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June 30, 1970 R. E. HEGGESTAD 3,518,666

MIMIC DIAGRAM PANEL FOR RAILWAYS HAVING LIGHT PIPING

Filed June 26, 1968 2 Sheets-Sheet 1

Fig. 1.

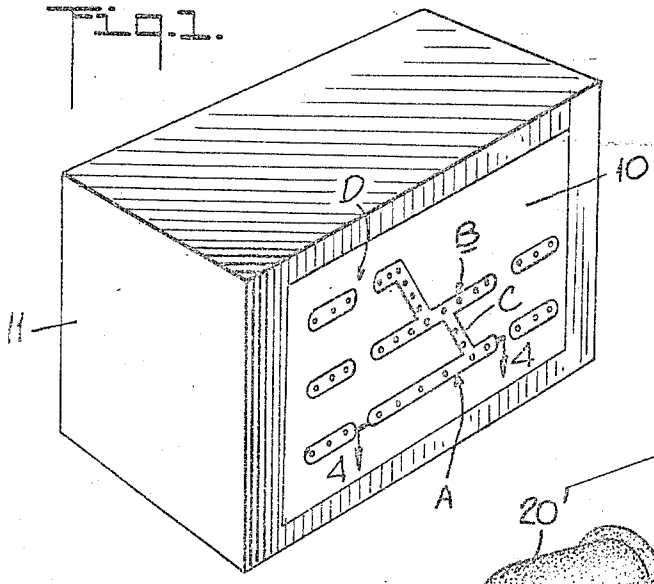
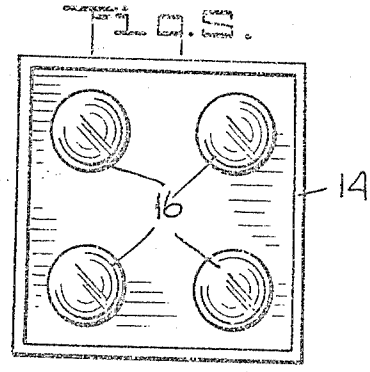


Fig. 5.



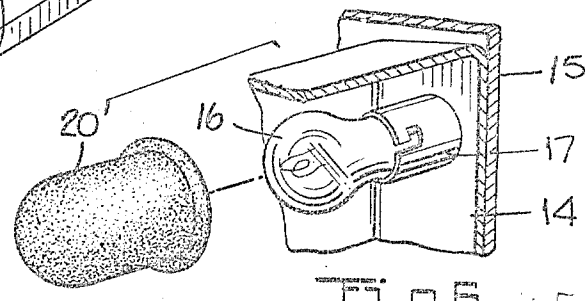
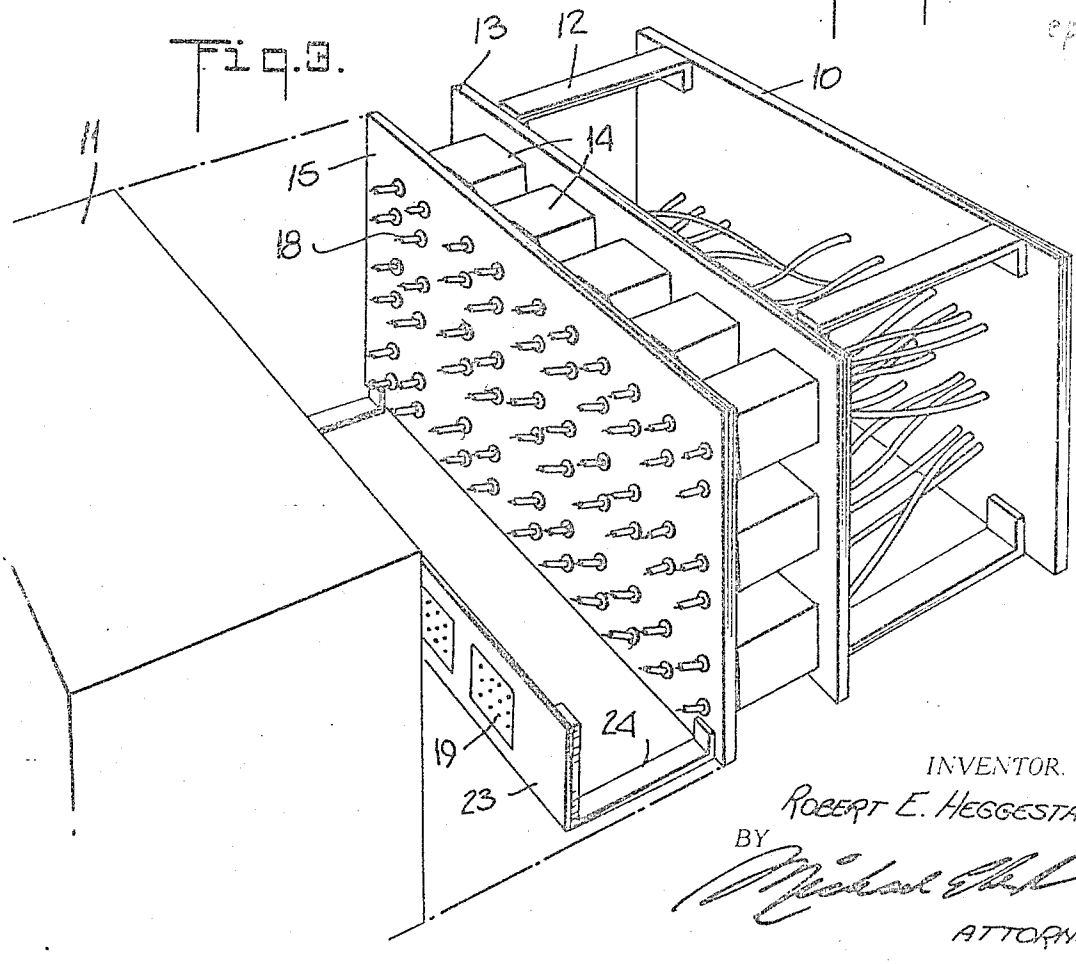


Fig. 6.

Ferrules & epoxy end seals col. 4

Fig. 3.



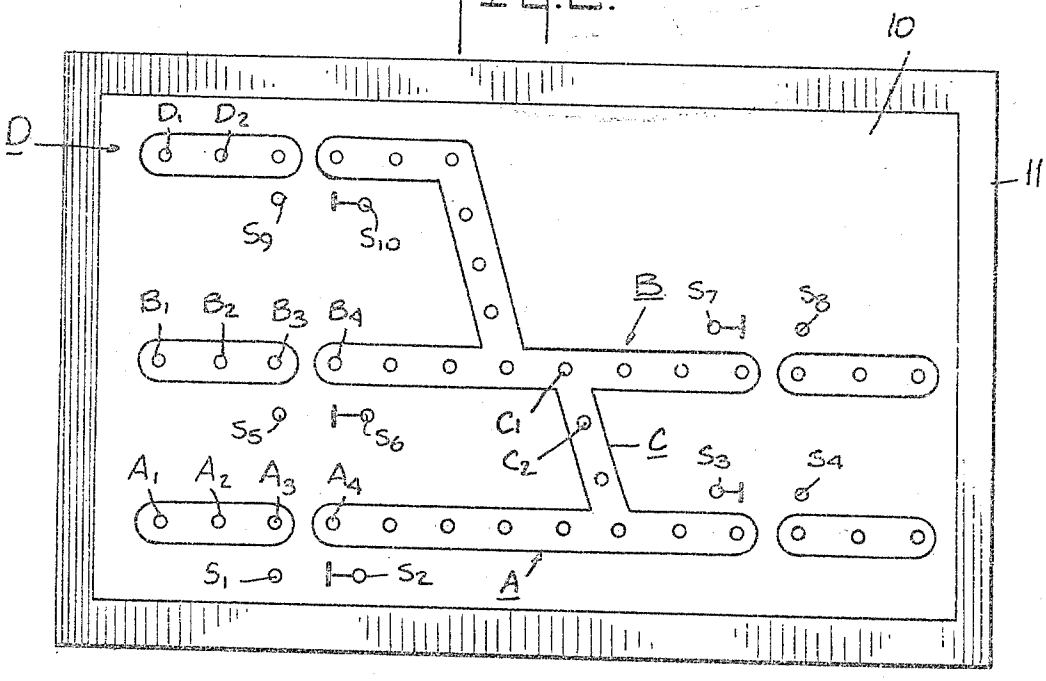
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MIMIC DIAGRAM PANEL FOR RAILWAYS HAVING LIGHT PIPING

Filed June 26, 1968 2 Sheets-Sheet 2

Fig. 2.



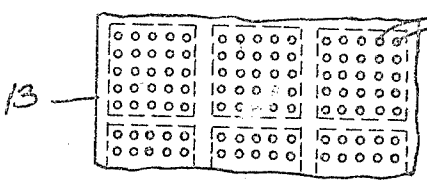


Fig. 7.

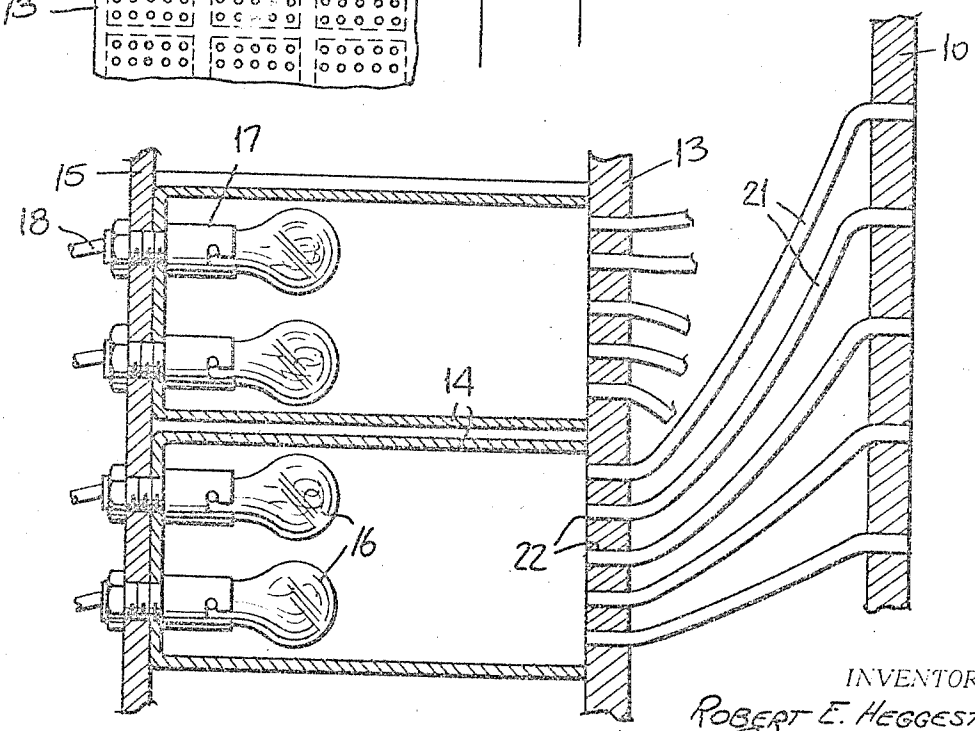


Fig. 4.

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MIMIC DIAGRAM PANEL FOR RAILWAYS HAVING LIGHT PIPING

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U.S. Cl. 340—380 6 Claims

ABSTRACT OF THE DISCLOSURE

A mimic diagram panel assembly for railway and other indicating systems in which representations of railway track networks or other layouts are selectively indicated by luminous points disposed on the panel at spaced positions in a linear series along the various paths defining the network. Each series of points is coupled by a group of light-conductive cables to a common light cell, such that when the cell is activated, light therefrom is distributed by the cables to the several points in the associated series.

This invention relates generally to line diagram panels, and more particularly to mimic diagram panels for railway and other indicating systems providing electrically-illuminated symbols and representations of railway track networks or other layouts.

Mimic panels are commonly employed in railway signal towers and dispatchers' offices to afford the signalman or dispatcher with a diagram of the track layout controlled by him. The diagram shows the positioning of the track switches and signals as well as the status of each track section in the layout, that is, whether the track is occupied or clear. This mimic panel is usually mounted above the control panel or console.

In the conventional mimic diagram panel, the various tracks, switches and cross-overs are indicated by suitably-shaped paths permanently marked on the panel and having a series of luminous points thereon. Each luminous point is created by an individual light bulb mounted on or behind the panel. In a complex diagram, the number of bulbs required to define the layout is considerable, and even with presently available miniature bulbs, it is difficult to crowd the necessary number of bulbs on the panel. Moreover, the connecting and control circuits for the bulbs are elaborate, for if a given track section is indicated by, say, a series of ten luminous points therealong, the ten individual bulbs must be connected in parallel to a control switch for simultaneous activation.

In order to make the luminous points on the display panel small and to place them close together, and yet prevent crowding of the light bulbs on the panel the prior Pat. 2,035,998 suggests the use of light-conducting rods which extend from individual light bulbs remote from the panel to bull's eyes or luminous points on the diagram. As pointed out in this patent, with available sizes of light units, when the bull's eyes are placed close together, there is insufficient room to mount the light units directly behind the bull's eyes. However, in this prior arrangement, there are as many light bulbs as there are bull's eyes, so that the number of bulbs is considerable and the associated circuits complex.

Accordingly, it is the main object of this invention to provide a mimic diagram panel in which a single light cell remote from the panel acts to render luminous a series of points along the diagram, whereby the several series of points on the diagram are illuminated by a relatively small number of cells.

More specifically, it is an object of this invention to provide a mimic diagram panel in which each series of points thereon is connected by a group of fiber-optic cables to a common light cell, such that when the cell is activated, light therefrom is uniformly distributed to the several points in the associated series.

A significant advantage of the invention is that the color of the luminous points in a given series may readily be changed, this being accomplished by the selective operation of differently-colored light units within the associated cell. This use of different colors affords the observer with more information in clearer form than can be supplied by individual lights on the panel.

Also an object of the invention is to provide a mimic diagram panel which operates reliably and efficiently, and in which the associated electrical control connections are simplified, the power requirements of the panel being relatively low.

Briefly stated, these objects are accomplished in an assembly constituted by a diagram panel and a light distributor plate spaced from the rear of the diagram panel and covering an array of open light cells, each cell furnishing illumination to a related series of points in the diagram panel by means of a group of fiber optic cables extending between these points and a set of apertures in said light distributor plate communicating with the cell.

For a better understanding of the invention, as well as other objects and further features thereof, reference is made to the following detailed description to be read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of a mimic diagram panel in accordance with the invention, the associated light cells and light-conductive cables being housed in a cabinet;

FIG. 2 is an elevational view of the diagram panel;

FIG. 3 is a perspective view of the panel assembly removed from the cabinet, as seen from the rear of the diagram panel;

FIG. 4 is a sectional view taken in the plane indicated by line 4—4 in FIG. 1;

FIG. 5 is a plan view of one of the light cells;

FIG. 6 is a perspective view of one of the light bulbs in the cell and its associated color filter; and

FIG. 7 shows, in elevation, a portion of the light distributor plate.

Referring now to FIGS. 1 and 2, there is shown a mimic diagram panel 10 on the front of a cabinet 11 which houses the equipment associated with the panel. The mimic diagram illustrated is that of a railway track layout controlled from the signal tower or dispatcher's office where the panel is installed, so that the signalman, dispatcher or other observer is able to see at a glance the track and signal conditions which prevail. The diagram panel is preferably made of a Formica sheet bonded to a pressed-wood board, thus providing a solid, non-warping composition board. The markings are engraved and painted on the Formica facing.

In the simplified layout, which is illustrated merely by way of example, there are shown parallel tracks A and B, a cross-over track C interconnecting tracks A and B, with a siding D joining track B. Track A is indicated by a series of spaced luminous points A_1, A_2, A_3, A_4, etc.; track B by a series of spaced luminous points B_1, B_2, B_3, B_4, etc.; cross-over C by a series of spaced luminous points C_1, C_2, etc.; and siding D by a series of spaced luminous points D_1, D_2, etc.

Point S_1 represents a stop signal while point S_2 represents a "clear" signal for track A in the east direction, whereas points S_3 and S_4 represent stop and clear signals, respectively, for the west direction. Points S_5 to S_8 represent corresponding clear and stop signals for track B, while points S_9 and S_{10} represent stop and clear signals for siding D.

In practice, when a command is given to present a particular clear signal, the related luminous point on the

diagram is caused to flicker, but when the command is executed, the related luminous point is steady. When a given track is clear, this is indicated by no lights at all or by a series of white luminous points therealong, but when the track is occupied, this is indicated by the fact that these luminous points are then red. The specific manner in which the lights are controlled in response to remote switching operations forms no part of the present invention, which is principally concerned with illuminating a selected series of points on the diagram from a common light cell.

As shown in FIG. 3, diagram panel 10 is mounted in parallel relation to light-distributor plate 13 by means of frame member 12, this assembly comprising the diagram panel assembly. Immediately adjacent to the light distributor plate 13 is the light cell assembly consisting of an array of open light cells 14 supported on a mounting panel 15, and terminal panel 23 with supporting frame member 24. Proper alignment between the open ends of the light cells and the light distributor plate which covers the cells is provided by the proper mounting of each within the cabinet 11.

The diagram panel and light cell assemblies mount independently within the cabinet and either one may be removed for the replacement of lamp bulbs, depending on whether access from front or rear is preferred. Terminal panel 23 is supported behind light cell mounting panel 15 by frame members 24, and suitable electrical terminals or plug connectors 19 are mounted on this panel. Thus the removable light cell assembly contains all electrical wiring for the various bulbs.

Cells 14 are formed by open rectangular metal cans, within which are disposed one or more light bulbs 16 received in sockets 17 which are supported on mounting panel 15 and which secure the cell cans to said panel. The arrangement is such that all bulbs in the system are electrically grounded on one side to mounting panel 15, which is metal and electrically conductive. Hence only a single lead 18 fed to a respective terminal 19 on terminal panel 23 behind the mounting panel 15 is all that is necessary to supply current to each bulb.

As shown in FIG. 5, as many as four bulbs may be disposed within each cell 14, only one of which is ordinarily energized at a time. The main purpose of having several bulbs in a cell is to make possible a choice of colors, and while all of the incandescent bulbs produce white light, a particular color may be imparted thereto by applying flexible thimble-shaped jackets 20 over the bulbs, as shown in FIG. 6. The jackets are made of a translucent plastic filter material of the desired color. Where no more than two different colors are required, two bulbs in the same cell may be energized simultaneously to afford additional brilliance and redundancy of the light source.

While the several bulbs in the cell are not centered therein, the metal interior thereof is highly reflective so that the cell is brightly and uniformly illuminated with light having the color of whichever bulb is energized.

In order to conduct light from an illuminated cell 14 to a series of points in the diagram on the mimic panel, a group of fiber optic cables 21 is associated with each cell. As shown in FIG. 4, one end of the cables in each group is inserted in apertures 22 in light distributor plate 13, the other ends going into a series of apertures which are spaced along the track path A.

Light-distributor plate 13, as shown separately in FIG. 7, is provided with several arrays of apertures 22, each array cooperating with the casing of a cell 14. Thus the cluster of apertures which communicate with a cell act as a light manifold, light from the associated cell being conducted by the cables inserted in these apertures to various points on the diagram panel.

For example, if a particular track section is indicated by a series of twelve spaced points in series, these points are all illuminated from a single cell by extending twelve fiber optic cables from apertures 22 in the distributor plate array associated with that cell to the serially-arranged twelve points. The twelve luminous points may be given a red color by energizing the bulb in the cell having a red filter, a yellow color by energizing the bulb in the cell having a yellow filter, a green color by energizing the bulb in the cell having a green filter, and a white color by energizing the filter-free bulb in the cell.

Thus if the total number of luminous points on the various track sections is, say, one-hundred and sixty and all sections have a series of sixteen points thereon, ten cells are sufficient to illuminate all of these points. It will be appreciated, however, that in practice, some track sections may have only two points, while others have ten or more, in which event, some cells will have more cables associated therewith than others.

In the case of signals on the railway layout, these points are operated individually, rather than in parallel as with the series of luminous points indicating a track section. A single light unit therefore of the proper color must be associated with each signal point. It is not necessary, however, to have full individual light cells for each signal light, for in this instance a cell may be provided with four light units, say, two red and two green, with partitions dividing the cell into four distinct compartments, one for each light. A cable is then used to couple each compartment with its related signal light point on the panel. The four light units in the compartmentalized cell are then totally independent from each other and selectively energized to activate the desired signal point on the diagram panel.

The cables are standard fiber optic, flexible guides, such as those manufactured by Corning Glass Company, and consisting of a bundle of 225 fine glass filaments surrounded by a plastic jacket. Transmission of white light through such cables one foot in length, is about 80% with polished ends, this being more than adequate for display purposes, in that the cables used in the assembly are all generally less than a foot in length.

The ends of the cables are preferably mounted in a ferrule and sealed with clear epoxy, after which the epoxy face is ground and polished. This prevents lateral movement of the fibers within the bundles and serves to seal out dirt and moisture. The ends are cemented into the holes in display panel and in the distribution plate.

While there has been shown and described a preferred embodiment of mimic diagram panel for railway and other indicating systems, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit of the invention as defined in the annexed claims.

What I claim is:

1. A mimic diagram panel assembly for railway and other indicating systems, in which representations of track networks or other layouts are selectively indicated by luminous points disposed at spaced positions in a series along the various paths defining the network, said assembly comprising:
   (a) a diagram panel having a hole for each point in the several series entailed in the layout;
   (b) a light cell for each series; and
   (c) a group of light conductive cables extending between each cell and the associated points in the related series to illuminate said points.

2. An assembly, as set forth in claim 1, wherein each cell is provided with a plurality of light bulbs producing light of different color, and means selectively to energize said bulbs.

3. An assembly, as set forth in claim 1, wherein each cable is constituted by a flexible multi-strand fiberglass guide.

4. An assembly, as set forth in claim 3, wherein the ends of each cable are surrounded by a ferrule and sealed in an epoxy whose face is polished.

5. An assembly, as set forth in claim 1, wherein the cells are open and are covered by a light distributor plate having an array of apertures associated with each cell, each group of cables being inserted in apertures of a given array.

6. A mimic diagram panel assembly for railway and other indicating systems, in which representations of track layouts are indicated selectively by luminous points disposed at spaced positions in a series along the various paths defining the layout, said assembly comprising:

(a) a diagram panel having a hole for each point in the several series entailed in the layout;

(b) a mounting panel in parallel relation to said diagram panel;

(c) an array of open light cells supported on said mounting panel;

(d) a light distributor plate overlying said array of cells, said plate having an array of apertures associated with each cell; and

(e) a group of flexible light-conductive cables extending between each cell and an associated series of points in the diagram, one end of the cables being inserted in said apertures, the other in said holes.

References Cited

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HAROLD I. PITTS, Primary Examiner

U.S. Cl. X.R.

340—324, 366, 378, 381