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H. H. HELMBRIGHT

2,082,629

ELECTRIC SIGNAL DEVICE

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Fig 2

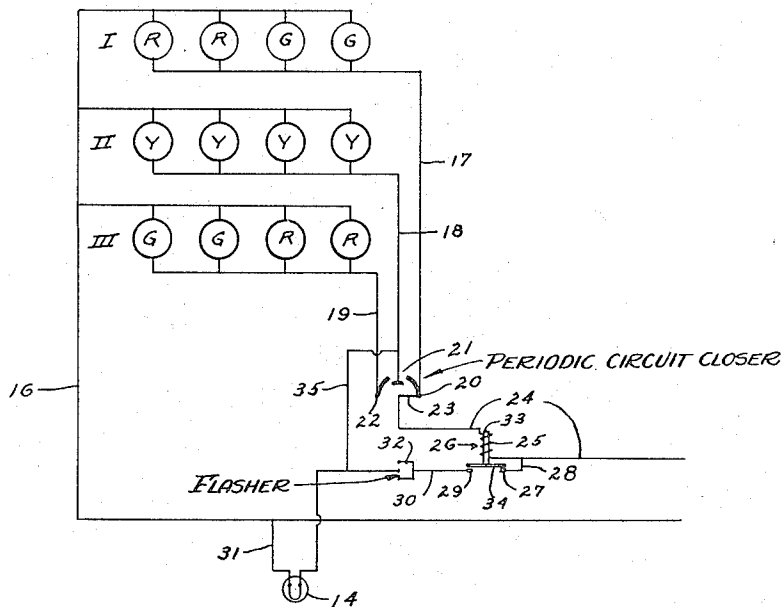


Fig 1

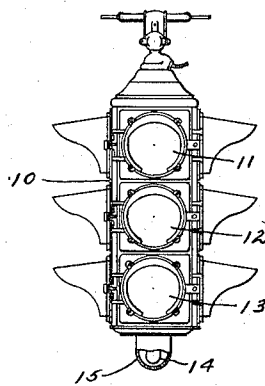
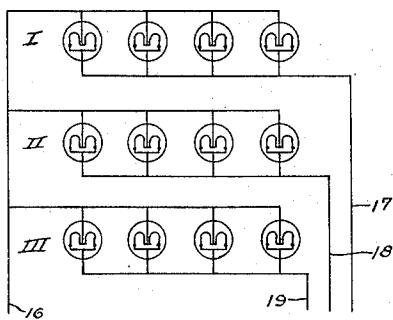


Fig 3



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ELECTRIC SIGNAL DEVICE

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1 Claim. (Cl. 177—337)

My invention relates to electric signal lights and more particularly to signal lights for highway traffic service.

The object of my invention is to provide means for indicating the failure of one or more lamps in a signal. An indication of lamp failure is highly desirable in traffic signal systems used at street intersections where the failure of a lamp is likely to create an extremely dangerous situation, particularly when it is the red or "stop" signal that has become inoperative. The motorist who should be receiving the signal to stop is then receiving no signal at all and may consequently pass across the intersection and collide with a motorist who is traveling on the intersecting street and receiving the "go" signal.

According to my invention, the above-mentioned hazard is obviated by providing means for causing either a separate warning lamp or one or more of the lamps in the signal itself to become illuminated when one or more of the other lamps become inoperative. The warning lamp is preferably mounted on the signal housing to give notice to motorists in all directions that there is a defect in the system. Notice of the defect is also readily given thereby to any police officer or inspector in the vicinity of the signal so that he may take the proper steps to have the defective lamp replaced. Further features and advantages of my invention will appear from the following detailed description of species thereof.

In the drawing Fig. 1 is an elevation of a form of traffic signal light comprising my invention; Fig. 2 is a diagrammatic representation of an electric circuit therefor, and Fig. 3 is a diagrammatic representation of a portion of a modified circuit.

In Fig. 1 is shown a standard pendant type four-way traffic signal comprising a housing 10 in which is mounted a plurality of lamps covered by lenses of different colors. The lenses 11, 12, 13 are illustrative of the lenses on the other three faces of the signal and are respectively red, yellow and green. In the form shown in Fig. 1, an auxiliary warning lamp 14 is mounted on the bottom of the housing 10 and is preferably enclosed in a red glass globe 15. The lamp 14 is normally unilluminated but upon failure of one of the lamps in the housing 10, said lamp 14 is cut into the circuit, by means hereinafter described, and is preferably caused to flash intermittently, thus providing a readily visible indication of the lamp failure.

Referring to Fig. 2, the circuit arrangement for a four-way, three-color system comprises

three groups, I, II, III, of four lamps each. The lamp groups I and III each comprise two lamps R covered by red lenses, and two lamps G covered by green lenses, while the four lamps Y in group II are covered by yellow lenses. The four lamps in each group are electrically connected in multiple and are each further connected at one end to a common conductor 16 which extends to one side of a source of electrical energy. At their opposite ends the lamp groups I, II, III are connected to conductors 17, 18, 19 respectively, which extend to contacts 20, 21, 22 respectively. A contact arm 23, which is connected to a conductor 24 extending to the other side of the source of electrical energy, is arranged to pivot in a counter-clockwise direction at definite intervals to engage each of the contacts 20, 21, 22 successively to illuminate each of the groups of lamps I, II, III.

In order to provide an indication of the failure of any one or more of the lamps in any of the groups, I prefer to insert in series with the conductor 24 the coil 25 of a "holding" type of relay 26. One contact 27 of the said relay 26 is connected by a conductor 28 to the conductor 24. The other contact 29 is connected to a conductor 30 which extends to one terminal of the warning lamp 14, the other terminal of which is connected by a conductor 31 to the conductor 16. I also prefer to insert in series with the conductor 30, a "flasher" device 32 to cause the lamp 14 to operate intermittently. When all the lamps in the signal are operative, the current flowing through the coil 25 of relay 26 will reach a predetermined value and cause the plunger 33 to be raised to withdraw the contact plate 34 from the contacts 27, 29, thus rendering the lamp 14 inoperative. But upon failure of one or more of the signal lamps, the current flowing through coil 25 when the particular group I, II or III comprising the defective lamp or lamps is illuminated, will drop below a predetermined value so that the contact plate 34 will remain down and establish a circuit through the lamp 14 which will then glow intermittently to indicate the failure. The contacts 20, 21, and 22 of the periodic circuit closer may be slightly overlapping as shown in the drawing so that the contact arm 23 momentarily engages two of said contacts to prevent de-energization of the relay coil 25 when the lamps in the groups I, II, and III are all operating properly.

Instead of employing a separate lamp 14 to provide the warning, the said lamp may be omitted and the yellow lamp group II may be

used to indicate the failure of a lamp or lamps in groups I and III by inserting a conductor 35 between the conductors 30 and 18. Then upon failure of one or more lamps in groups I or III, the relay 26 will operate upon illumination of that group as described above, to energize the secondary circuit through the yellow lamp group II which will then flash intermittently to provide the warning. It is of course possible to use both the separate lamp 14 and the yellow lamp group II simultaneously to provide the warning signal.

In the circuit shown in part in Fig. 3, the signal lamps in the groups I, II, and III are double-filament lamps. By using double filament lamps, the warning signal becomes operative upon failure of one of the filaments in a lamp so as to give an indication of the failure, but at the same time, the other filament remains operative, thus

maintaining the signal operative in all directions until the partially defective lamp is replaced.

What I claim as new and desire to secure by Letters Patent of the United States, is:

An electric signal comprising in combination a plurality of groups of lamps, the lamps in each group being electrically connected in multiple, means for causing each of said groups of lamps to be successively illuminated, a relay comprising a coil and contacts, said coil being connected in series with said signal lamps and a secondary circuit including said relay contacts and one of said groups of lamps, said relay being adapted to close said secondary circuit and illuminate the group of lamps included therein upon failure of one or more lamps in the remaining groups without affecting the operation of the remaining lamps in the signal.

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