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Dickey et al.

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[54] **PANEL DISPLAY DEVICE HAVING UNITARY MOLDED CASING**

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[52] **U.S. Cl.** .....**340/381 R,** 340/366 R

[51] **Int. Cl.**.....**G08b 5/00,** G08b 5/22, G08b 5/36

[58] **Field of Search** .....340/381 R, 366 R

[56] **References Cited**

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[57] **ABSTRACT**

A panel mounted display device having a unitary molded casing whose exterior and interior sidewalls define a plurality of compartments and whose rear wall contains access apertures. The sidewalls of each compartment have a lower portion terminating abruptly into an upper recessed portion. Indicia bearing disks are seated on the flange surfaces thus formed and are rigidly retained by integral protrusions extending into the compartments from the upper portions of the sidewalls. The upper portions of the sidewalls form shields about the individual compartments.

7 Claims, 5 Drawing Figures

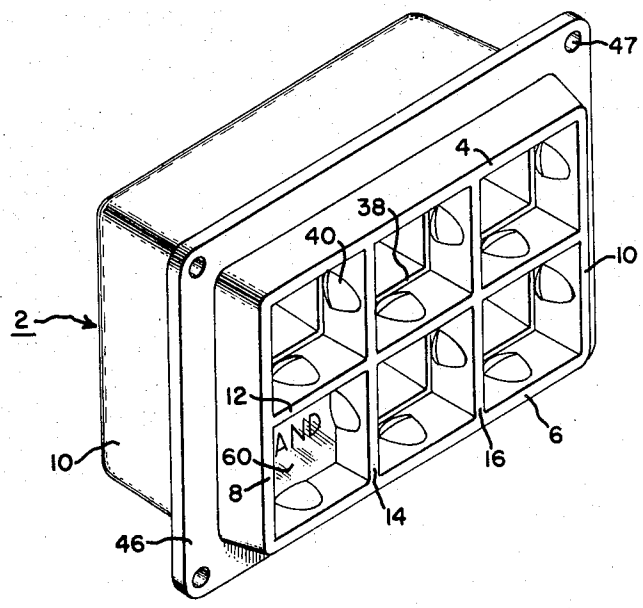


FIG. 1

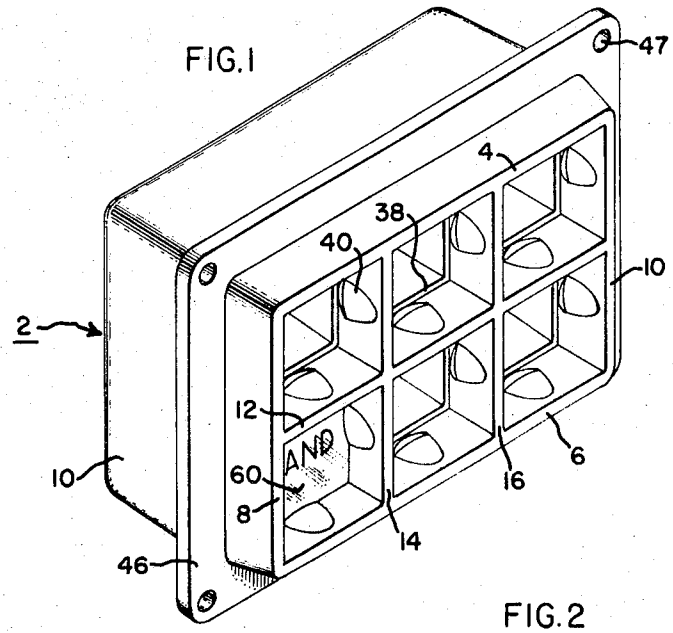


FIG. 2

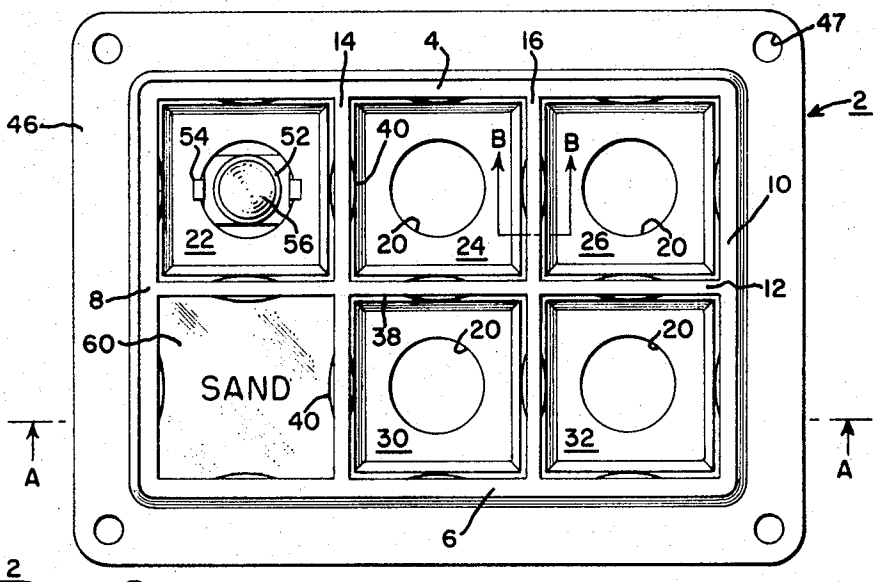


FIG. 3

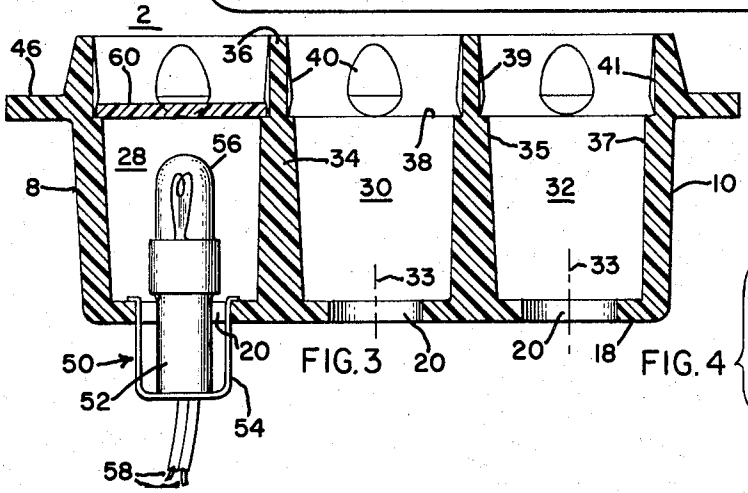


FIG. 4

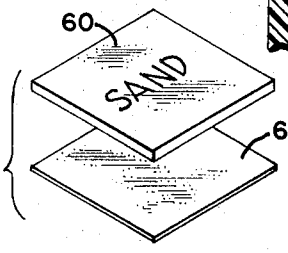
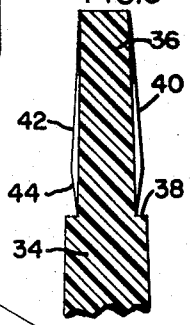


FIG. 5



PANEL DISPLAY DEVICE HAVING UNITARY MOLDED CASING

BACKGROUND OF INVENTION

The invention relates to annunciators and particularly to an arrangement, adapted to be panel mounted, for providing an illuminated indication of selected operating conditions of apparatus.

Various apparatus utilize visual displays of operating conditions wherein an electric circuit is actuated upon the occurrence of a condition so as to illuminate an electric light. Indicia, such as an alphanumeric description of the condition, is commonly displayed adjacent to the light. It is preferable to display the description in front of the light source, such that energization of the light causes the description itself to be illuminated. Where a plurality of conditions occurring simultaneously or sequentially are to be displayed, the lights, and associated alphanumeric descriptions, may for convenience by placed adjacent one another. Opaque wall members can be mounted about adjacent light sources to minimize unwanted illumination of adjacent displays as a result of the illumination of one light source. Plural groups of lights and their associated descriptions may be packaged in a common housing arrangement adapted to be secured to the panel of an equipment. Such an arrangement is hereinafter referred to as a panel display device.

Whereas the panel display device of the present invention may find application in many applications, it will be hereinafter described with particular reference to diesel electric locomotives, whereby the engineer may observe various normal and abnormal operating conditions, such as excessive engine heat, wheel slip, application of sand, etc. The displays of this type are frequently mounted on a control cabinet which is adjacent to the operator of the vehicle.

Frequent modifications, augmentation and modernization of the control systems of rail vehicles requires substantial modification of the number, and the indicia designation, of displays, both in respect to newly manufactured rail vehicles and the modification of rail vehicles in the field. Accordingly, it would be desirable to provide display devices permitting rapid modification of displays without requiring the use of special tools or mounting hardware. However, experience has indicated that the display assemblies should be constructed to prevent tampering or removal of components by unauthorized personnel. Accordingly, it would be desirable to construct the display assembly in a manner precluding disassembly from the front panel.

Prior art displays for locomotives commonly utilize high brightness displays, such as high brightness lamps having a surrounding conical lens. While this assures visibility of the display during high ambient light conditions in the operators cab, these displays may be objectionable to the operator under low ambient lighting conditions, such as dusk and darkness. Accordingly, it is desirable to provide a display constructed to provide displays of adequate visibility which do not interfere with the operator's visibility. Displays in locomotives, and other equipment, are commonly mounted in a control panel adjacent to the operator and thus have been damaged by scratching and breakage caused by the shoes of the operator.

It is therefore an object of this invention to provide an improved panel display device which overcomes all of the above problems and disadvantages.

It is another object of this invention to provide an improved panel display device which is rugged, withstands vibration and is inexpensive;

Briefly, in accordance with one aspect of the invention a panel display assembly is provided having a unitary molded casing of interior and exterior wall members defining a plurality of enclosures whose longitudinal axes are substantially parallel to one another. The casing has a rear wall surface defining apertures for each of said enclosures and a light source is inserted, and secured within, selected apertures. A plurality of the inside wall surfaces defining each enclosure comprise a lower portion extending from the rear wall surface and terminating abruptly into an upper portion recessed in respect to the lower portion to form supporting flange surfaces in a common plane substantially orthogonal to the longitudinal axis of the compartments. The flange surfaces of each enclosure are spaced to support an indicia bearing disk member. The side wall members of each enclosure extend outwardly from the common plane to form sun and scuff shields for each disk member and are spaced to facilitate insertion of the disk member unto the support flanges. A plurality of the side members having integrally molded and inwardly extending protrusions above the flanges to rigidly clamp the disk members unto the flanges.

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, together with other objects and advantages thereof, will become apparent from the following detailed description of a preferred embodiment of the present invention when read in connection with the accompanying drawings, wherein:

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view of the panel display device, with all but one of the display plates removed;

FIG. **2** is a front elevation view of the panel display device;

FIG. **3** is a vertical section of the panel display device taken at the plane defined by lines A—A of FIG. **2**;

FIG. **4** is a perspective illustration of one of the disk members and a color film member which may be utilized therewith; and

FIG. **5** is a partial vertical section of the device taken at the plane defined by lines B—B of FIG. **2**.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to FIGS. **1**, **2** and **3**, the panel display device comprises a container **2** of box type configuration adapted for mounting to a panel surface and comprising opaque exterior sidewalls and interior sidewalls to provide a plurality of enclosures. Each enclosure has a rear wall surface defining an aperture into which a source of illumination, such as lamp assembly **50** may be inserted and secured. A display plate, or disk member, **60**, adapted to contain indicia, is rigidly secured in each enclosure. The disk members are positioned intermediate the opposing ends of the sidewalls whereby the portions of the sidewalls extending outwardly from the disk members form scuff and sun shields for each individual enclosure. For purposes of

explanation, FIGS. 1 and 2 illustrate a display device containing only one disk member and two lamp assemblies. In normal usage disk members are incorporated in each enclosure. In the event all enclosures are not utilized as displays, disk members having a blank, as opposed to an indicia containing, surface may be inserted in those enclosures which are not utilized.

The disk members may be of a translucent material, such as an acrylic plastic. Indicia, such as alphanumeric symbols, identifying the condition to be indicated may be applied in a known manner, such as by inscribing, painting or a combination of these. For convenience, the disks should be of identical configurations, which are critical only in respect to their mating with the configurations of the container, as discussed subsequently. It is frequently desirable to indicate various conditions in different colors. This can be achieved with disk members having an appropriate color, but may more simply be achieved by inserting a color film member **62**, below the disk as illustrated in FIG. **4**. Such a film member may, for example, be cut to the surface area of the disks from 0.005 acetate or mylar colored film.

The container **2** is molded from a suitable rubber or plastic material offering rigidity and slight elasticity. The rigidity precludes flexures of the container which could result in advertent releasing of the discs or lamp holders. As subsequently described portions of the container should have some elasticity to permit insertion of the disk members. A variety of plastic materials are suitable, including polypropelene, polyethelyne, and polyvinyl chloride. A polypropelene material has been found to be particularly suitable because it is impervious to oils, solvents and other chemicals and its resiliency provides shock resistance.

In the preferred embodiment of the display device illustrated in FIGS. **1**, **2**, and **3**, the container **2** is of rectangular cross-section. It contains exterior sidewalls **4**, **6**, **8**, and **10**, with the long sidewalls **4** and **6** being parallel to one another and perpendicular to the short side walls **8** and **10**. The container is additionally provided with an interior sidewall **12** intermediate of, and parallel to, exterior walls **4** and **6** and two interior sidewalls **14** and **16** intermediate of, and parallel to, exterior walls **8** and **10**. The exterior and interior walls define six enclosures **22**, **24**, **26**, **28**, **30** and **32**, arranged in two rows and three columns. Each enclosure formed by four of the walls, is substantially square in cross-section, and the longitudinal axis **33** of the enclosures are parallel to one another. The container could, of course, have different configurations, and include any desired number of sidewalls and enclosures. The enclosures need not necessarily be of square-cross section although this is advantageous in view of the resulting symmetry of the disk members.

The container has a rear wall surface **18** provided with a plurality of apertures **20**, located so that an aperture is provided for each of the enclosures. In the preferred embodiment circular apertures of 0.625 inches diameter are located in the rear wall surface about the longitudinal center axis of each of the enclosures.

A lamp assembly **50** for each enclosure is inserted through the associated aperture. The preferred embodiment utilizes a socket **52**, containing bulb **56**, which socket is secured to a U-shaped holder **54**. The two upstanding spring metal arms of the U-shaped holder are biased outwardly. When the lamp assembly is inserted through the aperture the arms of the holder rigidly clamp the assembly into the enclosure. Lamp leads **58** are coupled to an appropriate actuating circuit. Lamp holders of the type described are commercially available. One suitable type utilizing type GE–44 bulbs is marketed as Part 4157 by Drake Manufacturing Company. Various other types of lamp assemblies may, of course, be utilized.

The container is constructed to permit a disk member to be seated and rigidly retained within each enclosure. The wall members are shaped to provide a plurality of supporting flanges within each enclosure whereby all disk members are seated in a common plane which is substantially orthogonal to the central axes of the individual enclosures. The plane extends within the opposing ends of the wall members so that the portions of the walls extending outwardly from the disk members provide individual scuff and light shields for each disk member.

The walls comprise a rear portion **34** extending from the rear wall surface and terminating abruptly into a forward portion **36**. The shoulder **38** on the rear portion **34** constitutes a supporting flange surface. In the preferred embodiment all wall surfaces of each enclosure are provided with such a flange surface. This is desirable since it provides for rigid and tight seating of the disk members. The supporting flange surfaces of each enclosure must be arranged in a common plane extending substantially perpendicular to the longitudinal center axis. The supporting flange surfaces for all enclosures should preferably be arranged in this plane. The interior walls are constructed so that the forward portion **36** has a lesser thickness than the thickness of rear portion **34**. The outer walls may have a similar arrangement.

The preferred embodiment utilizes disk members of square configuration having, for example, a length of 1.020 inches. The wall surfaces forming each enclosure are formed so that immediately below the supporting flange surfaces, the wall surfaces on opposing sides of each enclosure are separated from each other by distance less than the length of the disk member. For example, in respect to enclosure **32**, the rear surface **35** of interior wall **16** is displaced from the rear surface **37** of exterior wall **10** by 1.04 inches. The forward wall surfaces, i.e., those extending above the supporting flange surfaces, on opposing sides of each enclosure are separated from each other by a distance greater than the length of the disk member. For example, the surface **39** of the forward portion of wall **16** is separated from surface **41** of the forward portion of wall **10** by 1.0625 inches. Thus the rear portions of the sidewalls defining the internal wall surfaces of each enclosure have a periphery smaller than the periphery of the disk members, and the forward portions of the sidewalls defining the internal wall surfaces of each enclosure have a periphery greater than the circumference of the disk members. The disk members can, therefore, be readily inserted into the enclosures from the side opposite to the end wall to rest securely against the supporting flanged surfaces. Both the forward and rear surfaces of the wall members may be slightly inclined so as to converge outwardly in a direction extending from

the rear wall surface. This facilitates mold separation and in the case of the surfaces of the forward wall portions further facilitates the insertion of disk members.

The forward portions of the wall members extend for a distance adequate to provide scuff protection. In the preferred embodiment the forward portions extend one-half an inch from the supporting flanges. An extension equal to approximately one-half the diameter or length of the disk member provides ample sun shield protection. Modified sunshield configurations may be utilized, such as for example, incorporating an outwardly extending sunshield at the top of the assembly.

The disk members are secured to the supporting flange surfaces by integral protrusions **40** which extend into the enclosures from the upper surfaces of the sidewalls, as illustrated in FIGS. **2**, **3**, and **5**. In the preferred embodiment such protrusions are formed in each of the wall surfaces of each enclosure. The protrusions extend outwardly so that the distance between the extreme ends of opposing protrusions is, no greater than, and preferably, slightly less than, the length of the disk member. As illustrated in FIG. **5** the protrusions utilized in the preferred embodiment have an upper face **42** which gradually slopes inwardly and a lower face **44** which sharply slopes outwardly. The extreme end of the protrusion occurring at the intersection of these faces at a distance above the support flange which is slightly greater than the maximum thickness of the disk member. The gradually sloped upper face promotes easy insertion of the disk member. The sloped lower face is provided to accommodate disks having some tolerance variation in thickness. The sloped lower surface assures rigid fastening of disks having less than maximum thickness. In an arrangement having the dimensions cited previously the protrusions may extend inwardly by one-hundredths of an inch and the intersection is located 0.140 inches above the supporting flange surface in order to accommodate a disk member having a 0.125 inch thickness. The container assembly is intended to be mounted to a panel assembly having a cutout of dimensions adequate to accommodate the container. For this purpose, appropriate fastening means are provided on the container. In the preferred example a flange member **46** surrounds the container and contains a plurality of mounting holes **47**. It is preferable to mount the container assembly so as to preclude disassembly from the front of the panel. Known locking nuts or other fastening devices may be used for this purpose.

The dimensions cited are given by way of example and should not be construed to limit the scope of the invention. The above described arrangement provides for convenient insertion of the disk members from the front of the container, but precludes removal of the disk members from the front. Removal is instead readily achieved by means of a blunt instrument inserted through the aperture of the compartment. Upon removal of the lamp assembly the blunt end of an instrument, such as a pencil or screw driver, is inserted and pushed to readily knock out the disk member.

The above described arrangement constitutes a compact, and inexpensive panel display device which provides protection against breakage, scuffing and tempering as well as providing readily visible indications of low light level which are not readily obscured by incident ambient light. Changes may be made in the described embodiment of the invention which are within the full intended scope of the invention as defined in the appended claims.

What is claimed as new and desired to secure by Letters Patent of the United States is:

1. A panel display device comprising:

a. a plurality of lampholders,

b. a plurality of translucent planar disk members adapted to bear indicia and having a predetermined planar periphery,

c. a unitary molded casing of resilient material comprising:

1. exterior and interior sidewalls;

2. an external casing formed of said exterior sidewalls;

3. a plurality of enclosures formed by said exterior and interior sidewalls and having longitudinal center axes parallel to one another;

4. a rear wall surface of said external casing defining a plurality of apertures, each of said apertures extending about one of said longitudinal center axes and providing access to one of said enclosures, said lampholders being detachably mounted within said apertures;

5. rear portions of said sidewalls defining internal wall surfaces for each enclosure having a circumference smaller than the circumference of said disk members;

6. forward portions of said sidewalls defining internal wall surfaces of each enclosure having a periphery greater than the periphery of said disk members, said forward portions constituting individual shields for each of said disk members;

7. flange surfaces for supporting said disk members formed in each of said enclosures by the interconnection of said rear and forward portions; said flange surfaces being arranged in a plane orthogonal to said longitudinal center axes;

8. a plurality of protuberances extending into each enclosure from said forward portions and being formed integrally therewith, whereby a disk member inserted into the flange surface of each enclosure is rigidly maintained thereon.

2. The panel display device of claim **1** wherein the forward portions of said interior sidewalls have a lesser thickness than the rear portions of said internal sidewalls.

3. The panel display device of claim **1** wherein each of said protuberances comprises a first sloped surface gradually sloping inwardly toward the center axis of the enclosure from the front surface of the casing to facilitate insertion of said disk member and a second sloped surface steeply sloping outwardly to the second wall portion to permit rigid retention of disk members having some variation of thickness.

4. The panel display device of claim **2** wherein said unitary molded casing comprises four exterior sidewalls forming an external casing of rectangular cross-section, a plurality of interior sidewalls extending intermediate of and parallel to, respective ones of said exterior walls, said exterior and interior sidewalls defining a plurality of enclosures of rectangular cross-section.

5. The panel display device of claim **4** wherein said unitary molded casing comprises a plurality of enclo-

sures of square cross-sections, and wherein protuberances extend from each of the four sidewalls constituting each enclosure, each of said protuberances occupying only a portion of the sidewall in a plane orthogonal to said outer axis.

6. The panel display device of claim 5 wherein said external casing comprises an external flange adapted to be secured to a panel surface.

7. A unitary molded casing of resilient material for use as a panel display device comprising:

a. four exterior sidewalls;

b. an external casing of rectangular configuration formed by said exterior sidewalls;

c. a plurality of interior sidewalls extending intermediate of, and parallel to, respective ones of said exterior sidewalls;

d. a plurality of rectangular enclosures formed by said exterior and interior sidewalls, and having center axes parallel to one another;

e. a rear wall surface of said casing defining a plurality of apertures, each of said apertures extending about one of said center axes and providing access to one of said enclosures and adapted to house a lampholder;

f. rear portions of said sidewalls defining internal wall surfaces for each enclosure, having a first periphery;

g. forward portions of said sidewalls defining internal wall surfaces for each enclosure having a second periphery greater than said first periphery said forward portions constituting individual shields for each of said disk members;

h. flange support surfaces extending about the internal periphery of each of said enclosures formed by the interconnection of said rear and forward portions; said flange support surfaces being arranged in a plane orthogonal to said longitudinal center axes and adapted to seat a planar disk member of rectangular configuration having a planar periphery intermediate said first and second circumference;

i. protuberances extending integrally from each of the four sidewalls defining each enclosure, said protuberances being spaced to rigidly secure each of said planar disk members against said support flanges;

j. means extending from said external casing for securing said casing to a panel surface.

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