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LIGHT INTEGRATING MEANS FOR PHOTOCELL CIRCUIT

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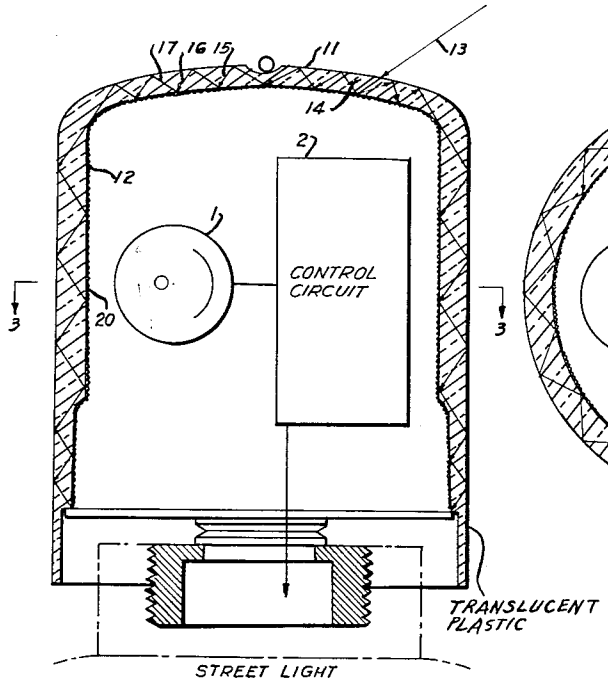


FIG. Nº 2

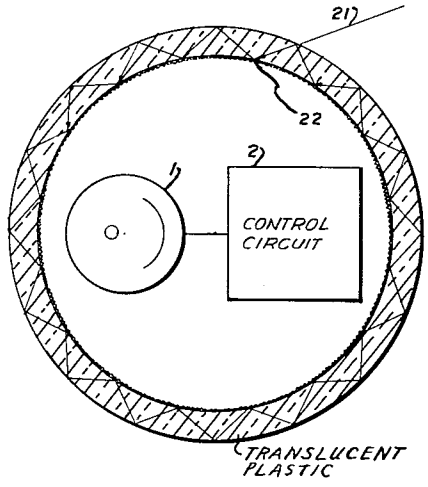


FIG Nº 3

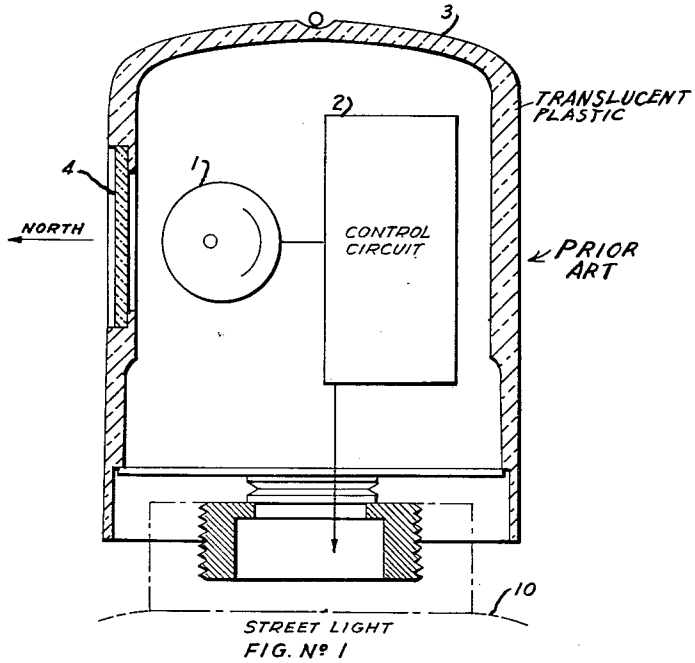


FIG. Nº 1

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LIGHT INTEGRATING MEANS FOR PHOTOCELL CIRCUIT

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4 Claims. (Cl. 250—239)

This invention relates to light integrating means for photocell control circuits and more particularly, to a light integrating cover for photocells in such circuits.

This invention is a continuation in part of my prior application S. N. 305,645 for Automatic Street Lighting System, filed August 21, 1952.

That application discloses photocell control means for automatic control of individual street lights. Such apparatus generally has a photocell to actuate the control circuit when the average light intensity decreases at sundown to turn on the street light. My prior application discloses signal integrating means including a source of heat and a thermostat control. The purpose of the integrating means is to avoid spurious responses due to flashes of light such as lightning, automobile head lights and the like. Such apparatus generally has a window in the cover so that the light can pass through to the photocell. In order to avoid direct sunlight on the photocell, the window is generally faced north. This provides a north light, which is not representative of the average light intensity, since the majority of the light comes from above and other directions. Furthermore, there may be artificial impediments on the north side such as buildings or trees which may cause shadows and distort the light.

The present invention provides an automatic street light control circuit having a translucent cover which integrates the light received from all directions as well as from above. In one embodiment, the cover is made of methyl methacrylate also known as Plexiglas or Lucite, or equivalent, and is sandblasted on the inside in order to etch the inside surface so as to scatter the light received. The etching on the inside serves several purposes. One is to protect the photocell from direct light, and another purpose is to scatter the light so that it may travel through the Lucite and be picked up by the photocell. Since light is received from all directions, the input to the photocell will be an average or integrated version of the total light intensity received from all directions as well as from above. The transmission of light through Lucite even around curves and bends is a well known phenomena.

Accordingly, a principal object of the invention is to provide new and improved light integrating means.

Another object of the invention is to provide new and improved light integrating means for photocell control circuits.

Another object is to provide cover means for automatic street lighting control circuits which are adapted to receive light from all directions and from above and which also serve to integrate said light and transmit it to a photocell.

Another object is to provide an automatic street light control system comprising a photocell, a control circuit responsive to said photocell and cover means for said photocell adapted to receive light from all directions, and to integrate said light and transmit said light to the photocell.

Other objects of the invention will be apparent from the following specification and drawings of which:

Figure 1 is a view partially in section showing a typical conventional street light control system having a cover with a window on one side.

Figure 2 is a sectional view of the light integrating cover of the present invention illustrating the transmission of light through and around the cover.

Figure 3 is a sectional view taken along the lines 3—3 of Figure 2.

Referring to Figure 1, there is shown a conventional street lighting control system which is a simplified version of that shown in my aforementioned patent application. Figure 1 shows a street light **10** on top of which is mounted the light control units. The light control unit includes a photocell **1** and a control circuit **2** connected to, and responsive to the photocell to turn the street light **10** on and off at a certain average light intensity. The cover **3** for the light control circuits transmits light only through the window **4**. As previously mentioned, the standard practice is to face the window toward the north in order to protect the photocell from direct sunlight. This procedure has several disadvantages. In the first place, the north light is not representative of the average light intensity. Secondly, there may be buildings or trees on the north side which may further interfere with the proper operation of the system. Therefore, it is seen that the conventional covers with the windows facing north provide a false indication of the average light intensity, since the most representative light comes from above.

Figures 2 and 3 show the system of the present invention. The cover **11** is made of a translucent plastic such as Lucite and it is sandblasted or etched on its entire inside surface **12**. The photocell **1** and the control circuit **2** may be the same as previously described.

The light integrating operation of the cover is as follows:

Assume a beam of light represented by the arrow **13** strikes the cover. The light will pass through to the inside surface of the cover **11** and will be scattered in all directions by the sandblasted inside surface at the point **14**. Thereupon, the light will travel in both directions through the Lucite being alternatively reflected from one side or the other of the cover as illustrated by the arrows **15, 16, 17** and so forth.

We have shown only one beam of light **13**. However, it can be easily visualized that light may be received from all directions and that an infinite number of light beams are continuously being scattered by the inside etched surface and that these light beams are then being transmitted through the Lucite cover according to the well known phenomena of transmission of light through Lucite and similar materials.

The etching of the inside does not reflect all the light and some portion of the light will be transmitted through to the inside of the cover. The amount of light transmitted through the cover at any given point, will be the integrated light intensity of the infinite number of light beams which have been received from all directions, scattered and thence transmitted through the Lucite cover.

Therefore, the inside of the cover in front of the photocell at point **20** will transmit to the photocell the average light intensity of all the light received both from all sides and from the top.

Figure 3 shows a sectional view of Figure 2 taken along the lines 3—3. Figure 3 illustrates that the cover is circular in the horizontal plane and also illustrates reception of a light beam **21** which is scattered by the inside surface at point **22** and thence travels around until it illuminates the photocell **1**.

The invention is not limited to the illustrated use for automatic street lighting control circuits, but it may be used wherever it is desired to obtain an integrated light for use with photocells or for any other purpose. The

invention is not limited to the use of Lucite since it is intended to cover any equivalent material.

Certain subject matter shown in Figure 1 is being claimed in my copending prior application aforementioned.

I claim:

1. A photocell, a street light control circuit connected to and responsive to said photocell, and protective cover adapted to integrate the light received from substantially all directions and to guide said light to said photocell.

2. A photocell, a control circuit connected to and responsive to said photocell, and means to integrate the light received from substantially all directions and to transmit said light to said photocell comprising a cylindrical translucent cover etched on the inside.

3. An automatic control system for street lights comprising a photocell, a control circuit responsive to said photocell, and cover means to integrate the light input to said photocell.

4. An automatic control system for street lights comprising a photocell, a control circuit responsive to said photocell, and means to integrate the light input to said photocell comprising a translucent plastic cylindrical cover sandblasted on the inside.

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