

- [54] **GRAPHIC DISPLAY ASSEMBLY**
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Related U.S. Application Data

- [63] Continuation of Ser. No. 701,179, Jan. 29, 1968, abandoned.

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- [52] U.S. Cl. **340/381, 340/324, 340/225, 40/132 D, 40/52 R**
- [51] Int. Cl. **G09f 9/14**
- [58] Field of Search **340/381, 225, 366, 340/324, 325; 240/52 R; 339/61 L; 40/132 D, 132 R, 130 R, 61-65, 52 R**

[57] **ABSTRACT**

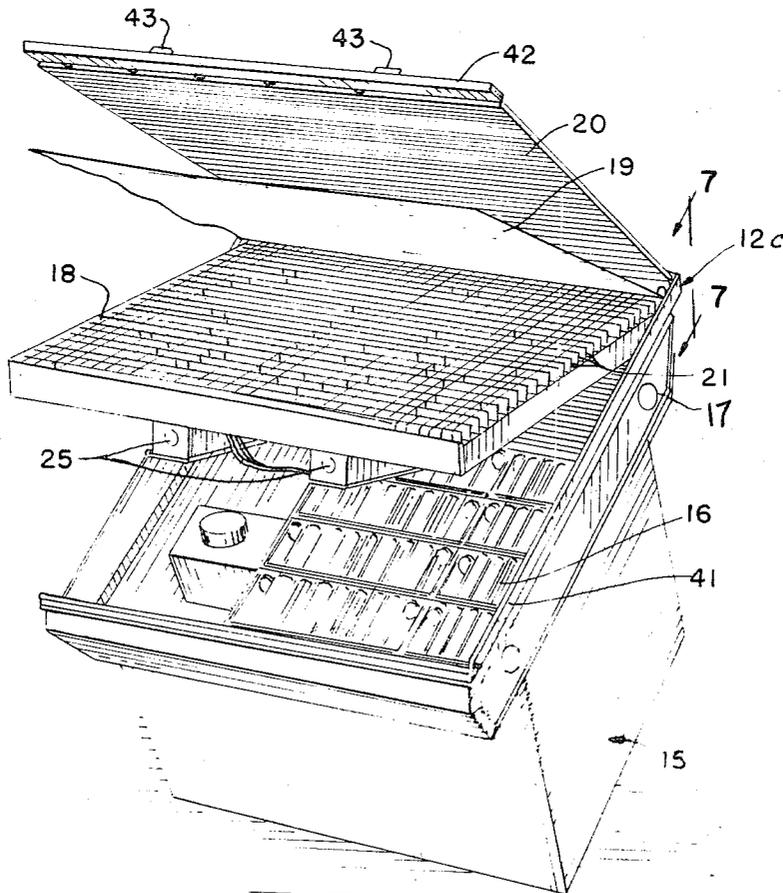
A graphic display assembly is provided for use with a known type of industrial process annunciator system. The graphic display annunciator provides for indication of abnormal process functions on a process diagram representing the process and for indication of points in the process where the condition is abnormal. Thus there is provided a clear and compact visual presentation of the condition of the process.

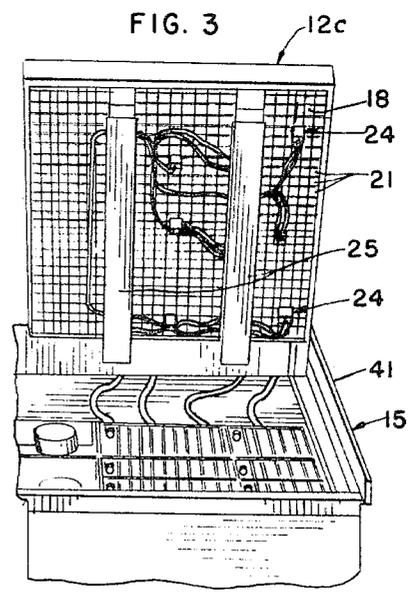
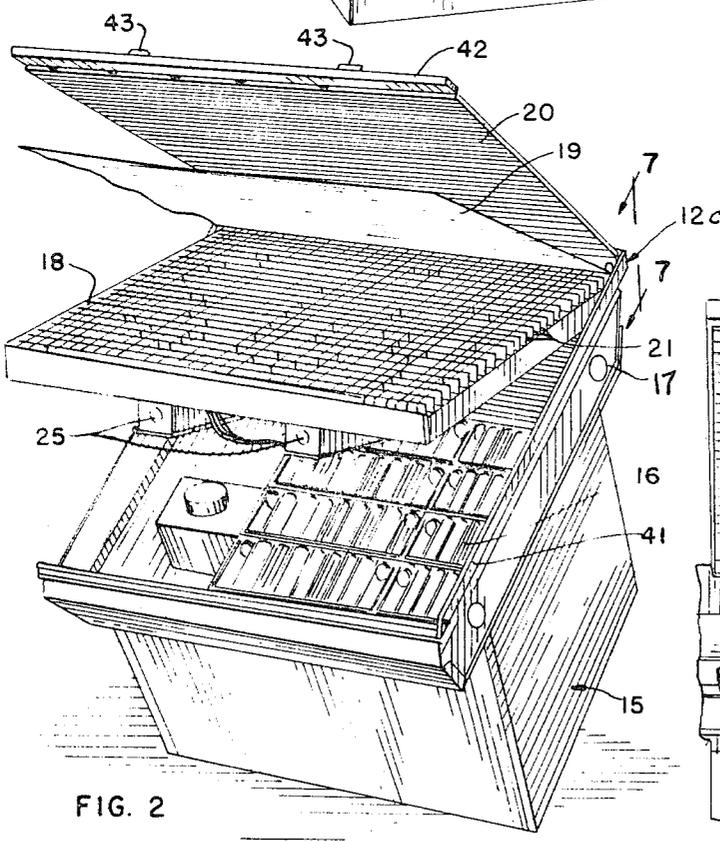
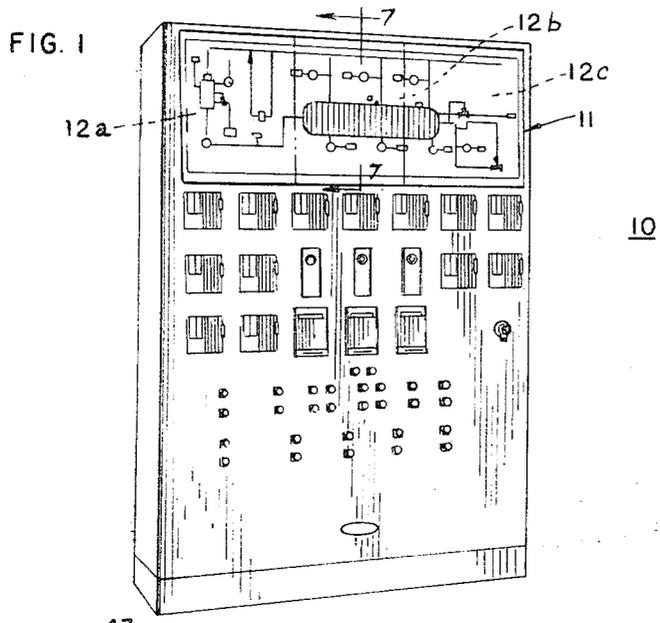
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1 Claim, 8 Drawing Figures





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FIG. 4

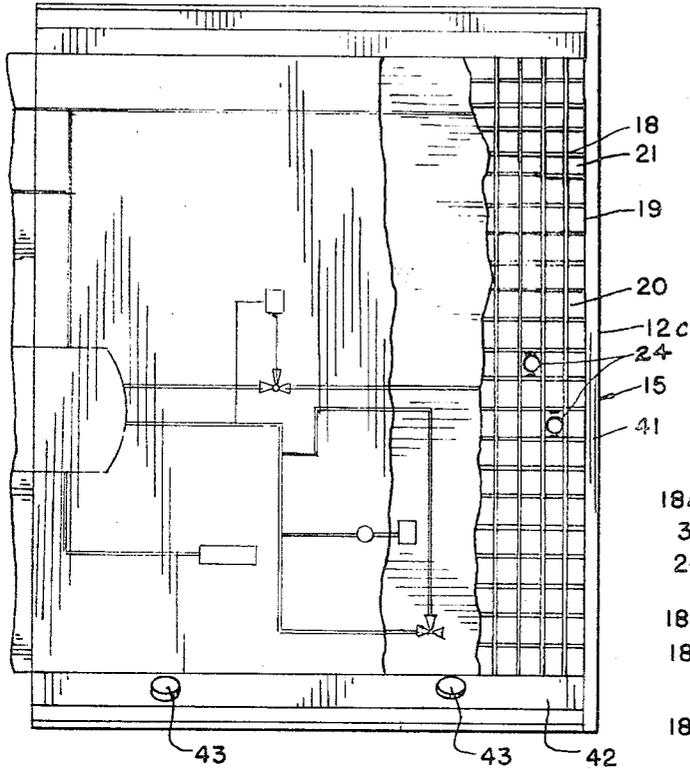


FIG. 5

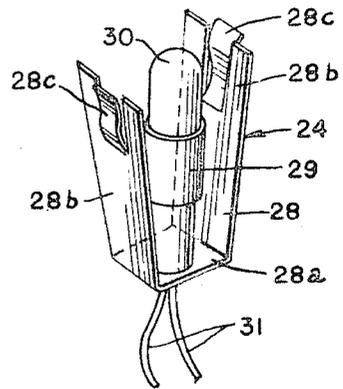


FIG. 6

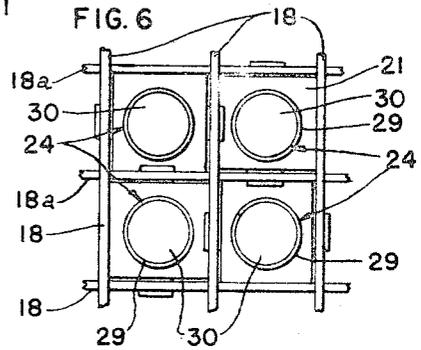


FIG. 7

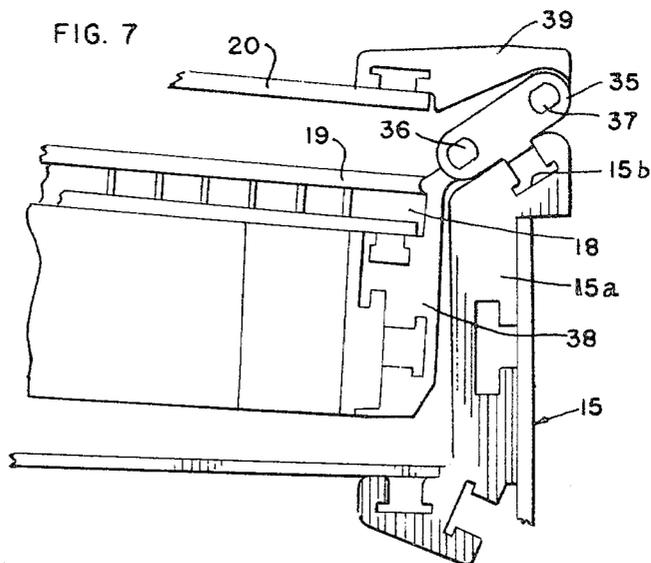
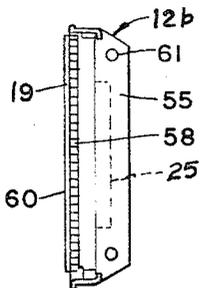


FIG. 8



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GRAPHIC DISPLAY ASSEMBLY

This application is a continuation of application Ser. No. 701,179, filed on Jan. 29, 1968 and now abandoned.

The present invention relates to a graphic display assembly and, more particularly, to a graphic representation providing an indication for abnormal conditions in an industrial process and the like. Systems are well known for continuously monitoring a large number of variables for abnormal conditions and for placing before an operator large masses of information concerning most of the variables. An alarm for limiting conditions is generally provided by comparing signals from transducers associated with the variables with preset signals representing upper and lower alarm conditions of variables. Such annunciator systems today are commonly operated with transistor logic elements, modules and power supplies so as to provide a compact control and indicating panel. One such annunciator system is described in Panagraph bulletin H667 of The Scam Instrument Corporation.

Because of the large number of variables which frequently are associated with an annunciator at a central control point, it is desirable to present the system condition in a clear and compact manner such that would minimize error by the operator and which would readily pinpoint the abnormal condition.

Accordingly one object of the present invention is to provide a graphic display annunciator.

Another object of the present invention is to provide a new and improved indicator for providing information relating to abnormal process conditions on a diagram representing the process layout.

Yet a further object of the present invention is the provision of a new and improved visual indicator for providing a clear and compact presentation of process conditions on a diagrammatic background of a process.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In accordance with these and many other objects of the present invention, there is provided a new and improved graphic display assembly for visually indicating process functions in a process diagram. The graphic display assembly includes a lamp nesting panel of grid-work, defining a multiplicity of lamp bulb apertures, adapted to selectively receive indicating lamp bulbs. A drawing of the process is provided on a replaceable translucent sheet over the lamp nesting panel, covered with a transparent protective panel. By the placement of lamps of a desired color in the lamp nesting panel at selected points behind the process points on the process diagram, there is readily provided a visual indication of abnormal process conditions at a point in the process wherein such conditions occur. Thus the abnormal condition location will readily be apparent to the operator.

For a better understanding of the present invention reference may be had to the accompanying drawings wherein:

FIG. 1 is a perspective view of an annunciator incorporating graphic display assemblies according to the present invention;

FIG. 2 is a perspective view of a logic and display assembly of the annunciator of FIG. 1, incorporating the graphic display features;

FIG. 3 is a perspective view, to a somewhat smaller scale, of the logic and display assembly of FIG. 2, illustrating the back side of the lamp nesting panel;

FIG. 4 is a front view of the logic and display assembly of FIG. 2;

FIG. 5 is a perspective view of a typical lamp and lamp holder assembly;

FIG. 6 is a fragmentary view of the lamp nesting panel illustrating the positioning of lamps therein;

FIG. 7 is a cross-sectional view illustrating the hinge arrangement between the housing, lamp nesting panel, and protective panel covering of a display assembly, taken along line 7-7 of FIG. 2; and

FIG. 8 is a cross-sectional view of a different one of the indicating display assemblies of FIG. 1, taken along line 8-8 of FIG. 1, illustrating a somewhat different embodiment.

Referring now to the drawings, particularly to FIG. 1 thereof, there is illustrated an annunciator 10 having a graphic display area 11. The graphic display area 11 is formed of a plurality of display assemblies 12a, 12b, 12c, arranged in side by side relation. The annunciator 10 includes suitable control and indicating assemblies so both visual and audible alarm, if desired, are provided. Annunciator components to provide suitable sequence, such as that commercially designated as AF and AR, marketed by The Scam Instrument Corporation and described in Panastat bulletin A564, may be provided for the logic of the annunciator and do not per se form a part of the present invention.

Referring now to the graphic display assembly 12c, as best illustrated in FIGS. 2, 3, and 4, each of the display assemblies 12c includes a suitable housing 15 which, in the illustrated embodiment, is arranged to enclose standard annunciator logic packs, such as plug-in modules and power supplies, identified generally as 16. The housing 15 may be provided with one or more knock-outs 17 to permit wiring with other display assemblies or components as required. The housing 15 is open at its front end and covered first by a lamp nesting panel or grid 18, then by a portion of a replaceable translucent drawing sheet or process diagram 19 defining a graphic representation of the process, and finally by a removable transparent protective cover panel 20 which if desired may suitably be formed of plastic. In the illustrated embodiment the process diagram 19 extends across all three display assemblies 12a, 12b, and 12c. The lamp nesting panel is formed of latticework in egg carton fashion to provide lamp receiving compartments 21, most clearly illustrated in FIGS. 4 and 6. Each of the lamp receiving compartments 21, in a particular embodiment, may be approximately three quarter inches square and three quarter inches deep, so as to be adapted to receive a suitable indicating lamp assembly 24. The lamp assemblies 24 may selectively be positioned in lamp receiving compartments in alignment with positions in the process diagram represented by the annunciator functions. The indicating lamp assemblies may be wired from one or more terminal strips 25, FIGS. 2 and 3, which may be slideably mounted on the frame of the lamp nesting panel 18.

FIG. 5 illustrates one of the indicating lamp assemblies adapted for selective insertion into the lamp receiving compartments. As therein illustrated, there is

provided a resilient lamp support 28 generally U-shaped having a bight portion 28a and a pair of up-standing legs 28b. Each of the legs 28b has its outer end bifurcated to provide an outwardly extending fork 28c having an outwardly curved outer edge. The fork is adapted to engage the grid members 18a, FIG. 6, of the lamp nesting panel 18. Because of the unique arrangement of the lamp support 28, the lamps may be, where desired, placed in adjacent lamp receiving compartments by merely altering adjacent lamps through a quarter turn, thus providing maximum flexibility to the graphic display panel. A lamp socket 29 is supported by the lamp support 28 and carries a removable lamp bulb 30 which may be colored or may carry a colored jacket to indicate a desired condition, for example, a red bulb for an abnormal condition. Suitable leads 31 extend from the lamp socket 29 to the terminal boards 25.

FIG. 7 illustrates one arrangement for hinging the lamp nesting panel and protective panel to the housing of the device. As therein illustrated there is provided an upper housing frame 15a along the upper edge of the open end of the housing 15. The frame 15a is provided with a T-slot 15b to which is secured a hinge member 35. The hinge member 35 has two projecting hingepins 36 and 37. A grid frame 38 is hinged to one of the hingepins 36 and a cover frame 39 is hinged to the other of the hingepins 37. The grid 18 and terminal strips 25 are carried by the grid frame 38, and the protective cover panel 20 is supported by the cover frame 39. The protective cover panel 20 may be opened to expose the process diagram 19 for correction, alteration or change, and the grid 18 may be raised to provide access from the rear for lamps, wiring, and the like.

Suitable end trim 41 is provided along the outer edges of the outer ones of the graphic display assemblies, as best illustrated in connection with panel 12c, FIGS. 2, 3, and 4. The outer edge of the display panel 12c is free of projections or edging so that the grid of adjacent panels in the same annunciator 10 may abut against each other without void areas of lighting capabilities.

The lower edge of the protective cover panel 20 is provided with a lower frame member 42 carrying hand screws 43 to provide for securing the cover panel 20 in the closed position.

The display assembly 12c described above contains a suitably extended housing for enclosing logic circuits of the annunciator. Where it is necessary or desirable to provide an indicating display assembly without the need for the attached logic circuits, the housing may be closed in the rear as best illustrated with the display assembly 12b in the embodiment of FIG. 8. As therein illustrated there is provided the display assembly 12b having a housing 55 provided with a lamp nesting panel or grid 58 and a protective cover panel 60 adapted to enclose a portion of the process diagram 19. The lamp nesting panel 58 carries identical terminal strips 25 to provide for attachment of the indicating lamp assemblies. Suitable knockouts 61 are provided in the housing 55 for connection to integral annunciator components that are adapted to align with the knockouts 17 in the housing 15 of the combined logic and display assembly 12c.

From the above description, it will be understood that there is provided a combined graphic display panel with annunciator logic circuits, modules, power

supplies and the like. Process drawings are provided on replaceable translucent drawing sheets that form process diagrams covered by transparent plastic panels, illuminated from behind by lamps representing annunciator points. Sections of the graphic display area may be provided complete with annunciator switching logic, including racks, plug-in modules and power supplies. The vast number of light positions simplifies revision by permitting unrestricted lamp relocation. The process drawing itself becomes the graphic panel. Incorporation of color in the symbols and graphic lines, plus color jackets on the lamp bulbs, help the graphic presentation and materially enhance reception. The graphic drawing may be as simple or detailed as desired to show alarm locations, indicating lights and whatever symbolization may be incorporated to clearly depict process status. Process modifications are accompanied as readily and economically as the user can prepare new drawings. The display assemblies need not contain integral provisions for switching logic and the like, subject to the requirement of the annunciator and the graphic display area as best illustrated in connection with the display assembly 12b.

In a particular commercial structure, each of the graphic assemblies is available in a standard height, and in one or more standard widths, so that the display assemblies, including combined logic and display units or lamp assembly units, or both, may be mounted side by side to furnish a continuous graphic panel. Such commercially available display assemblies are 24 inches high overall, and available in 12 or 18 inch widths, so that the graphic display area 11 may be 24 inches high and as wide as desired. Each of the display assemblies in the commercially available structure will accommodate 30 or 60 lamps respectively for annunciation and indication points.

Although the present invention has been described by reference to only a single embodiment thereof, it will be apparent that numerous other modifications and embodiments will be devised by those skilled in the art which fall within the true spirit and scope of the present invention.

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

1. A combined graphic display assembly and annunciator system which accepts signals from transducers and which visually indicates both the occurrence and the source of any abnormality or event on a process diagram, said system comprising;

a housing open at one end;

a lamp nesting panel hingedly secured across said open end and formed of a latticework of interconnected strips defining a grid of lamp receiving compartments for receiving lamp assemblies;

a plurality of lamp assemblies each including a lamp support having at least one spring clip formed from members driven towards one another by spring driving means, supporting means for supporting a lamp bulb from said lamp support, and a lamp bulb carried by said supporting means;

each of said lamp assemblies engaging at least one selected strip of the nesting panel with the spring clip locked over the adjacent strip;

a non-opaque process diagram;

means for removably securing said process diagram over said panel comprising a transparent protective panel and fastening means for attaching said pro-

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protective panel over said lamp nesting panel with said non-opaque process diagram sandwiched between said panels; and
a plurality of plug-in annunciator logic circuits removably mounted within said housing, each of said circuits including an electrical energizing connection to the lamp-bulb in at least one of said lamp

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assemblies, and further each of said circuit including means for illuminating an associated lamp bulb in accordance with the relative magnitudes of said transducer signals and a corresponding set of pre-set reference signals.

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