container 70. The strapping connected to the rivets 114 of key-controlled switch 42 provides a pair of upstanding tabs one being the starter-solenoid-connected tab 128 and the other a generator-connected tab 130. Together with tabs 92 and 94, respectively generator and battery connected, the tabs 128 and 130 are adapted as a group to receive a plug-type disconnect or connector 132 later to be described more in detail.

One of the lower fixed contact rivets 114 for the key-controlled switch 42 is connected to strapping terminating in an upstanding ignition-connected tab 134. Terminating in a pair of upstanding posts 136 and 138 provided for the vehicle heater and spot light if desired, is a pair of rivets which mount a circuit breaker 140 between key-controlled switch 42 and handle-controlled switch 44 and adapted to limit load current therethrough. Circuit breaker 140 serves to connect the unenergized contacts of switch 44 to the energized strapping connected to the fixed contacts of key-controlled switch 42. A stop-lamp-connected tab 144 is connected by strapping directly to the post 136 energized through circuit breaker 140. Similar strapping connects post 136 to a rivet 114 forming a fixed contact for the handle-controlled lift switch 44, and similar rivets 114 penetrate insulating panel 106 to form other fixed contacts for the handle-controlled light switch 44. An upstanding tail lamp tab 146 is located adjacent the edge 142 of insulating board 106. The respective tabs 102, 104, 108, 144, and 146 are adapted as a group to receive a plug-type disconnect 148 later to be described in detail.

A socket 150 is provided in the strapping for switch 44 suitable for energizing an instrument lamp switch control and resistor unit such as unit 50. A similar socket 152 is formed in the strapping for switch 44, for illuminating the ignition lock if desired. Tabs 156 and 158 adapted to be connected to the vehicle parking lamp and to the head lamp respectively, are connected by conductive strapping to light switch 44 and are disposed in general adjacency to ignition tab 134 to receive as a group a plug-type disconnect 160 later to be more completely described.

In Figure 6 there is shown the plug-type disconnect or connector 132 used in connection with tab group 92, 94, 128, and 130. The disconnect 132 includes an insulating body having a plurality of passages therein providing internal shoulders, not shown. Receivably positioned within the passages is a plurality of conductor terminal clips such as clip 162, the conductors which terminate therein being variously load-connected and power-source-connected. Clip 162 comprises a sleeve portion 164 clamped about the insulation 165 of a battery-connected wire conductor 168 and having a reduced end portion 166 soldered to the end of the conductor. This soldering may easily be accomplished by dipping the conductor with the clip attached in molten solder. The dip soldering may be accomplished without solder touching blade portions 170 or return bent portions 172. 170 indicates blades extending laterally from cylindrical portion 164 and provided with a return bent yielding portion 172 serving as detents to engage the above described internal insulator shoulders. Between the generally juxtaposed blades 170 an upstanding tab such as

battery-connected tab 90 may wedgingly be received. A similar clip 173 is connected to the terminal of a wire conductor 175 forming a circuit to a starter solenoid 174. Energization of the starter solenoid causes the main relay contacts therein to close, directly connecting the vehicle battery 176 to the starter motor 178. A pair of clips 180 and 182 in connector 132 is interconnected by means of a U-shaped spring 184, the respective lugs of which are received between the blades 186 and 188 which terminate in claws received in an embossment of the type 188 in the blade 186. Spring 184 is conductive and serves with clip 180 and clip 182 to constitute a bridging member between tabs 92 and 130. The tubular sleeve portion of clip 180 receives a conductor 190 connected to generator 192 through a voltage regulator 194. The conductor 190 is open-circuited or not to the generator by the regulator 94 depending on the operation condition of generator 192. Armature and field connected conductors 196 and 198 from the generator 192 are both connected to the regulator 194.

In Figure 7, a plug-type disconnect 148 is provided for the group of upstanding tabs 102, 104, 108, 144, and 146 and has clips in which load-connected conductors terminate. A clip 200 received in the insulator of connector 148 has the terminal thereon of a wire conductor 202 connected to a vehicle tail lamp 204. A clip 206, which cooperates with tab 102, has a conductor 208 terminating therein which establishes an electrical connection with a fuel gage tank unit 210. A clip 212 is connected to a stop lamp 218 through a conductor 214 and an interposed brake pedal actuated switch 216. A clip 220 will be noted to have relatively wide blades 221 adapted to receive therebetween the pair of aligned tabs 104 and 108 for the purposes of interconnecting the named tabs. It will be noted that no conductor is otherwise connected to clip 220, the clip serving only as a bridging member between the named tabs.

In Figure 8 the connector 160 provides load-supplying conductor clips and is shown adapted for cooperation with the parking-lamp-connected tab 156 and head-lamp-connected tab 158, of switch 40 and the ignition-connected tab 134 of switch 42. Between the blades of a clip 222 the tab 134 is received for connection to ignition coil 224. Ignition coil 224 is in turn connected to a set of spark plugs 226 through an ignition distributor 228. A clip 230 cooperating with head lamp tab 158 is connected to head lamp 240 through a dimmer switch 234 having two leads 236 and 238 to a center tapped filament applied in known manner to the head lamp. A clip 242 receives parking lamp tab 156 between the blades thereof and through a conductor 243 establishes a connection with parking lamp 244.

The beneficial arrangement of parts of the electrical control unit of Figures 3, 4, and 5 both before and after application of the plug-type disconnects of Figures 6, 7, and 8, may be explained as follows. Before the plug-type disconnects are applied, either of the instruments 38 or 40 may be removed independently of the other instrument and moreover, the switches 42 and 44 may be removed from container 70 independently of the instruments. The fixed contacts and the circuit breaker for the respective switches 42 and 44 may also be removed independently of the rotary elements of the switch by the simple expedient of removing insulating panel 106 and the parts connected thereto. The electrical devices

mounted within container 70 are for use in the body of a vehicle since the instrument panel in which container 70 fits is mounted so as to be observed by passengers seated in the body of the vehicle. On the other hand, the electrical system of the vehicle is generally located in the chassis and includes the generator, battery, starter, ignition system, and various lamps of Figures 6, 7, and 8. Hence the convenient plug-type disconnects 132, 148, and 160 which are connected directly to the named chassis installed electrical devices are especially adapted to effect an electrical interconnection between the body and chassis simply and in an easy manner during the last phases of line assembly of the vehicle.

Any one instrument of the group of instruments 42 and 44 may simply be removed for inspection or repair merely by removing the associated connector 132 and 148 whichever that may be, and detachably removing the instrument from container 70. The remaining instrument, connectors, and the switches may conveniently be left in place in the container 70.

As herein disclosed, the invention is shown embodied in an instrument or dash panel having pressure and gear actuated instruments, and a separate unitary container housing a pair of switches and a pair of electrical instruments. It is evident that all electric instruments could be used and the temperature and oil pressure gages and even the speedometer could equally well be electrically actuated. So also the drawings show only the pair of switches interconnected by a circuit breaker and supplying a common load-connected-connector therebetween. But self-evidently the switches and interconnections are limited as to number only by the particular needs of the energy-consuming electrical loads supplied thereby. Indeed, it is not essential to the invention that the completed structure be arranged in a single container at all although a unit assembly is preferred for the sake of simplicity and general cleanness of design. The invention applies to many possible arrangements in which a plurality of load-connected switches are to be interconnected or in which a switch and an instrument are to be interconnected to a load and source through connector means or in which a plurality of instruments and switches are to be interconnected, and variations and modifications of the invention described are equally comprehended by the foregoing description.

What is claimed is:

1. An electrical control unit for dash panels and the like comprising a container having a face opening, an instrument received in the face opening of the container and detachably secured to the container at the back thereof, a rotary switch element mounted for rotation in said container adjacent the instrument, a plurality of fixed contacts for the rotary switch element and an insulated cover plate for a portion of the back of the container for insulatively mounting said contacts to the container so as to establish cooperation with the rotary switch element, conductive strapping separately carried by the instrument and cover plate and respectively connected to the instrument and switch contacts, unconnected ends of said strapping terminating in individual tabs grouped on either side of an edge of the cover plate, and a connector formed to receive said group of tabs and having a plurality of energized and load-connected conductor terminals carried thereby, and being arranged for interconnecting

the energized and load-connected conductor terminals through the instrument and switch.

2. An electrical control unit for dash panels and the like comprising a container having a face opening, a pair of instruments received in the face opening of the container and detachably secured to the container at the back thereof, a rotary switch element mounted for rotation in said container adjacent to and independently of the instruments, a plurality of fixed contacts for the rotary switch element and an insulated cover plate for a portion of the back of the container for insulatively mounting said contacts to the container so as to establish cooperation with the rotary switch element to form a switch, conductive strapping separately carried by the instruments and cover plate and respectively connected to the instruments and switch contacts, unconnected ends of said strapping terminating in individual tabs arranged in groups adjacent an edge of the cover plate, and connectors formed to receive said groups of tabs and having a plurality of energized and load-connected conductor terminals carried thereby, and being arranged for interconnecting the energized and load-connected conductor terminals through the instrument and switch.

3. An electrical control unit for dash panels and the like comprising a container having a face opening, an instrument received in the face opening of the container and detachably secured to the container at the back thereof, first and second movable switch elements mounted for movement in said container adjacent the instrument, pluralities of fixed switch contacts for the switch elements and an insulated cover plate for a portion of the back of the container for insulatively mounting said contacts to the container so as to establish cooperation with the switch elements, said pluralities of fixed contacts and said first and second movable switch elements forming respectively first and second switches, a circuit breaker mounted to said insulated cover plate in juxtaposition to the first and second switches, electrically conductive strapping carried by the instrument and the insulated cover plate and respectively connected to the instrument and to the switches and including said circuit breaker in circuit between the latter, said conductive strapping having unconnected ends terminating in individual tabs and arranged in groups adjacent the edges of said cover plate, and connectors formed to receive said groups of tabs and having a plurality of load-connected and power-supply-connected conductor terminals incorporated therein and being arranged for interconnecting the load-connected and supply-connected conductor terminals through the instrument, first switch, circuit breaker, and second switch.

4. An electrical control unit for dash panels and the like comprising a container having a face opening, an instrument received in the face opening of the container and detachably secured to the container at the back thereof, first and second movable switch elements mounted for movement in said container adjacent one another in general adjacency to the instrument, pluralities of fixed switch contacts for the switch elements and an insulated cover plate for a portion of the back of the container for insulatively mounting said contacts to the container so as to establish cooperation with the switch elements, said pluralities of fixed contacts and said first and second movable switch elements forming respectively first and second switches, a circuit breaker mounted to said insulated cover plate in juxtaposition to the first and second switches, electrically conductive strapping carried by the instrument and the insulated cover plate and respectively connected to the instrument and to the switches and including said circuit breaker in circuit between the latter, said conductive strapping having unconnected ends terminating in individual tabs and arranged in groups adjacent the edges of said cover plate, and connectors formed to receive said groups of tabs and having a plurality of load-connected and power-supply-connected conductor terminals incorporated therein and being arranged for interconnecting the load-connected and supply-connected conductor terminals through the instrument and first switch and through the instrument, first switch, circuit breaker, and second switch, at least one said group of tabs being disposed between said first and second switches and another between said first switch and instrument.

5. An electrical control unit for instrumental panels and the like having an instrument opening in the face thereof, said control unit comprising an instrument received in said instrument opening and detachably secured to the panel structure, a switch element mounted to rotate in the panel structure adjacent said instrument, a plurality of fixed switch contacts, an insulating panel mounted to the rear of the panel structure and supporting the fixed contacts in cooperative adjacency to the switch element, said contacts and element forming a rotary switch, electrically conductive strapping carried by the instrument and by the insulating panel and connected respectively to the instrument and to fixed contacts of said rotary switch plurality of contacts, said conductive strapping having unconnected ends terminating in upstanding tabs and arranged in a group adjacent to and on either side of an edge of the insulating panel, and in combination therewith, a connector formed to receive said group of tabs and having energized and load-connected conductor terminals incorporated therein, said connector being arranged to interconnect said energized and load-connected conductor terminals through said instrument and switch and including a bridging member therein for directly connecting at least one tab on one side of the panel edge to at least one tab on the other side of the panel edge.

6. An electrical control unit for instrument panels and the like having an instrument opening in the face thereof, said control unit comprising a pair of instruments received in said instrument opening and detachably secured to the panel structure, a pair of switch elements mounted to rotate in the panel structure adjacent said instrument, pluralities of fixed switch contacts, an insulating panel mounted to the rear of the panel structure and supporting the pluralities of fixed contacts for cooperation with the switch elements, said contacts and elements forming a pair of rotary switches, electrically conductive strapping carried by the instruments and by the insulating panel and connected respectively to the instruments and to fixed contacts of said rotary switch pluralities of contacts, said conductive strapping having unconnected ends terminating in upstanding tabs and arranged in groups adjacent to and on either side of an edge of the insulating panel, and in combination there-

with, a pair of connectors formed to receive groups of said tabs and having energized and load-connected conductor terminals incorporated therein, said connectors being arranged to interconnect said energized and load-connected conductor terminals through said instruments and each including a bridging member therein for directly connecting at least one tab on one side of the panel edge to at least one tab on the other side of the panel edge.

7. An electrical control unit for instrument panels and the like having an instrument opening in the face thereof, said control unit comprising a pair of instruments received in said instrument opening and detachably secured to the panel structure, a pair of switch elements mounted to rotate in the panel structure adjacent said instrument, pluralities of fixed switch contacts, an insulating panel mounted to the rear of the panel structure and supporting the pluralities of fixed contacts for cooperation with the switch elements, said contacts and elements forming a pair of rotary switches, electrically conductive strapping carried by the instruments and by the insulating panel and connected respectively to the instruments and to fixed contacts of said rotary switch pluralities of contacts, said conductive strapping having unconnected ends terminating in upstanding tabs and arranged in groups adjacent to and on either side of an edge of the insulating panel, and in combination therewith, a pair of connectors formed to receive groups of said tabs and having energized and load-connected conductor terminals incorporated therein, said connectors being arranged to interconnect said energized and load-connected conductor terminals through said instruments and each including a bridging member therein for directly connecting at least one tab on one side of the panel edge to at least one tab on the other side of the panel edge, and a circuit breaker mounted to the insulating panel intermediate the pair of switches and effectively establishing a connection between the strapping connected to one switch and the strapping connected to the other switch.

8. An electrical control unit for instrument panels and the like having an instrument opening in the face thereof, said control unit comprising a pair of instruments received in said instrument opening and detachably secured to the panel structure, a pair of switch elements mounted to rotate in the panel structure adjacent said instrument, pluralities of fixed switch contacts, an insulating panel mounted to the rear of the panel structure and supporting the pluralities of fixed contacts for cooperating with the switch elements, said contacts and elements forming a pair of rotary switches, electrically conductive strapping carried by the instruments and by the insulating panel and connected respectively to the instruments and to fixed contacts of said rotary switch pluralities of contacts, said conductive strapping having unconnected ends terminating in upstanding tabs and arranged in groups adjacent to and on either side of an edge of the insulating panel, and in combination therewith, a pair of connectors formed to receive groups of said tabs and having energized and load-connected conductor terminals incorporated therein, said connectors being arranged to interconnect said energized and load-connected conductor terminals through said instruments and each including a bridging member therein for directly connecting at least one tab on one side of the panel edge to at least one tab on the other side of the panel edge, and a third connector having load-connected conductor terminals incorporated therein and being formed to receive simultaneously grouped tabs from strapping connected to both switches.

9. An electrical control unit for instrument panels and the like having an instrument opening in the face thereof, said control unit comprising an instrument received in said opening and detachably secured to the panel structure, a switch element mounted to rotate in the panel structure in spaced adjacency to the instrument, an insulating panel behind the switch element and detachably secured to the panel structure, strap-supporting rivets extending through the insulating panel in a manner to form fixed switch contacts adjacent said switch element and cooperating therewith to constitute a rotary switch, means forming conductors connected to the instrument and to the switch and having unconnected ends terminating in tabs arranged in a group, said conductor forming means including strapping conductively supported by said rivets, and a connector formed to receive said group of tabs and having energized and load-connected wires terminating therein, said connector being arranged to interconnect said energized and load-connected wires through the switch and instrument.

10. An electrical control unit for instrument panels and the like having an instrument opening in the face thereof, said control unit comprising an instrument received in said opening and detachably secured to the panel structure, a pair of switch elements mounted to rotate in the panel structure in spaced adjacency to the instrument, an insulating panel behind the switch elements and detachably secured to the panel structure, strap-supporting rivets extending through the insulating panel in a manner to form fixed switch contacts adjacent each of said switch elements and cooperating therewith to constitute a pair of rotary switches, means forming conductors connected to the instrument and to the switches and having unconnected ends terminating in tabs arranged in one group between one switch and the instrument in another group and between said one switch and the other switch, said conductor forming means including strapping conductively supported by said rivets, a connector formed to receive said one group of tabs and having energized and load-connected wires terminating therein, said connector being arranged to interconnect said energized and load-connected wires through the said one switch and instrument, a second connector formed to receive said other group of tabs and having load-connected wires terminating therein, and a circuit breaker mounted to the insulating panel between the switches and connecting the respective strapping of the latter to supply at least a portion of the load-connected wires in said second connector with a limited current.

11. A control unit for electrical instrument panels and the like comprising metallic panel structure having an insulating panel at the back thereof, a pair of switch elements mounted to the panel structure in adjacency to one another and to the insulating panel, pluralities of strap-supporting rivets extending through the insulating panel to form fixed switch contacts in juxtaposition to the respective switch elements and cooperating therewith to constitute a pair of rotary switches, conductors for the switches hav-

ing unconnected ends terminating in tabs and including strapping conductively supported by the contact forming rivets upon the insulating panel, at least a portion of the strapping connected to one of said switches having means for energizing it and at least a portion of the strapping connected to the other of said switches having means for loading it, a circuit breaker mounted to the insulating panel connected between the respective said portions of strapping, and a connector formed to receive strap tabs connected to each of the switches, said connector having load-connected wires terminating therein adapted to receive energy directly from one switch and indirectly from the other switch through the circuit breaker.

12. A control unit for electrical instrument panels and the like comprising metallic panel structure having an insulating panel at the back thereof, a key-controlled switch element and a handle-controlled switch element mounted to the panel structure in general adjacency to one another and to the insulating panel, pluralities of strap-supporting rivets extending through the insulating panel to form fixed switch contacts in juxtaposition to the respective switch elements and cooperating therewith to constitute a pair of rotary switches, conductors for the switches having unconnected ends terminating in tabs and including strapping conductively supported by the contact forming rivets upon the insulating panel, at least a portion of the strapping connected to said key-controlled switch having means for electrically energizing it and at least a portion of the strapping connected to the handle-controlled switch having means for electrically loading it, a circuit breaker mounted to the insulating panel connected between the respective said portions of strapping, and a connector formed to receive strap tabs different ones of which are connected to the handle-controlled switch and to the key-controlled switch, said connector having load-connected wires terminating therein adapted to receive energy directly from the key-controlled switch and indirectly from the handle-controlled switch through the circuit breaker.

13. A control unit for electrical instrument panels and the like comprising metallic panel structure having an insulating panel at the back thereof, a key-controlled switch element and a handle-controlled switch element mounted to the panel structure in general adjacency to one another and to the insulating panel, pluralities of strap-supporting rivets extending through the insulating panel to form fixed switch contacts in juxtaposition to the respective switch elements and cooperating therewith to constitute a pair of rotary switches, conductors for the switches having unconnected ends terminating in tabs and including strapping conductively supported by the contact forming rivets upon the insulating panel, at least a portion of the strapping connected to said key-controlled switch having means for electrically energizing it and at least a portion of the strapping connected to the handle-controlled switch having means for electrically loading it, a circuit breaker mounted to the insulating panel connected between the respective said portions of strapping, a connector formed to receive strap tabs different ones of which are connected to the handle-controlled switch and to the key-controlled switch, said connector having load-connected wires terminating therein adapted to receive energy directly from the key-controlled switch and indirectly from the handle-controlled switch through the circuit breaker, and a pair of instruments mounted to the panel structure and including an ammeter, said instruments having conductors providing pairs of rivet-supported tabs cooperating with other tabs aforesaid to form a group of tabs between the ammeter and key-controlled switch and a group of tabs between the handle-controlled switch and other instrument, said means for energizing and loading said portions of strapping including a pair of connectors respectively formed to receive said groups of tabs and having load-connected and power-connected conductors terminating therein.

14. An electrical control unit for automotive instrument panels and the like which include a panel, said unit having means mounted to the panel including cable-supplied mountably removable electrical devices constituted by a plurality of switches and instruments, material presenting insulative surfaces carried at the backs of certain said electrical devices so as to define lines of division generally juxtaposed to the plane of the devices and intermediate the devices, plug-type disconnects having energized and load-connected conductors forming electrical cables terminating therein, electrically conductive straps disposed along said insulative surfaces and connected through the material to the said backs of individual devices, said straps having portions provided with upstanding tabs arranged in groups to receive said plug-type disconnects, the grouped tabs of straps connected to at least two said electrical devices being arranged in a group straddling a said line of division with the tabs for one of the two devices being on one side of the line of division and the tabs for the other of the two devices being on the other side of the line of division such as mutually to receive a plug type disconnect having energized and load-connected conductor in the cable thereof when the devices are in place and yet to permit independent removal of the said two devices one without the other when the disconnect is not in applied position.

15. An electrical control unit for automotive instrument panels and the like which include a panel, said unit having means mounted to the panel including cable-supplied mountably removable electrical devices constituted by pluralities of switches and instruments, material presenting insulative surfaces carried at the backs of at least some of said electrical devices so as to define lines of division generally juxtaposed to the plane of the devices and intermediate the devices, plug-type disconnects having electrical cables terminating therein, electrically conductive straps disposed along said insulative surfaces and connected through the material to the said backs of individual devices, said straps having portions provided with upstanding tabs arranged in groups to receive said plug-type disconnects, the tabs of straps connected to at least two said electrical devices being arranged in a group straddling a said line of division with the tabs for one of the two devices being on one side of the line of division and the tabs for the other of the two devices being on the other side of the line of division such as mutually to receive the corresponding plug-type disconnect when the devices are in place and yet to permit independent removal of the said two devices one without the other when the disconnect is not in applied position.

16. An electrical control unit for automotive instrument panels and the like which include a panel, said unit having means mounted to the panel in the same general vicinity including cable-supplied devices constituted by a plurality of switches and instruments, material presenting insulative surfaces carried at the backs of adjacent electrical devices and so carried at the backs of at least some of the adjacent devices as to define lines of division intervening between and generally juxtaposed to the plane of the latter said devices, plug-type disconnects having energized and load-connected wires forming cables terminating therein, electrically conductive straps disposed along said insulative surfaces and connected through the material to the backs of individual devices, said straps having portions provided with upstanding tabs arranged in groups to receive said plug-type disconnects, other adjacent devices from those above mentioned between which lines of division intervene, including at least two switches, certain tabs of the connected straps of which are arranged in a common single group such as mutually to receive a plug-type disconnect having only load-connected wires in the cable thereof, and supplied by the switches mutually, and a circuit breaker mounted to said material between the two-named switches, said two switches having a common feed and said circuit breaker being included in the feed circuit to one of the two switches.

17. An electrical control unit for automotive instrument panels and the like which include a panel, said unit having means mounted to the panel in the same general vicinity including cable-supplied devices constituted by pluralities of switches and instruments, material presenting insulative surfaces carried at the backs of adjacent electrical devices and so carried at the backs of at least some of the adjacent devices as to define lines of division intervening between and generally juxtaposed to the plane of the latter said devices, plug-type disconnects having electrical cables terminating therein, electrically conductive straps disposed along said insulative surfaces and connected through the material to the backs of individual devices, said straps having portions provided with upstanding tabs arranged in groups to receive said plug-type disconnects, tabs on the straps for at least two adjacent devices other than those above mentioned between which lines of division intervene being arranged in a single group such as mutually to receive and supply a plug-type disconnect in common, and a circuit breaker mounted between the two-named devices, said two devices having a common feed and said circuit breaker being included in the feed circuit to one of the two devices.

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