

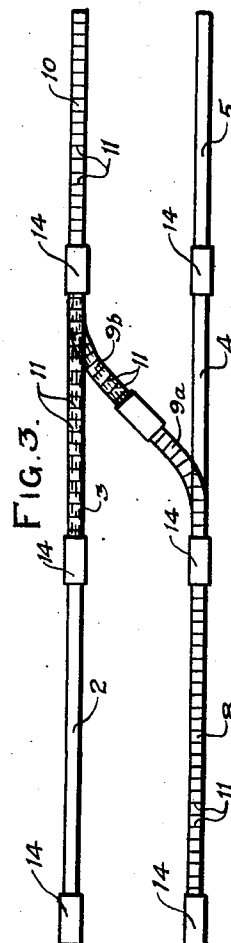
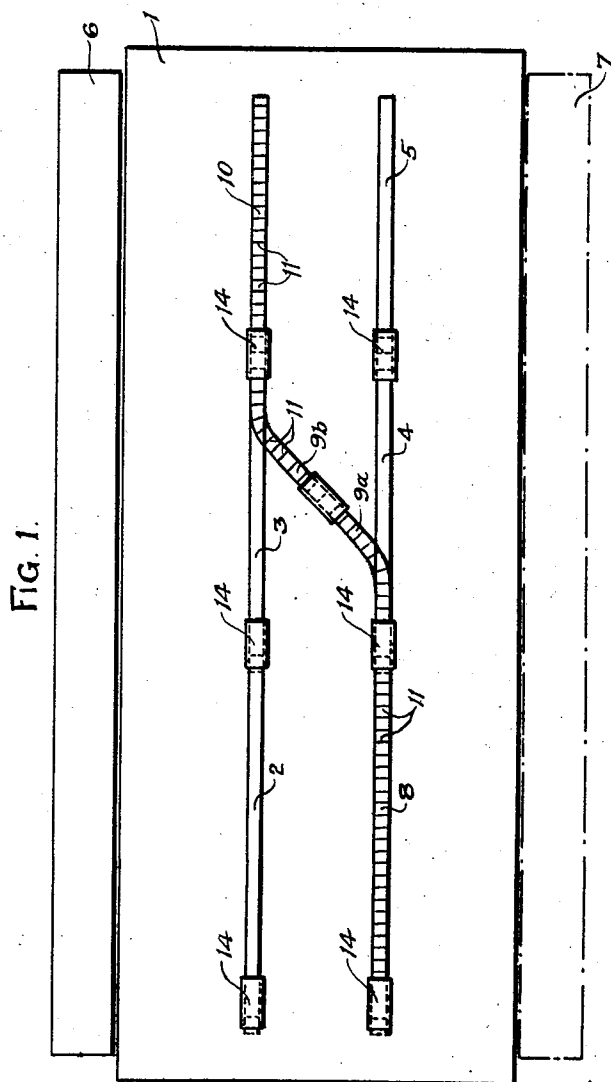
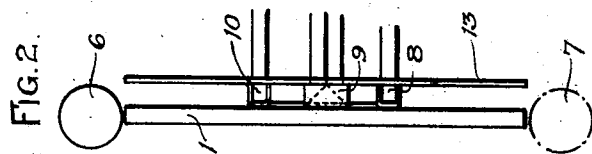
April 8, 1952

L. H. PETER ET AL
LINE DIAGRAM PANEL

2,591,864

Filed April 16, 1949

3 Sheets-Sheet 1



Inventors:
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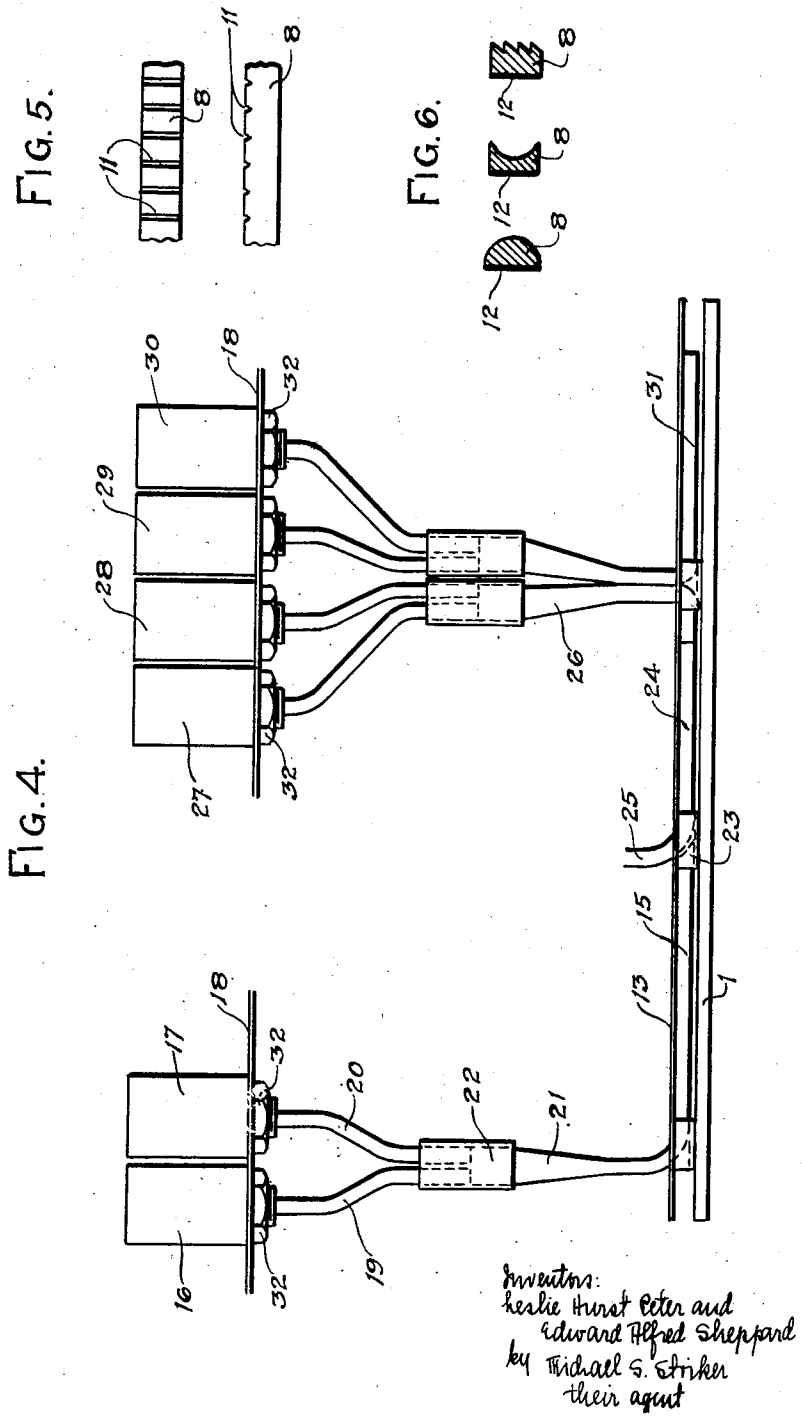
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3 Sheets-Sheet 3

FIG. 10.

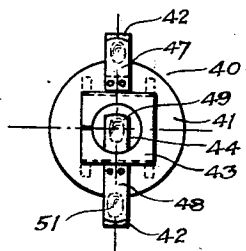


FIG. 7.

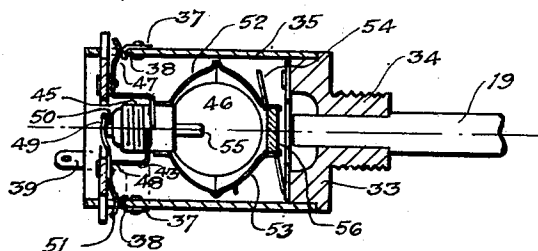


FIG. 9.

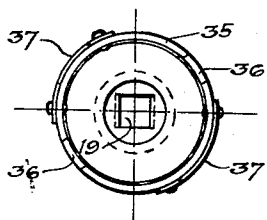
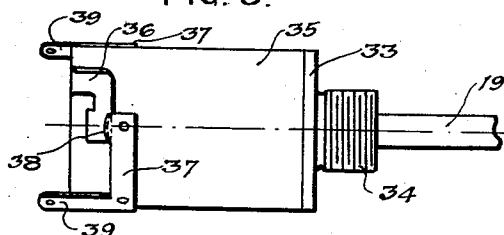


FIG. 8.



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UNITED STATES PATENT OFFICE

2,591,864

LINE DIAGRAM PANEL

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Application April 16, 1949, Serial No. 88,008
In Great Britain May 13, 1948

4 Claims. (Cl. 177-311)

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This invention relates to mimic diagram panels for railway and other indication systems of the kind arranged to provide an electrically illuminated representation of railway track or conductor layouts or networks and of operating conditions therein for the purpose of control or information.

Mimic diagram panels of this character are now widely employed in railway signal cabins, for example, to provide a signalman with a complete and compact representation of the track layout controlled from the cabin showing the setting of routes points and signals and the occupative condition of each section of the layout.

The panel is usually mounted above a control panel or console and comprises, in addition to an invariable representation or symbols of the layout or network, translucent or transparent variable and controlled supplementary portions of the diagram which are directly illuminated from the rear so as to be plainly visible against an opaque background.

In most cases, these transparent or translucent portions of the diagrams are of relatively considerable length corresponding to the track or conductor sections of the layout and their effective and even illumination necessitates numerous and somewhat closely spaced electric lamps which not only require a considerable amount of electrical energy but occupy considerable space at the rear of the panel.

The present invention has for its object to provide an improved mimic diagram panel in which these disadvantages are eliminated and according to the invention the mimic diagram panel is composed of transparent material, the invariable portion of the representation and of any symbols associated therewith being carried on the surface of the panel and illuminated by internal reflection, within the panel, of light from sources at an edge or edges of the panel while the variable or controlled supplementary representations are carried on the faces of plates or strips of transparent material arranged immediately behind or in front of the panel and also illuminated by internal reflection of light from a controlled source of one or other of a number of controlled sources of illumination.

It should be noted that the light above referred to as internally reflected may have a wavelength within or beyond the visible light spectrum, the light rays in the latter case serving to illuminate the representation or symbols by fluorescent action.

The invention is illustrated by way of example

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in the accompanying drawings as applied to the mimic track diagram panel at a control office or cabin for a railway signalling system.

Figure 1 is a view in front elevation of a diagram panel for a simple track layout constructed and arranged in accordance with the invention, Figure 2 being a view thereof in end elevation. Figure 3 is a view similar to Figure 1 showing the appearance of the diagram under a particular condition of occupation of a portion of the track layout by a train or vehicle.

Figure 4 is a plan view showing arrangements for illuminating portions of a mimic diagram panel of the kind shown in the preceding figure, Figure 5 showing in front elevation and plan on an enlarged scale an element of the diagram of the preceding figures, Figure 6 showing in section various modifications of the element of Figure 5.

Figure 7 is a sectional view of a preferred construction of one of the lamp units shown in Figure 4, Figure 8 being a view in elevation of this unit with the lamp removed.

Figure 9 is a view in end elevation of Figure 8 and Figure 10 is a similar view of Figure 7.

Referring now first to Figures 1, 2 and 3 it will be seen that the mimic diagram panel illustrated comprises a sheet 1 of transparent material (such as the plastic sold under the registered trade-mark "Perspex") mounted above and to the rear of the usual control panel or console (not shown) supporting the control switches for operating the track points signals and routes of the portion of the signalling system to be controlled.

Upon a part of the rear face of the diagram panel 1 a main representation of the track layout with the associated symbols and other indications is painted, etched or otherwise applied, as shown for instance at 2, 3, 4 and 5 in Figures 1 and 2, this main representation being continuously illuminated, so as to be visible through the transparent panel 1, by internal reflection within the body of the panel, of light rays emitted from a tubular or fluorescent electric lamp 6 arranged at the upper edge of the panel 1. If desired a second lamp 7 may also be provided at the lower edge of the panel as shown in chain dotted lines in Figures 1 and 2. It will be understood that the part of the rear face of the sheet 1 bearing the main representation has a different light reflecting capacity from the remainder of the sheet by reason of the paint or etching borne thereby.

Immediately behind the panel 1 and extending along the lines of the main track representation

are bodies such as relatively narrow strips 8, 9a, 9b, 10 of transparent material bearing a supplementary representation and having transverse spaced bars or lines 11 engraved thereon which are arranged to be illuminated by internal reflection within the strips by lamps arranged at the ends or at suitable intervals along the length of each strip, as will be hereinafter described.

It will be understood that the bars 11 on the strips 8, 9a, 9b, 10 when thus illuminated are visible through the transparent panel 1 so that the bars 11 when the strips are illuminated appear as transverse lines across the permanently illuminated portions of the representation as shown in the case of the portions corresponding to the strips 8, 9a, 9b, 10 of the track representation.

In order to indicate different conditions of portions of the track corresponding to the strip such for example as the setting up of a route including these track portions or their occupancy by a train or vehicle, the internal illumination of the strips may be arranged to be effected by light (Fig. 3) of different colours emitted from separate lamps automatically controlled in accordance with these track conditions.

In the case of the panel shown in Figure 1 for example the setting up of a route comprising the portions of the track layout corresponding to the strips 8, 9a, 9b, and 10 may be indicated by the illumination of these strips by white or green light while the occupation by a train or vehicle of the portions of the layout corresponding to the strips 3, 9b may be indicated by the illumination of these strips by red light.

The white or green illumination of a strip is effected by light rays from a lamp or lamps the energising circuit of each of which is closed only when a route including a portion of the track representation corresponding to the strip has been properly set up while the red illumination of a strip is effected by light rays from a lamp or lamps the energising circuit of each of which is controlled by a track relay or relays so as to close the lamp circuit when this portion of the track layout is occupied.

As a result, the transverse bars or lines on the strip will appear illuminated in white or green when the route is established and in red when a train or vehicle occupies the corresponding track portion.

The strips may be of rectangular cross section as shown in Figure 5, the transverse bars 11 being formed by engraving or etching. Alternatively the strips may be of non-rectangular cross section, a few forms of which are shown in Figure 6, while the rear faces of the strips may be provided with a coating or backing of light reflecting or opaque material as indicated at 12 in Figure 6. The upper and lower edges of the strips may be similarly treated, if desired, to prevent the escape of light from the body of the strip.

The strips such as those indicated at 2, 3 etc., in Figures 1 and 3, are preferably sub-divided into sections corresponding to the block sections of the track, but where a section includes a junction it may be necessary to sub-divide it into 3 or more parts, as indicated at 3, in order to obtain the desired representation. The two abutting strip sections at the block joints are secured together by an opaque sleeve 14.

It will be understood that the illumination of the representation on the panel 1 and of the bars 11 on the strips is effected by internal reflection within the panel or strip, the light rays entering the panel or bar at an end or edge thereof and

being transmitted by repeated reflection along or across the panel or strip to illuminate the representation or bars which are thereby rendered visible.

The relative arrangement of the strips immediately behind the rear face of the panel 1 is shown in Figure 2, the strips being secured to a backing panel 13 in any suitable manner.

The lamps above referred to may be arranged in any suitable position to cause the light rays emitted therefrom to enter the body of the strip but in a preferred arrangement illustrated in Figure 4 advantage is taken of the possibility of transmitting light rays from a source to a desired point at a considerable distance from the source through a rod of transparent plastic material, the lamp or other source of light rays being located adjacent to one end of the rod, the other end of which is located at the desired remote point. It is found that light rays can be thus transmitted by internal reflection within the rod which may be bent or curved without serious loss of light.

Referring now to Figure 4 it will be seen that a strip section 15 is arranged to be illuminated alternatively from a white lamp unit 16 or a red lamp unit 17 supported upon a mounting or bracket 18 which may be carried on the panel 13. The light rays emitted from the lamps of the units 16, 17 are transmitted by internal reflection through rods 19, 20 of transparent plastic material to a common rod 21 of similar material the end of which adjacent to the strip section 15 is bent so as to abut against the end of this strip section, the rods 19, 20 being secured together and to the rod 21 by a sleeve 22.

The opposite end 23 of the strip section 15 is rendered opaque in any suitable manner so as to prevent the escape of light rays to the next adjacent strip section 24 and it will be evident that by supplying energising current (through a route relay for example) to the lamp unit 16 the strip section 15 can be illuminated in white light to indicate the establishment of a corresponding section of the route while by the supply of energising current to the lamp unit 17 the strip section 15 can be illuminated in red light to indicate that the corresponding section of the route is occupied by a train or vehicle.

The adjacent strip section 24 corresponding to section 3 in Figures 1 and 3, is divided into 3 sections. One part is shown as arranged to be illuminated from one end through a light transmission rod, 25, similar to rod 21, while another part is illuminated from the other end of the section through the rod 26 and lamp units 27, 28 similar to lamp units 16 and 17, respectively. The third part of the section is not shown in Figure 4, but is arranged to be similarly illuminated from its outer end. At the junction of the three parts of the section, an opaque screen is provided to prevent the light from one part passing into the others, and thus causing undesired illumination of these parts, when the required representation necessitates that they should be unilluminated.

In some instances such as in the case of a long section, it may be desirable to divide a simple straight section into two parts and to illuminate each part from its outer end. In these instances no opaque screen is provided at the junction of the two parts, and the duplication of the light transmission to a strip or section evidently increases and renders more uniform the illumina-

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tion of the strip section and may be adopted wherever necessary or convenient.

The lamp units 27, 28 may conveniently form a group with lamp units 29, 30 for an adjacent section 31 as shown in Figure 4 and the units a preferred construction of which is shown in detail in Figures 7, 8, 9 and 10 may be secured to the support 18 by nuts 32.

Referring now to Figures 7 to 10 inclusive a construction of lamp unit is illustrated comprising a metal base plug 33 having an externally screw-threaded nozzle 34 within which is fitted the end of a light transmission rod such as that indicated at 19 or 20 in Figure 4. The nozzle 34 serves to mount the lamp unit in position and after being passed through a corresponding aperture in the support 13, is secured thereto by the nut 32.

The lamp unit also comprises a cylindrical casing 35 constructed of insulating material one end of which is fitted on and secured to the base plug 33, the other end of the casing 35 being provided with bayonet-joint slots 36. This end of the casing 35 is also provided with L-shaped terminal strips 37 one end of each of which is bent over the edge of the corresponding slot 36 as indicated at 38, the ends 39 of the strip 37 constituting the terminals of the lamp unit.

The lamp carrier 40 of the unit as shown in Figure 10 comprises a disc 41 of insulating material provided with lugs 42 arranged to be capable of entering the slots 36 of the casing 35. Mounted on the disc 41 is a metal lamp support 43 having a central screw-threaded aperture 44 for receiving the screw-threaded cap 45 of an electric lamp 46, the support 43 being provided with a contact lug 47 arranged, when the lamp carrier is in position in the lamp unit, to engage with the end 38 of one of the terminal strips 37. Another contact strip 48 is mounted on the disc 41 one end 49 of this strip engaging with the central stud 50 of the lamp 46 while the other end 51 engages with the end 38 of the other terminal strip 37.

It will thus be seen that when the lamp 46 is inserted into the lamp carrier 40 one lamp terminal constituted by the lamp cap 45 is electrically connected to the lug 47 through the support 43 while the other lamp terminal constituted by the stud 50 is electrically connected to the contact strip 48. When the lamp carrier 40 is inserted into the lamp unit, the lamp terminals are thus connected to the terminal strips 37. The latter are connected to the control circuit for the lamp unit and it will be evident that the lamp carrier 40 can be removed from the unit without interfering with the control circuit connections above referred to.

The lamp 46 is provided with a substantially hemispherical reflector section 52 supported on the neck of the lamp together with a similar complementary reflector section 53 between which and the plug 33 of the unit a light helical spring 54 is interposed. The reflector section 53 is provided with a central aperture containing a transparent disc 56 which in the case of certain lamp units may be a colour screen so as to transmit correspondingly coloured light to the end of the rod 19.

When the light unit is assembled it will be evident that the lamp 46 is enclosed between the reflector sections 52, 53, the abutting peripheral edges of which are held in engagement with one another by the spring 54.

The reflector sections 52, 53 are of such cross-

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sectional form that the filament 55 of the lamp 46 occupies such a position relative to the reflecting surfaces of the reflector sections 52, 53 that the rays of light emitted by the filament 55 are directed towards the end of the rod 19 to the maximum extent possible.

In a modified form of the invention any portion of the track representation for which automatically controlled illumination (to indicate occupation for example) is not required may be arranged to be continuously illuminated by internal reflection by light of a special colour different from that for the remainder of the track.

The sources of light for internal reflection as above described may in some cases be sources of ultra-violet light arranged to cause fluorescence or excitation of suitable paint or other material employed for the representation on the panel or the plates or strips.

It will be understood that many various modifications of the constructions above described and illustrated may be made without exceeding the scope of the invention.

Having thus described our invention what we claim is:

1. A mimic diagram panel for a track or conductor layout, comprising in combination, a sheet of transparent material having a part bearing a main representation of the layout; means for illuminating said part bearing the main representation by internal reflection of light within said material; at least one body of transparent material bearing a supplementary representation and located closely adjacent to a surface of said sheet; and means for independently illuminating said body bearing the supplementary representation by internal reflection of light within said body.

2. A mimic diagram panel for a track or conductor layout, comprising in combination, a sheet of transparent material having a part bearing a main representation of the layout, said representation being formed by a portion of a surface of said sheet having a different light reflecting capacity from the remainder of said sheet; means for introducing light into the interior of said sheet through an edge thereof; at least one body of transparent material located closely adjacent to a surface of said sheet and bearing a supplementary representation formed on a surface of said body substantially in contact with the surface of said sheet bearing said main representation; and means for independently illuminating said body bearing the supplementary representation by internal reflection within said body.

3. A mimic diagram panel for a track or conductor layout, comprising in combination, a sheet of transparent material having a part bearing a main representation of the layout; means for illuminating said part bearing the main representation by internal reflection of light within said material; at least one body of transparent material corresponding to at least a portion of said part bearing the main representation and bearing a supplementary representation, said body being located closely adjacent to a surface of said sheet so that said portion of said sheet and said body are substantially superposed; and means for independently illuminating said body bearing the supplementary representation by internal reflection of light within said body.

4. A mimic diagram panel for a track or con-

ductor layout, comprising in combination, a sheet of transparent material having a part bearing a main representation of the layout; means for illuminating said part bearing the main representation by internal reflection of light within said material; at least one body of transparent material corresponding to at least a portion of said part bearing the main representation and bearing a supplementary representation, said body being located closely adjacent to the rear surface of said sheet so as to render visible the supplementary representation, when illuminated, from the front through said sheet.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,286,014	Rowe	June 9, 1942
2,305,185	Merkel	Dec. 15, 1942
2,317,472	Merkel	Apr. 27, 1943

FOREIGN PATENTS

Number	Country	Date
640,488	Germany	Jan. 6, 1937