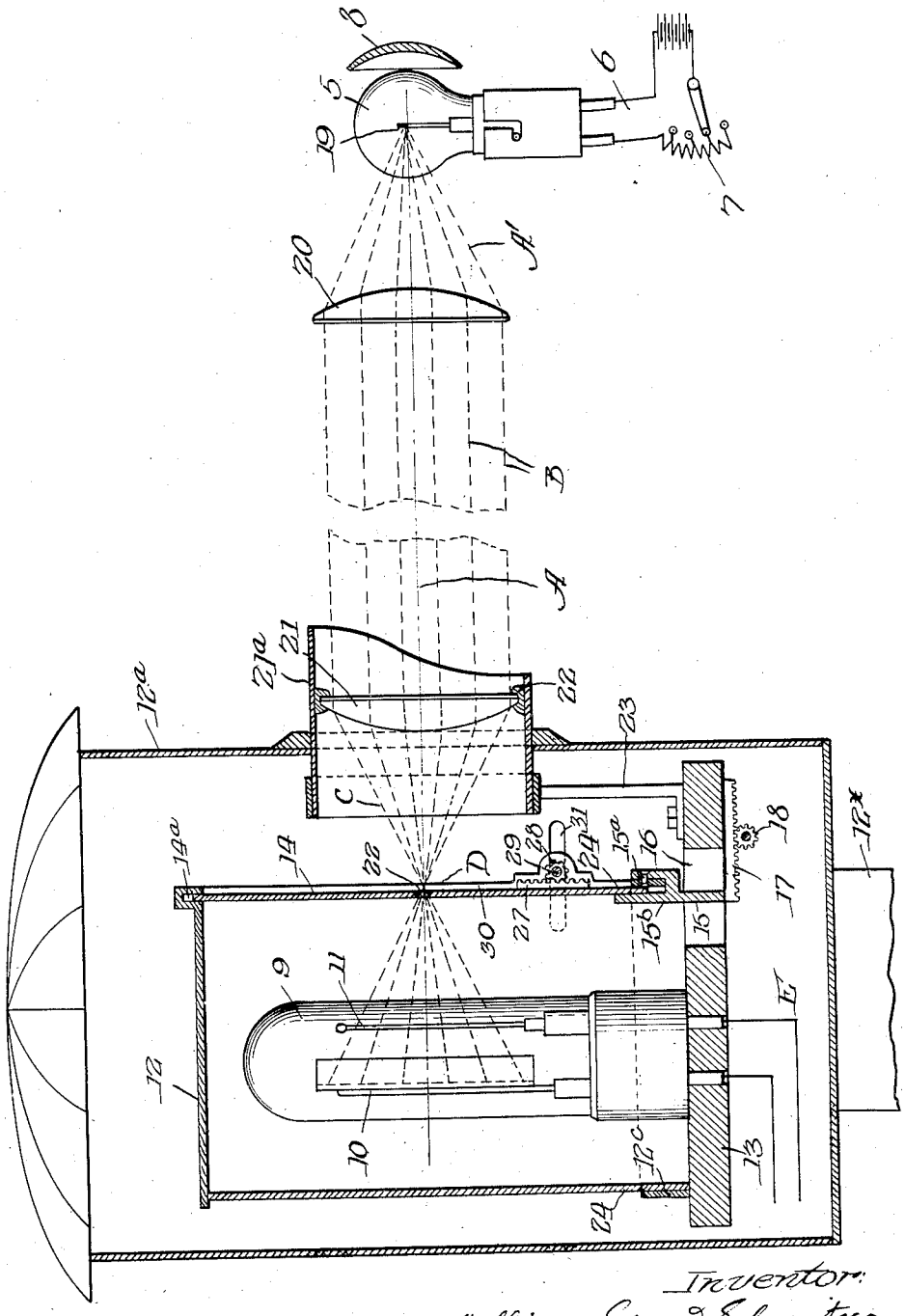
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LIGHT OPERATED MECHANISM

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LIGHT-OPERATED MECHANISM

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This invention relates in general to light-operated mechanism, and more particularly to signalling systems and specially to those of the character wherein light-sensitive elements are employed for actuating a controlling circuit for an electrical signal. In one of its embodiments this invention finds utility as an actuating means for visual or audible signals for announcing the presence or absence of objects within or their passage through a predetermined field, such, for example, for announcing to the attendant of a garage or gasoline station the presence of a customer in the entrance or driveway thereof.

The principal objects and advantages of this invention reside in the provision of an improved arrangement of the light-sensitive means and the normally permanently acting light source whereby a visual or audible signal may be actuated upon the interposing of an object between the light source and the light-sensitive element; the provision of an improved arrangement of the light-sensitive means and permanent light source wherein the light-sensitive element is made to respond only to variations or interruptions in the permanent light source and is unresponsive to extraneous light rays; the provision generally of an improved signalling system; the provision of an improved arrangement of the light-sensitive cell for controlling an electrical circuit and in associating lens and apertured diaphragm means therewith so that an artificial light source placed at a distance from the light element source may be focused thereon to the substantial exclusion of other unwanted activating light rays; the provision of an improved signalling means, including a light-sensitive element, collecting and condensing lenses and means for providing for relative adjustment between said elements; and the provision of a signalling system of the character referred to which is relatively simple in construction and inexpensive to maintain and operate.

The foregoing and such other objects and advantages as may appear as this description proceeds are attained in the structural embodiment of the invention shown in the accompanying drawing.

Referring now more particularly to the drawing, I provide as the essential elements of this invention a light source 5, such for example as a conventional incandescent lamp, which is placed in a circuit 6 to which electrical current is supplied, a rheostat or other variable resistance 7 being interposed in said circuit for regulating the intensity of the rays projected from said lamp. A suitable reflector 8 may be provided behind the lamp.

The light source 5 is arranged in spaced relationship to a light-sensitive element 9, and in one of the installations of this invention in practical operation the light source is placed on one side of a driveway to a garage or gasoline filling station and the light-sensitive element is placed in axial alignment with the beam of light projected from the light source on the other side of such driveway, so that any vehicle or person passing along the driveway will intercept the light rays passing from the light source to the light-sensitive element.

It will be understood, of course, that the light-sensitive element is not only responsive to rays from the light source 5 but that without the associatd structure, which I will now describe, the light-sensitive element would be affected by extraneous light rays such as daylight and, therefore, it is necessary to provide means for excluding extraneous light and facilitating the concentration of the light rays from the source 5 on said light-sensitive element.

To this end the light-sensitive element, which may be of the vacuum tube type, having the electrodes 10 and 11 therein, is enclosed in a housing 12. This housing and the light-sensitive tube or cell 9 are mounted on a suitable base 13 which is adapted to be supported in any convenient position as desired. The housing 12 is provided with a variably positioned diaphragm 14, said diaphragm being supported by a leg 15 passing through a slot 16 in the base 13. The lower end of the leg 15 is provided with a rack bar 17 and a pinion 18 meshes with said rack bar for the purpose of moving the diaphragm 14 bodily toward or away from the light sensitive element.

The light-sensitive element is so positioned that its medial portion lies substantially transverse to the optical axis A of the beam of light projected from the light source 5, the filament 19 of said light source being similarly arranged on said optical axis A.

Adjacent to the light source 5 I provide a projecting lens 20, so positioned as to collect and project the light rays A' in a substantially parallel cylindrical form, indicated by the lines B, on to a condensing or focusing lens 21, which latter is arranged adjacent to the light-sensitive element and diaphragm 14. Both of the lenses 20 and 21 are preferably disposed with their optical axes in alignment with the axis A. The lens 21 is supported in a suitable ring 22 carried by a leg 23 fixedly mounted on the base 13. It will be

understood that the lens 21 may be adjustably mounted, if desired, but that under ordinary conditions the lens can have a fixed adjustment with respect to the plate 10 in the light-sensitive cell.

The lens 21 acts upon the rays, indicated by the lines B, to converge these rays as indicated at C, the focal point of said lens being indicated at the point D and being substantially on the axis A. The diaphragm 14 is provided with a relatively small aperture 22 preferably in substantial alignment with the optical axis A and, by an adjustment of said diaphragm to and fro, the aperture 22 may be made to coincide substantially with the focal point D of the lens 21. In this manner the rays thus condensed by the lens 21 will, within the housing 12, be distributed to the light-sensitive element of the cell or tube 9.

It will be understood that extraneous light is substantially excluded from entering the housing by virtue of the relatively small opening 22 in the diaphragm 14 and that in any event such incidental extraneous light rays as may enter the housing do not have an undesirable effect on the light sensitive cell, due to the fact that they are not focused on the sensitive portions thereof.

In the normal installation of the device for a signalling means, such as a gas station or the like, light rays from the light source 5 are continually projected through the aperture 22 on to the light-sensitive cell. Under these conditions, this cell is connected to the grid circuit on a vacuum tube amplifier on one side and is supplied with a voltage on the other side so that, upon an interruption of the light rays passing from the source 5 to the light-sensitive element, this element will function to operate a suitable relay closing a circuit which renders either an audible or visual signal, this directing an attendant's attention to the fact that there is a customer in the driveway.

The aperture 22 may, if desired, be constructed to be of variable size by means such as that known as an Iris diaphragm, in place of the fixed sized opening shown in the drawing, and thus by a proper regulation of the size of the opening 22, position of the diaphragm 14 and the intensity of the light source, the light-sensitive cell may be rendered sensitive normally only to the light rays passing from the light source 5 thereto and thus by substantially excluding all other extraneous light rays, permitting the device to operate successfully either in daylight or at night time.

The housing 12 may be positioned in a casing 12*a* provided with a slidable tubular extension or hood 21*a* in which the lens 21 may be mounted. This arrangement not only permits an adjustment of the lens 21 relative to the aperture 22 but also further serves as a hood to protect the lens 21 both from the incidence of incidental extraneous ray and from atmospheric precipitation and accidental blows.

The casing 12*a* may be supported by a standard capable of rotary motion, whereby further adjustment of lens 21 relatively to the lens 20 is readily attainable.

The inner housing 12 is adapted to be slidably adjusted on the base 13 by manipulation of the rack and pinion 17 and 18, the arm 15 having engagement with an annulus 12*c* which reinforces the bottom edge of the wall 24 of the housing 12, the arm 15 having a rivet 15*a* engaging said annulus 12*c* and the annulus being spaced from a portion 15*b* of said arm 15 to permit of a vertical adjustment of the diaphragm 14 in the housing 12. It will be observed that the upper edge of the diaphragm 14 engages in a recess 14*a* formed in the top wall of the housing 12 which permits of such vertical adjustment.

In order to vertically adjust the diaphragm, I provide a rack and pinion 27 and 28, the rack being carried by the diaphragm, and the pinion being mounted on the side wall of the housing 12. The shaft 29 extends through a slot 31 in the outer wall of the casing 12*a* and may be provided with a suitable manipulating rod.

It will further be noted that one of the advantages of structures embodying my invention is that in the event of any interruption of (or even substantial reduction in) the feed circuit for the source of light, the circuit controlled by the light sensitive element will also be correspondingly varied. Thus not only the passage of any one across the light path, but any interference with the feed circuit or other parts of the mechanism will cause the signalling element to operate.

It will thus be observed that the invention is susceptible of installations other than the specific example given herein and that the signalling circuit, which is generally designated, may be provided with the required relays and other electrical apparatus for attaining the desired signal, either audible or visible, and has a wide field of usefulness.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a system of the character described, the combination of a weather-proof casing, a base fixed within said casing, a light-senstive element mounted on said base, a shield surrounding said element and resting on said base, means for moving said shield horizontally comprising a rack rigidly secured to said shield, a pinion rotatably supported by said casing and meshing with said rack, and means extending externally of the casing for rotating said pinion to adjust said shield horizontally, said shield including a vertically movable portion having an aperture therein positioned opposite the element, means for moving said portion vertically comprising a rack secured to said portion, a pinion meshing with the last-mentioned rack and being rotatable and horizontally slidable relative to said casing, and means extending externally of the casing for rotating the last-mentioned pinion, and a condensing lens supported by the wall of the casing opposite the aperture for focusing light from an external source at said aperture.

2. In a system of the character described, the combination of a weather-proof casing, a base fixed within said casing, a light-sensitive element mounted on said base, an opaque shield surrounding said element and slidably supported on the top of said base to permit adjustment thereof relative to said element, said shield including a diaphragm slidable vertically in said shield and having an aperture opposite said element, a condensing lens mounted in the wall of the casing opposite said aperture for focusing light from an external source, means for sliding the shield as a whole on the top of the base, and means for sliding said diaphragm vertically to adjust said aperture to the focal point of the light focused by said lens.

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