April 6, 1948. J. M. WILSON 2,439,326

CONTROL PANEL

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Fig. 1.

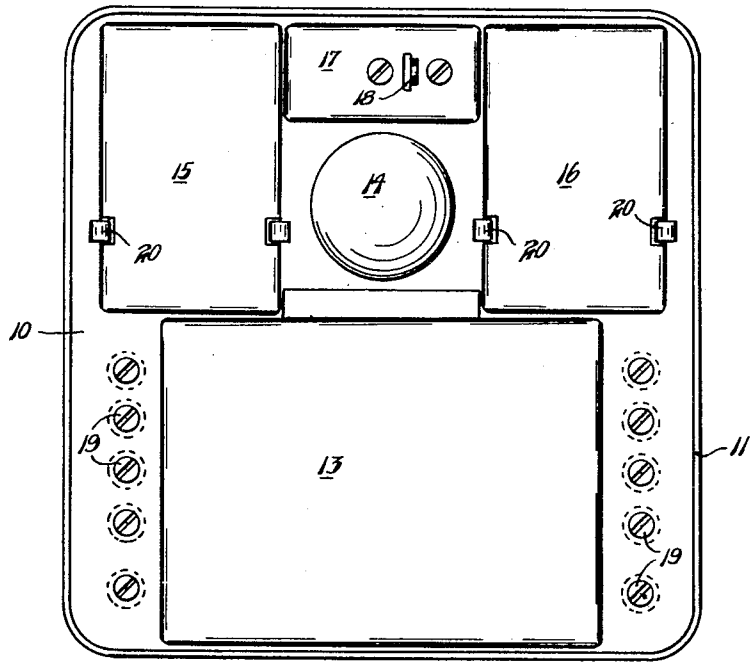


Fig. 2.

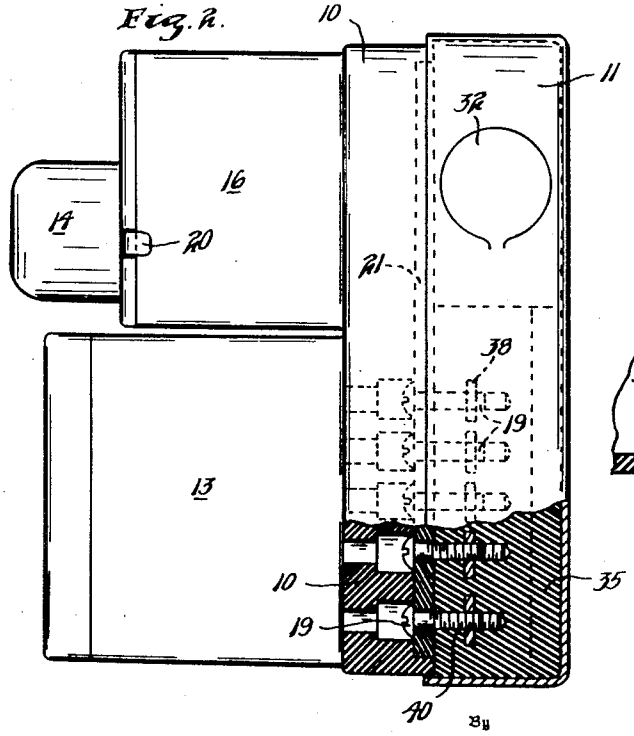
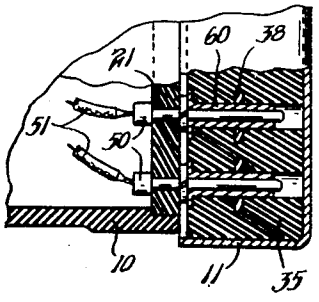


Fig. 8.



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Fig. 3.

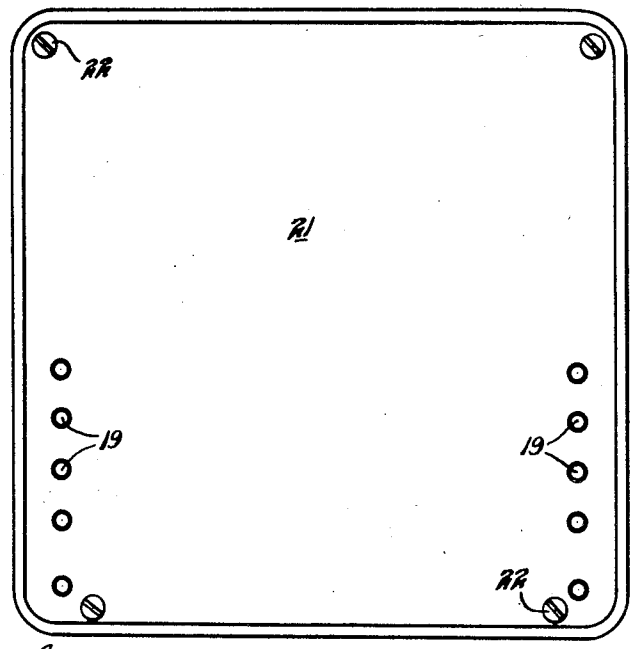
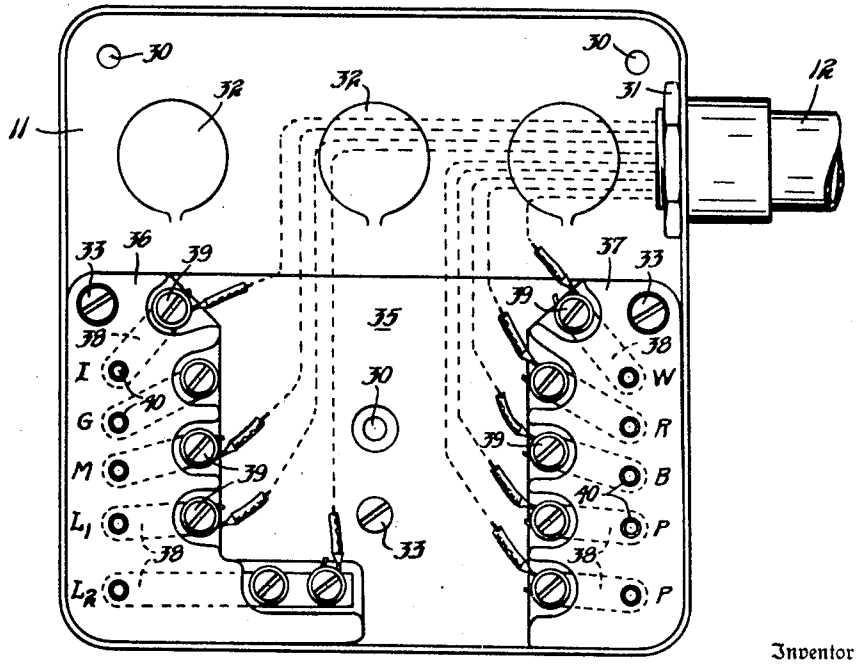


Fig. 4.



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Fig. 5.

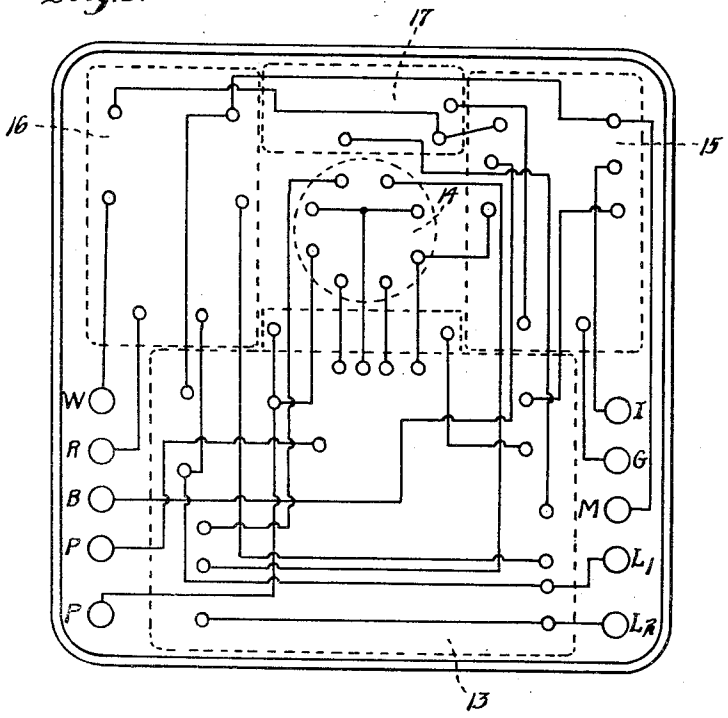


Fig. 6.

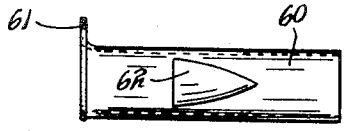
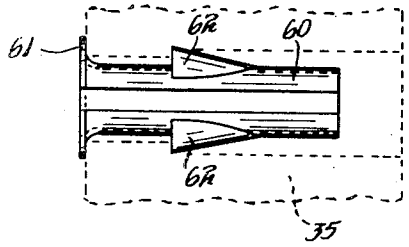


Fig. 7.



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UNITED STATES PATENT OFFICE

2,439,326

CONTROL PANEL

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Application May 10, 1944, Serial No. 534,898

3 Claims. (Cl. 175—308)

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My invention is related to the subject of control panels. More particularly it is directed to a demountable control panel for use in a condition control system such as a fluid fuel burning furnace or the like.

In an electronic burner control such as is described in my copending application Serial No. 462,558, filed October 19, 1942, a plurality of control devices are used such as an electron discharge element, a transformer, a condenser, a safety switch and a pair of electromagnetic relays. The circuit arrangement of these various elements of the control systems is very complicated and therefore to secure proper connections between the various elements, the device should preferably be constructed as a unit and completely wired at the factory. In this manner of handling, the assembled elements may be arranged on a panel member and interconnected so that on installation the only steps required are to provide for a panel support and then extend wiring from the thermostat, motor device, ignition and flame responsive device, and the source of power, to terminals associated with the panel. This arrangement facilitates handling and has the further advantage that in the event of failure of any of the control elements, the entire assembly may be quickly removed for repair, or it may be readily replaced with another assembly in but a few moments' time.

Another advantage of my invention is that inasmuch as it includes an electron discharge element which is to be used in conjunction with a plurality of other control elements, I have arranged these elements in a compact manner about the electron discharge element in such a way as to furnish essential protection against external injury to said element.

A further advantage is that all of the elements of the control device are grouped in close proximity to each other for simplicity of wiring and in such a manner as to present an attractive salcable assembly.

The principal object of my invention is to provide in a single assembly, an easily demountable control panel consisting of a plurality of cooperating control devices.

Another object is to provide in an electrical control mechanism, a readily accessible terminal receiving portion and a second portion consisting of a plurality of cooperating electrical control devices so arranged as to be easily and quickly mounted on the terminal receiving portion, with means for electrically connecting the terminals to certain of the electrical control devices.

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Other and further objects and advantages will be apparent from the following descriptions and claims, and from the appended drawings in which:

Figure 1 is a plan view of the control panel;

Figure 2 is a side elevation of the control panel mounted on the terminal receiving panel with certain portions shown in cross section;

Figure 3 is a rear view of the sub-base of the demountable panel;

Figure 4 is a plan view of the terminal receiving portion of the panel mounted in relation to a wire conveying conduit;

Figure 5 is a rear view of the demountable panel with the sub-base removed, showing the electrical connections mounted on the rear of the panel;

Figure 6 is a side elevation of a resilient socket used in one modification to secure electrical connection with the terminal members;

Figure 7 is a front elevation of the device shown in Figure 6, and

Figure 8 is a broken-away view illustrating in cross-section, a modified manner of mounting the two panels illustrated in cross-section in Figure 2.

Referring now to the drawings and particularly to Figures 1 and 2, a panel member 10 which comprises an assembly of control elements is adapted to be mounted upon a terminal receiving assembly indicated at 11. It will be understood that assembly 11 is arranged to be securely mounted on a wall or other structure in a fixed relation to a wire conveying conduit 12 shown in Figure 4.

Suitably mounted on one side of the panel is a transformer 13, an electron discharge device 14, a pair of relays 15 and 16, and a safety switch 17, having a manual operator 18. Visible from the front of the panel but preferably counter sunk therein are a plurality of electrical connectors 19 which are here shown in the form of bolts having kerfs to accommodate a screw driver. The two relays have detachable top sections which are secured in place by resilient clamps 20. As shown in Figures 1 and 2 the panel assembly 10 is formed of a single mold of "Bakelite" with detachable top sections for members 13, 15, 16, and 17, the electrical connectors 19 being embedded in the insulating material. This is merely a commercial adaptation of my device for it will be readily recognized that the panel member could be made of any suitable material having the various elements suitably mounted thereon.

Referring now to Figure 3 there is shown a back

panel or sub-base 21 which is secured to the rear of panel 10 by means of screws 22. This sub-base is here illustrated as being formed of an opaque insulating material such as "Bakelite" but it will be understood that any suitable insulating material may be used. In certain instances it might be desirable to have this sub-base formed of a transparent material such as glass or "Lucite" to permit visual inspection of the connections. The electrical connectors 19 extend through the member 21 to be brought into electrical connection with terminal members in a manner to be disclosed hereinafter. Although the connectors 19 are shown as extending from the side of the panel it will be understood that they may be arranged in any other suitable manner.

The panel receiving assembly 11 shown in Figure 4 consists of a receptacle arranged to be mounted on a wall or supporting member by inserting fastening means in the apertures 30. A wire receiving conduit 12 is shown as being fastened to the side of the receptacle by means of the lock nut 31 but it will be understood that more than one conduit may enter the receptacle as by the knock-outs 32 shown in other positions on the receptacle with suitable separating means to separate the wires into appropriate groups. Suitably secured within the receptacle 11 as by screws 33 is an insulating terminal block 35, having raised portions 36 and 37 on the opposite sides thereof. Embedded within the two raised insulating portions are a plurality of electrical conductors 38 which have wire receiving terminals 39 fastened to one end and threaded sockets 40 at the other end. The threaded sockets 40 are adapted to receive the electrical connectors 19, thus providing proper electrical connections between devices which may be connected to the conductors 18 and the wire receiving terminals 39. Shown in dotted lines are a plurality of electrical wires which serve the purpose of conveying current to or from the various terminals to other devices such as a motor, ignition device and flame detecting means and a source of power, which form no part of the present invention.

Referring now to Figure 5, there is shown a rear view of panel 10 with the sub-base 21 removed therefrom and showing the sundry electrical connections or conductors between the various electrical elements. The members 13, 14, 15, 16 and 17 are shown in dotted lines. As the various connections between the various electrical devices form a highly complicated circuit, it is not deemed essential to give a detailed description of the circuit relationship herein since the latter has been fully explained in my copending application set forth hereinbefore, but for the purpose of properly connecting the panel with other electrical devices whose operation it serves to control, a series of terminals are provided. The letters W, R, and B indicate terminals which are intended to be connected to the three contacts of a room thermostat. The letters P_1 and P_2 indicate terminals which are intended to be connected to a photoelectric cell or other light sensitive device. The letter G indicates a terminal for connection with an electrically operated gas valve when the panel is used in conjunction with a gas furnace; while the letter M indicates a terminal for connection to an electric motor when the device is used with a motor driven oil furnace. The letters L_1 and L_2 indicate a source of electrical energy with L_1 being the source of potential and L_2 the ground connection.

Referring now to Figures 6, 7 and 8 is shown an alternative method for mounting assembly 10 on assembly 11 and a modified means for securing electrical connections between them. As seen in Figure 8 electrical connectors 50 are used in place of the electrical connectors 19 shown in Figures 1, 2 and 3. The connectors 50 are shown as being embedded in the sub-base or rear panel 21 and through wires 51, are suitably connected to the proper electrical devices by means equivalent to the lettered terminals shown in Figure 5. In place of the threaded sockets 40, shown in Figure 4, for the purpose of this modification, resilient frictional sockets 60 shown in Figures 6 and 7 have been substituted. It will be evident from this modification therefore that the panel assembly 10 is adapted to be frictionally mounted upon the terminal assembly 11 rather than by the threaded connection of members 19 and 40 as illustrated in Figure 2. The resilient sockets 60, are formed from a single piece of metal by shaping the metal into a cylindrical form of approximately 340°. A collar 61 formed by swaging a portion of the cylinder gives resilience to the structure. A pair of louvres 62 are formed as by stamping sections of the side of the tube, and serve to prevent the withdrawal of the tube from a panel structure when the plug 50 is withdrawn therefrom.

Since the resilient sockets 60 are shown and described in a copending application No. 534,897 filed concurrently herewith in the name of John O. Rosche, they per se do not form a part of the present invention and any other form of resilient plug and socket structure may be substituted therefor. Application Serial No. 534,897 has become abandoned.

It will be evident from the foregoing description that my invention comprises a novel method of assembling a plurality of electrical control elements having a rather complicated electrical circuit into a single device for quick and easy mounting in proper relation to a plurality of electrical conducting wires. Since many other similar arrangements would be evident to anyone skilled in the art I do not wish to be limited by the specific disclosures made heretofore but rather by the scope of the appended claims.

I claim as my invention:

1. A control panel for controlling an electrically operated air conditioning mechanism, comprising in combination, a first assembly including a panel member and a plurality of dissimilar electrical devices mounted on the front of said panel, a plurality of conductors on the back of said panel interconnecting the electrical devices and terminating in a plurality of circular connecting lugs, headed projections inserted in the lugs of said conductors, a plate formed of insulating material removably attached to the base of said first assembly and having a plurality of openings adapted to retain the headed portions of said projections within said assembly, a second assembly removably receiving said first assembly, said second assembly being adapted for mounting on a rigid support and including a member having a plurality of wire receiving terminals adapted for connection to elements of said electrical mechanism and a source of power, and means forming a part of said second assembly adapted to receive said projections and rigidly retain the same and thereby said first assembly while also completing electrical connections between said electrical devices,

the source of power and said electrical mechanism.

2. A control panel for controlling an electrically operated air conditioning mechanism, comprising in combination, a first assembly including a panel member and a plurality of dissimilar electrical devices mounted on the front of said panel, a plurality of conductors on the back of said panel interconnecting said electrical devices and terminating in a plurality of circular lugs, headed projections inserted in the lugs of said conductors, a plate formed of insulating material removably attached to the back of said first assembly and having a plurality of openings adapted to pass the unheaded portions of said projections, said plate when attached completely enclosing said conductors within said first assembly, and a second assembly including an open ended housing and a single terminal block rigidly mounted therein having a receiving assembly adapted to receive said first assembly by said projections to mechanically and electrically connect the same, said joined assemblies forming a second completely enclosed housing for said projections and said terminal block.

3. A control panel for controlling an electrically operable air conditioning mechanism, comprising in combination, a first assembly including an open ended hollow panel member and a plurality of dissimilar electrical devices mounted on the front of said panel, a plurality of conductors on the back of said panel interconnecting said electrical devices and terminating in a plurality of circular lugs, headed projections inserted in the lugs of said conductors, a plate formed of insulating material removably attached to the back

of said first assembly, flushly mounted within the hollow portion of the panel member, and having a plurality of openings adapted to pass the unheaded portions of said projections, a second assembly including an open ended housing whose inside dimensions at the open end are equal to the outside dimensions of the back of said first assembly and a single terminal block rigidly mounted therein having a receiving assembly adapted to receive said first assembly by said projections to mechanically and electrically connect the same, said joined assemblies forming a completely enclosed housing for said projections and said terminal block.

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