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INSTRUMENT PANEL LIGHTING ASSEMBLY

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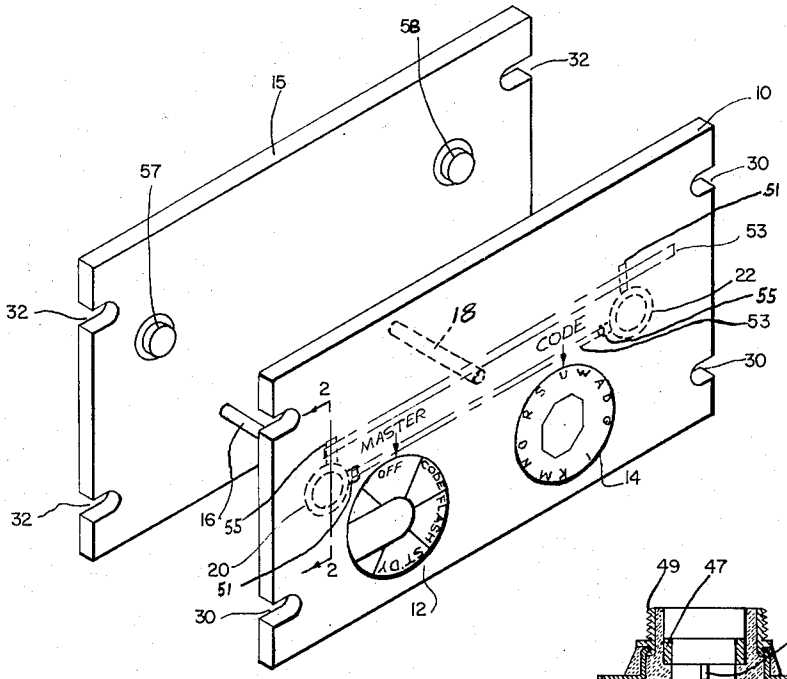


FIG. 1

FIG. 4

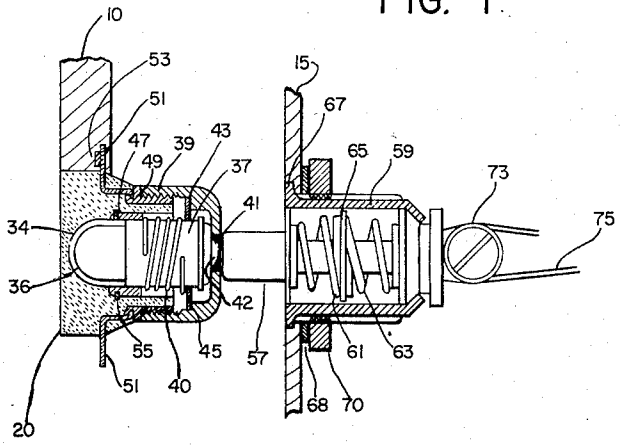


FIG. 2

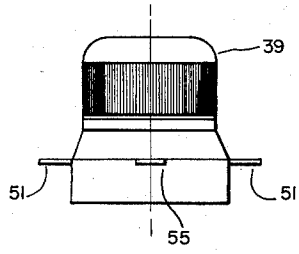


FIG. 3

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INSTRUMENT PANEL LIGHTING ASSEMBLY

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6 Claims. (Cl. 240—8.16)

This invention relates to panels which are illuminated so that the legends and indicia carried thereon may be read at night or under other circumstances involving the absence of adequate natural lighting.

More particularly, this invention has reference to the illumination of instrument panels by light transmitted through the medium of the material of which the panel is composed. This light is usually supplied by a source which is coupled closely to the panel and located substantially in the plane thereof. The rays of light are transmitted edgewise of the body of the panel and confined therein except at the information areas defined by the legends or indicia.

In the usual practical installation of an illuminated panel of the foregoing type, the panel is fabricated from a plastic material which is transparent. The surfaces of the panel are processed with one or more coatings of material which may, for example, include a white vinyl layer applied directly to the surfaces of the panel, and an overlying layer of opaque black vinyl. The black vinyl layer is appropriately etched or engraved so as to expose portions of the white vinyl layer in accordance with appropriate indicia or legends. The panel thus fabricated is processed with one or more holes which individually receive an associated lamp. These lamps when energized illuminate the interior of the panel, and inasmuch as the light is readily transmitted they also illuminate the legends which are rendered easily readable in contrast to their opaque black background.

Various arrangements have heretofore been proposed in the prior art for particular panel construction, including the application of various overlying layers of material for covering a transparent panel, and the positioning and support of lamp sockets and the energizing conductors for these sockets upon the panel. In view of the considerable advances made within recent years in the instrumentation for aircraft and other devices requiring a panel type disposition of controls, considerable demand now exists for commensurate improvements in the illuminated panel arrangements associated with such instrumentation.

Aircraft controls are becoming increasingly complex, resulting in a requirement for more switches, control dials, and terminal jacks projecting or otherwise mounted at the control panel for access and manipulation by the operator. Heretofore, the lamp arrangements incorporated in the control panel for illuminating indicia or legends associated with the foregoing switches, dials and jacks in most instances have required that portions of the sockets for housing these components project from the front surface of the panel so that ready access may be had to the enclosed lamps. It may be readily appreciated that these socket projections interfered with the readability of the panel instruments by increasing the number of components projecting from the front surfaces of the panel and presenting a highly complicated array to the operator. In many instances, the projecting

lamp sockets obstructed the visibility of meter scales or the like.

Moreover, because of the constant supervisory demands made upon present day aircraft pilots, close attention is not given in all instances to the operation of the control panel switches. These switches are quite frequently operated without directly viewing the control panel and on the basis of experience. The presence of the projecting lamp sockets quite often result in the inadvertent twisting of socket caps in lieu of the proper switches or dials, thereby detracting from the pilot's effective control over the aircraft.

Accordingly, a principal object of this invention is to provide an improved lighting arrangement for instrumentation control panels which is characterized by a complete absence of sockets or other lighting equipment from the front surface of the panel, thereby improving the visibility of the controls and the readability of the information legends and, at the same time, substantially reducing the number of components prejecting from the front control panel surface which tend to complicate the appearance of the panel and confuse the operator.

Another object is to greatly simplify the construction of illuminated control panels so that they can be easily fabricated and installed.

Another object is to provide an illuminated control panel which will promote the more effective sealing of the chassis box or the like containing the electrical and mechanical components which are under control by the equipment operated from the panel.

Other objects will become apparent in the ensuing specification and appended drawings in which:

Figure 1 is a perspective view showing an illuminated panel in position for placement in operative association with a central supporting panel;

Figure 2 is a view in section taken along the lines 2—2 of Figure 1;

Figure 3 is a view in elevation of the lamp support shown in Figure 2, and

Figure 4 is a view in section of a portion of the lamp support shown in Figure 2.

Referring now to the drawings, an indicia panel 10 has a pair of dials 12 and 14 mounted thereon. A second panel 15 has mounted thereon suitable shafts 16 and 18 to be connected to dials 12 and 14 respectively. A pair of lamps are mounted in supporting sockets on panel 10 and extend to the region of the front surface of panel 10, the supports for the lamps being shown dotted at 20 and 22. A pair of protruding, resiliently mounted plungers 57 and 58 are mounted on the rear plate 15 to define electrical contacts for the lamps mounted in supports 20 and 22 respectively as will be subsequently explained. These lamps provide edgewise illumination of the translucent supporting panel 10 and thus illuminate the indicia inscribed upon the forward surface of panel 10. These indicia may be marked on panel 10 in various ways well known in the art, one being to coat the entire surface black except for the desired designations, so that light may penetrate therethrough. A plurality of notches or apertures 30 are provided in panel 10 to permit the indicia panel to be mounted by means of mounting screws on the front of an instrument case. A corresponding plurality of apertures 32 are located in rear panel 15 to permit the mounting screws which hold the forward panel to also secure the rearward panel 15 in position, the specific mounting arrangement being shown in greater detail in Figure 2.

Referring now to Figure 2, there is depicted, in section, a plastic member 20 mounted in panel 10 and having an aperture 34 which is adapted by its curvature to receive a lamp 36. The base 37 of lamp 36 is secured

to a metallic cylindrical cap 39 by means of solder or other equivalent means at point 41 adjacent the base of lamp 36.

Advantageously, a helical spring 40 is mounted on the base 37 of lamp 36 and compressed between annular metallic ring 47 and plastic ring 43 to ensure good electrical contact between ring 47 and base 37 of the lamp. This helical spring also serves to lock cylindrical member 39 into position when cylindrical member 39 is screwed down against the flange of annular member 49. A plastic annular ring 43 engages the base 37 of lamp 36 and also engages a shoulder 45 in cap 39 to insure adequate physical support for lamp 36. A pair of annular metallic rings 47 and 49 provide electrical connections for the outer periphery of base 37 and the centrally located base pin 42. Conductors 51 provide electrical connections between annular ring 49 and conductors such as 53 mounted in the forward panel 10 in any convenient manner known in the art. Another pair of conductors such as conductor 55 are connected to annular ring 47 in a manner similar to the connection between conductor 51 and annular ring 49. For example, they may be crimped between flanges of annular ring 49 and thereafter soldered, however, crimping alone may be sufficient to provide adequate electrical contact. Since conductors 51 and 55 extend through plastic member 20 at right angles, the connections between these conductors and conductors 53 may be reversed to provide serial connection between a pair of lamps by the rotation of base 20 through 90° before base 20 is secured to panel 10.

Supporting panel 15 has mounted therein a pair of resilient metallic plungers 57 one of which engages cap 39 in a region adjacent solder point 41 when the panels are mounted on an instrument case. Plunger 57 is mounted in a cylindrical metallic member 59 and is biased by a pair of toroidal springs 61 and 63 which are separated by an annular guide member 65. Cylindrical member 59 is secured in panel 15 by means of flange 67 engaging a recess in the forward surface of panel 15 and an annular washer 68 and a nut 70 which threadably engages the outer periphery of cylindrical member 59. A screw terminal 73 is mounted on the rear of cylindrical member 59 and connected to plunger 57. A wire connection such as wire 75 may be placed under the head of the screw of terminal 73 and secured in position.

If, when the assembly is fabricated, one of the lamp supports, such as support 20, is rotated 90° with respect to support 22, the two lamps will be connected in parallel and plunger 57 may be connected to ground or reference potential while plunger 58 may be connected to a source of electromotive force, such as a battery. With such an arrangement, plungers 57 and 58 define the only electrical connections to the front panel 10 and facilitate removal of the front panel for maintenance and replacement of the lamps.

Another combination of flush-mounted lamp support and indicia panel is disclosed and described in my application Serial No. 609,289, filed September 11, 1956.

While one preferred embodiment of this invention has been specifically disclosed it is understood that the invention is not limited thereto as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

For example the resilient pins 57 and 58 may be mounted within the control box (not shown).

I claim:

1. The combination of a translucent panel having a translucent lamp supporting member secured thereto substantially flush with the forward surface of said panel, a cap member for said supporting member and having a lamp therein, said lamp being secured to said cap member, a first annular metallic ring mounted on the outer periphery of said lamp support, a second annular metallic ring mounted on the inner periphery of said lamp support, conductors connected to each of said annular metallic rings, a plastic annular ring encircling said lamp and secured to said cap member, a helical spring surrounding the base of said lamp and engaging one of said annular metallic rings and said annular plastic ring, conductor means connected to said conductors and resiliently mounted pin means for defining an electrical contact with the said cap member.

2. The combination as claimed in claim 1 wherein said resilient pin means includes a metallic pin mounted in a second panel and including a pair of helical springs having a guiding device mounted therebetween.

3. The combination as claimed in claim 1 wherein said conductors extend through said lamp supporting member at substantially right angles to each other whereby the connections between said conductors and said conductor means may be reversed by rotating said lamp supporting member.

4. The combination of a translucent panel having a translucent lamp supporting member secured thereto substantially flush with the forward surface of said panel, a cap member having a lamp secured therein, a first annular metallic ring mounted on the outer periphery of said lamp supporting member, said cap engaging said first annular metallic ring, a second annular metallic ring mounted on the inner periphery of said lamp support for contacting the base of said lamp, conductors connected to each of said annular metallic rings, conducting means connected to said conductors and a second panel having a resilient metallic pin mounted therein for engaging said cap member to define an electrical connection therewith.

5. The combination as claimed in claim 4 further comprising helical spring means surrounding the base of said lamp and engaging said second annular metallic ring.

6. The combination as claimed in claim 4 wherein said conductors extend radially through said lamp supporting member in different directions in the same transverse plane and wherein said conducting means includes a plurality of conductors lying in the same transverse plane whereby the connections between said contors and said conducting means may be reversed by rotating said lamp supporting member.

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