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RECEIVING DEVICE FOR LIGHT SIGNALS

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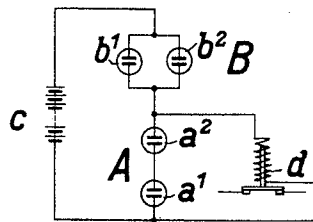


Fig. 1

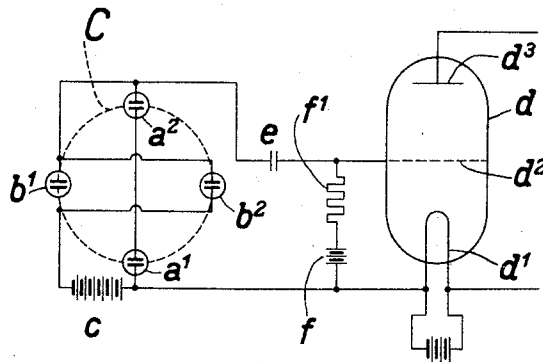


Fig. 2

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RECEIVING DEVICE FOR LIGHT SIGNALS

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The present invention relates to a receiving device for light signals, which is provided with light-sensitive cells and is applied for instance in optical train control systems. When using this device it is generally not possible to have the light-sensitive cells struck only by the light for transmission of signals and not also by other light, for instance daylight, which is not to be permitted to produce any effect on the receiving device. This disadvantage is obviated by equipping the device, in addition to the cells for receiving the light signals, which are hereinafter termed effective cells, with cells for compensating the effects produced by daylight and similar illuminations. A group of effective cells and an equal group of compensating cells are connected in series in a circuit and the potentials for operating the control circuits are taken from the ends of one of these groups. The desired effect is always obtained when the cells are exposed to light in the predetermined manner, that is to say when with existing detrimental light both the effective and the compensating cells are simultaneously exposed to this detrimental light, and, when any detrimental light does not exist, only the effective cells are struck by the light for signal transmission. It has proved however that not only these predetermined but also other exposures have to be taken into consideration, for instance exposures caused by mischievously directing strong light to all effective and only to part of the compensating cells by means of a pocket mirror. The known device cannot provide any sufficient compensation to meet this case which may be rather seldom but is nevertheless possible. A criminal interference is to be feared especially with the optical end signals of trains, in the case of which the receiving device and a light source for influencing the same are close together and easily accessible near the track.

The object of the present invention is to give the known device a compensation which is by far more efficient and can deal with any unfavorable illumination. This can be achieved by substituting for the usual equal, unequal groups of effective and of compensating cells, that is to say by connecting the cells of the effective group in series and the cells of the compensating group in parallel. This compensating group may as well consist of one single cell. As hitherto, care is to be taken that the sensitivity of all cells is the same, in other words, the ratio of the resistance of a cell in a definite illumination to the resistance of this cell in the dark must be always equal. It has been proved that the connection according to the invention makes the difference between the effect due to the required kind of illumination and that due to any possible undesired kind of illumination greater than hitherto, the consequence being that it is easily possible to so adjust a relay influenced by the light-sensitive cells that it does not react upon undesired illuminations, whereby the case in which all effective cells, that is to say these cells alone, are mischievously illuminated is of course left out of account.

With a view to also prevent any such mischievous illumination as far as possible, the effective and compensating cells are mixed in a suitable manner. It is convenient to provide two effective and two compensating cells and to arrange these cells in a circle in such a manner that the two effective as well as the two compensating cells are diametrically opposite each other. The arrangement permits both effective cells to be illuminated in the predetermined manner for instance by means of a suitable triple mirror, any criminal illumination of the two effective cells thus requiring a mirror of a definite form which is not easy to be had at once.

The cells according to the invention are suitably used together with a cathode ray relay and leads are branched from the ends of one of the cell groups to the grid of one of the electrodes of an amplifier valve.

The accompanying drawing illustrates the object of the invention in a device having two effective and two compensating cells. Figure 1 shows the connection of the cells, no regard being had to their spatial arrangement. Figure 2 is a complete con-

nection diagram of four cells arranged in a circle and connected to an amplifier valve.

According to the diagram represented by Figure 1 a group A of effective cells and a group B of compensating cells are connected in series to the circuit of a battery *c*. The group A consists of two cells *a*¹ and *a*² which are also connected in series, and the group B consists of two cells *b*¹ and *b*² connected in parallel. From the ends of the group A leads branch to a relay *d* which is to become effective as soon as the two cells *a*¹ and *a*² are illuminated by the signal light. The relay *d* must not act when all cells are illuminated by daylight or when some of the cells, or for instance the cells *a*², *b*¹ and *b*², are exposed to an illumination stronger than that reflected onto the cell *a*¹.

In the constructional example according to Figure 2 the cells *a*¹, *a*², *b*¹ and *b*² are arranged in a circle C, in the corners of a square the cells *a*¹ and *a*² lying on the one diagonal, and the cells *b*¹ and *b*² on the other. The relay *d* is an amplifier valve having a cathode *d*¹, a grid *d*² and an anode *d*³. The group of the effective cells is connected direct to the cathode *d*¹ and by means of a condenser *e* to the grid *d*² of the valve *d*. Between the grid and the cathode are provided a tension battery *f* and a grid resistance *f*¹.

I claim:

1. A device for receiving light signals, comprising a source of current, a relay, a group of light-sensitive cells connected in series and serving the purpose of energizing the relay, another group of light-sensitive cells connected in parallel, the cells of this other group having the same sensitivity as the cells of the first said group and serving the purpose of compensating the effect of detrimental light, the two groups being connected in series in a circuit containing the said source of current, and the relay being connected to the two ends of one of the two groups.

2. A device for receiving light signals, comprising a source of current, a relay, one pair of light-sensitive cells connected in series and serving the purpose of energizing the relay, another pair of light-sensitive cells connected in parallel, the cells of this other group having the same sensitivity as the cells of the first said group and serving the purpose of compensating the effect of detrimental light, the four cells being arranged in a circle, the two cells of the first said pair lying on one diameter and the two cells of the other pair lying on another diameter of this circle, the first said pair being connected in series to the other pair in a circuit containing the said source of current, and the relay being connected to the two ends of one of the two pairs.

3. A device for receiving light signals,

comprising a source of current, a relay, one pair of light-sensitive cells connected in series and serving the purpose of energizing the relay, another pair of light-sensitive cells connected in parallel, the cells of this other group having the same sensitivity as the cells of the first said group and serving the purpose of compensating the effect of detrimental light, the four cells being arranged in the corners of a square, the two cells of the first said pair lying on the one diagonal and the two cells of the other pair lying on the other diagonal of the said square, the first said pair being connected in series to the other pair in a circuit containing the said source of current, and the relay being connected to the two ends of one of the two pairs.

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