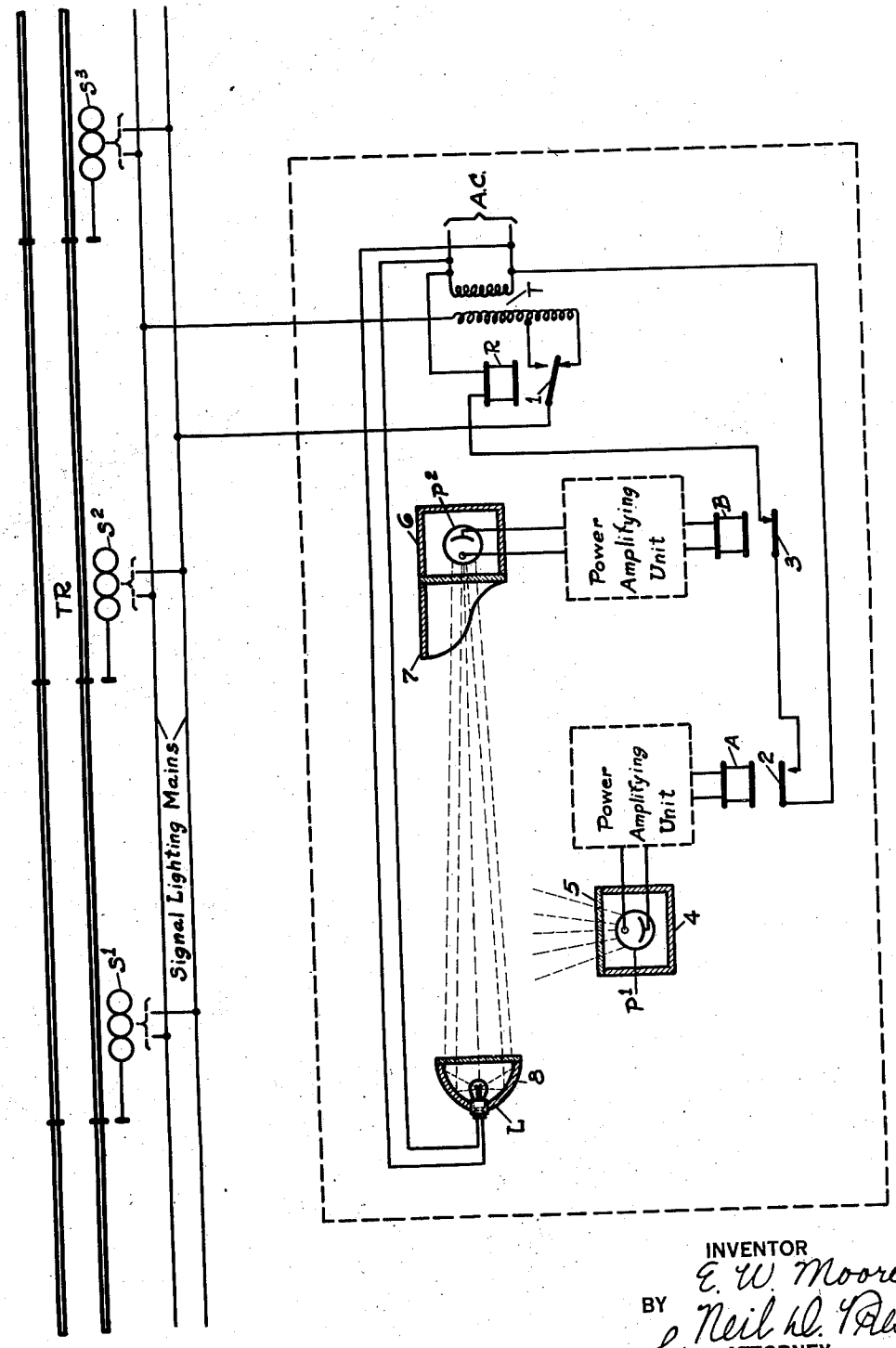
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LIGHT SIGNAL

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LIGHT SIGNAL

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This invention relates to light signals and more particularly to a means for controlling the intensity of such light signals in accordance with the presence or absence of sunlight and also in accordance with the opacity of the atmosphere.

In railway signalling practice, it is found possible to dim the lamps of color light signals when daylight turns to darkness inasmuch as a less intense light at night displays as distinct an indication as the stronger light during the day time. This practice has proved desirable from the standpoint of reducing glare of such signals at night as well as saving in energy consumption and increasing the life of the signal lamps.

Systems have been devised which employ light sensitive cells controlling a relay which is arranged to apply decreased voltage to such signal lamps when this light sensitive cell is not receiving sunlight. However, such systems possess the disadvantage of applying reduced voltage in the day time when an abnormal condition of the atmosphere such as fog, smoke or snow obstructs the sun rays from the light sensitive cell, and it is obvious that it is very undesirable to have a less intensive light under such conditions.

In view of the above it is proposed in accordance with this invention to provide a means for controlling the intensity of illumination of light signals in accordance with the absence of sunlight as well as in accordance with the clearness of the atmosphere.

Other objects, purposes and characteristic features of the invention will appear as the description thereof progresses during which reference will be made to the single sheet of drawing which diagrammatically shows the arrangement of a system for controlling the intensity of illumination of a plurality of railway signals in accordance with this invention.

In the accompanying figure of drawing a section of railroad track TR is shown as having signals S^1, S^2 and S^3 governing traffic thereover. These signals are controlled through suitable local means not shown, and energized by the illustrated signal lighting mains which are in turn energized by a main lighting transformer T.

A relay R is arranged to shift the degree of energization of those mains from the full terminal voltage of the transformer T to a reduced voltage tap by its contact 1, hence changing the candle power produced by the signal lamps energized thereby. The relay R is controlled over a circuit including a back contact 2 of a relay A and a front contact 3 of a relay B.

A photo-electric cell P^1 is arranged in a suitable housing 4 and exposed to the general outside level of light through a glass 5. This cell P^1 is of a well known type which is capable of emitting an amount of current proportional to the intensity of the light to which it is exposed. When current is thus emitted from the cell P^1, it is amplified by a suitable means such as a conventional vacuum tube amplifying arrangement indicated by a dotted rectangle in the drawing and is then effective to energize the relay A.

The characteristics of the relay A and its control circuit are selected so that during normal day time illumination the current emitted by the cell P^1 is sufficient to pick up and hold up the armature 2, but is insufficient at some lesser degree of illumination such as twilight. Thus, when twilight or darkness reduces the emitted current of the photo-electric cell P^1 below the operating point of the relay A, its armature 2 drops which closes an obvious energizing circuit for the relay R and applies a low degree of energy to the signal lamp mains through its back contact 2.

A second photo-electric cell P^2 is arranged in a housing 6 but is protected from the direct rays of sunlight by a hood 7 and receives its light from a distantly located lamp L equipped with a suitable reflector 8. The current generated in this manner by the cell P^2 is amplified through a similar associated amplifying unit and is then effective under normal clear atmospheric conditions to pick up relay B.

The light from lamp L is of course transmitted through outside atmosphere and the strength of the lamp L and its distance from the cell P are adjusted so that under normal clear atmospheric conditions, the current emitted by the cell P^2 is just sufficient to hold up relay B. When some abnormal atmospheric condition exists, such as heavy fog, smoke or snow, which increases the opacity of the atmosphere between the lamp L and the cell P^2, the light received by the cell P^2 is decreased sufficiently to reduce the emitted current below the operating point of relay B.

The dropping of relay B opens the energizing circuit for the relay R at front contact 3 and consequently prevents the application of a decreased voltage on the signal lamp mains even though the absence of sunlight has conditioned relay A for such an application. It may be here stated that the light from lamp L is of sufficient intensity to prevent the presence or absence of sunlight from producing enough relative change in the amount of light received by the cell P^2 to cause a response of relay B. The energization

of the lamp L may be from any suitable source but for convenience is shown as the primary of transformer T.

The present invention has thus provided a means for automatically applying a high degree of energization to light signals during the day time when the sunlight requires an intense light to properly display indications of such signals and has also provided means for reducing glare at night and conserving power and depreciation of lamps by reducing the degree of energization of these lamps during night time when a less intense signal light is sufficient. The present invention has also provided a means for checking the opacity of the atmosphere which is arranged to prevent the application of a reduced degree of energy to such signal lights at any time when an atmospheric condition hinders the proper display of indications from such signals.

In describing the present system attention has been directed to one specific embodiment thereof without attempting to point out the various alternate or optional features of construction, or the different organizations or combinations that may be employed. For example, photo-electric cells have been shown and described as supplying power through amplifying units to relays A and B but any similar arrangement may as well be employed such as a light sensitive device in series with an external supply of energy for controlling these relays.

In other words, the particular embodiment of the present invention has been selected to facilitate in the disclosure thereof rather than to limit the number of forms which it may assume.

Having thus shown and described my invention, what I claim is:—

1. In a circuit voltage regulating means, in combination, a first relay, an energizing circuit for the relay including light sensitive means exposed to atmospheric light, the light sensitive means being adjusted for allowing the relay to thus be energized only during daytime, a second relay, a source of light, a light sensitive means exposed to light from the source after it has traversed atmosphere, an energizing circuit for the second relay controlled by the last said light sensitive means to be energized only under clear atmospheric conditions, a source of potential, a circuit, the voltage of which is to be regulated, the circuit having high and low potential connections to said source, and a voltage control relay having a contact finger and cooperating front and back points, for placing high and low voltages, respectively, on the last said circuit through its back and front points; said voltage relay having an energizing circuit including a back point of said first relay, and a front point of said second relay.

2. In a railway signalling system, in combination, a light signal, a source of electrical energy having a variable potential, means for controlling said source to apply a high potential to said signal when the atmosphere adjacent said signal is of a predetermined opacity and for applying a low potential to said signal when the sunlight adjacent said signal is below a predetermined intensity.

3. In a railway signalling system, in combination, a light signal, a source of electrical energy having a variable potential, means for controlling said source to apply a high potential to said signal when the atmosphere adjacent said signal is of a predetermined opacity and for applying, subject to control by the opacity of the atmosphere adjacent said signal, a low potential to said signal when the sunlight adjacent said signal is below a predetermined intensity.

4. In a railway signalling system, in combination, a light signal, a source of electrical energy having a variable potential, means for controlling said source to apply a high potential to said signal when the atmosphere adjacent said signal is of a predetermined opacity and for applying a low potential to said signal when the sunlight adjacent said signal is below a predetermined intensity and the atmosphere adjacent the signal is of an opacity below said predetermined opacity.

5. In a railway signalling system, in combination, a light signal, a source of electrical energy having a variable potential, means for controlling said source to apply a high potential to said signal when the atmosphere adjacent said signal is of a predetermined opacity and for applying a low potential to said signal only when the sunlight adjacent said signal is below a predetermined intensity and the atmosphere adjacent the signal is of an opacity below said predetermined opacity.

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