

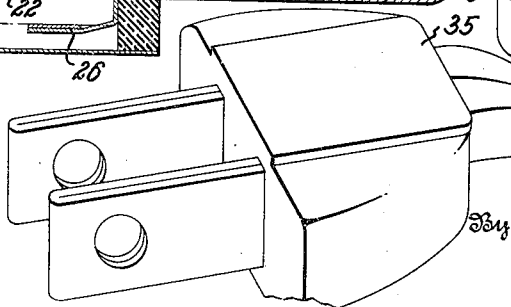
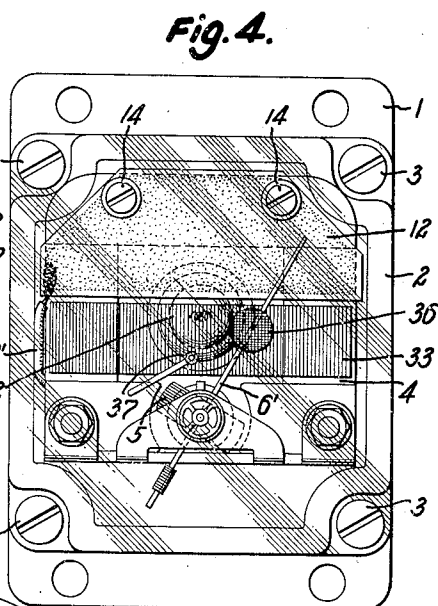
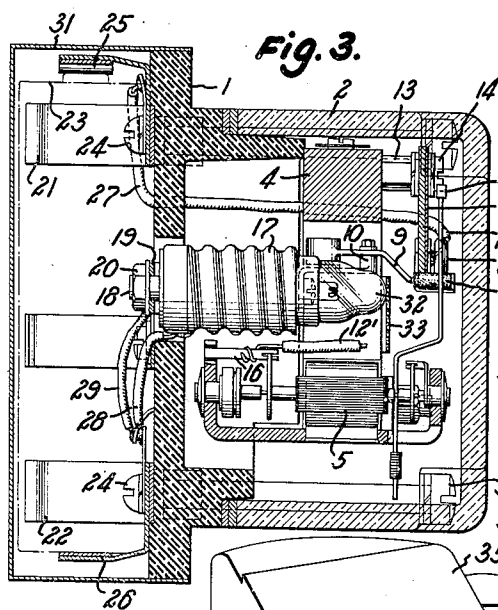
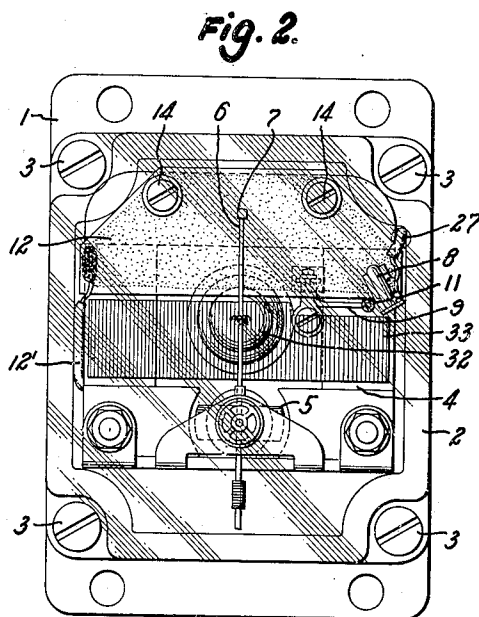
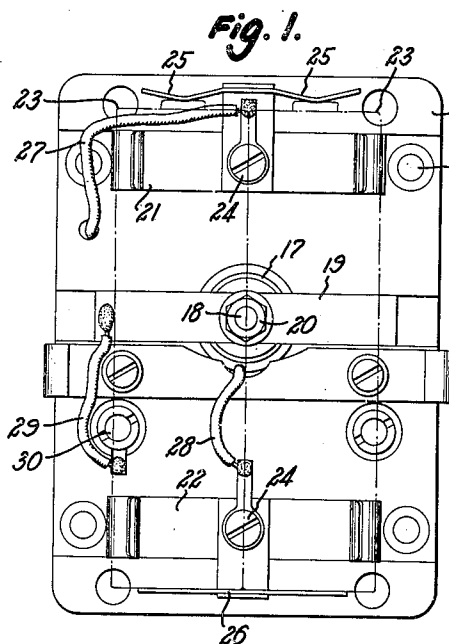
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DARKNESS ALARM

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DARKNESS ALARM

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8 Claims. (Cl. 250—206)

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This invention relates to darkness alarms which develop a significant signal at the approach of inadequate illumination in a school room, an office or shop where close visual tasks are performed, and more particularly to readily portable darkness alarms of small size which may be placed on and moved about on a desk or work bench.

The human eye endeavors to compensate for variations in light intensity and does not warn against inadequate lighting until eyestrain, headache or other results of decreased lighting develop to advise the worker that the lighting has been inadequate for some time. Photoelectric equipment for the measurement of light intensity is well known, but such "light meters" have not included a visual or audible signal for indicating a decrease of the lighting below the value appropriate for the particular work, such as reading, sewing or shop work, which is to be performed. The light meters have been very useful in the determination of the artificial illumination which is adequate for various types of work but have been of little or no utility so far as concerns an indication of the appropriate time for turning on lights to compensate for decreasing daylight illumination of the room or shop.

Objects of the invention are to provide darkness alarms, and particularly small or miniature darkness alarms, which develop a significant signal when the lighting falls below the value which should be maintained for the work which is to be performed. An object is to provide a small, self-contained and readily portable darkness alarm which may be placed on and moved about a desk or shop bench. Another object is to provide a small and readily portable darkness alarm which is energized from the customary light or power circuit.

These and other objects and the advantages of the invention will be apparent from the following specification when taken with the accompanying drawings in which:

Fig. 1 is a rear elevation of a darkness alarm embodying the invention, but with the rear cover and dry cells removed;

Figs. 2 and 3 are respectively a front elevation of and central vertical section through the same; and

Fig. 4 is a front elevation of a darkness alarm for operation from a conventional light or power system.

In the drawings, reference numeral 1 identifies a rectangular base of insulating material to which a cup-shaped cover 2 of glass or a transparent plastic is secured by screws 3 to form a casing for the darkness alarm. A sensitive direct current instrument-type relay, comprising an approximately C-shaped permanent magnet 4 and a moving coil 5 carrying a contact arm 6, is mounted

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on the base by any appropriate means. The contact arm 6 carries a small magnetic material contact 7 for cooperation with a stationary magnetized contact 8. A pendulum type of mechanism for separating the magnetic contacts, after an engagement thereof, takes the form of a lever 9 pivotally supported for movement about an axis parallel to the sides of the instrument casing by a bracket 10 secured to the base 1, the lower end of the lever being weighted and the upper end being provided with a soft rubber sleeve 11.

The overall size and the detailed construction of the sensitive relay may be varied as desired but it is usually preferable to employ a relay of small size such as, for example, the illustrated "miniature" relay which, as now manufactured and sold as "Model 813" by Weston Electrical Instrument Corporation, has a base of 1.5 by 2.1 inches.

A photocell 12 of the barrier layer type is supported on and above the yoke portion of magnet 5 by spacing bushings 13 and screws 14. The back electrode of the photocell is grounded on the magnet 2, and is thereby connected in conventional manner to the upper terminal of the moving coil 5, i. e. through the upper jewel bridge and the upper spiral spring. The front electrode of the photocell 12 is connected to the other coil terminal by a fine lead 12' which is soldered or welded to a collector electrode spot on the front electrode and to the lower spring support 16.

The base 1 is provided at, or approximately at, its center with an opening to receive a lamp socket 17 having a center contact terminating in a threaded screw 18 which extends through an opening in a metal strap 19 and is secured thereto by a nut 20. Spring clips 21, 22 for holding a pair of miniature dry cells 23, 23 are mounted near the top and bottom portions, respectively, of the base 1 by screws 24 which also serve to secure T-shaped spring terminal strips 25, 26 to the clips 21, 22, respectively. The dry cells 23 are slipped into the spring clips 21, 22 in parallel arrangement, i. e. like cell terminals engage terminal strip 25, and the other set of like cell terminals seat upon the terminal strip 26. A lead 27 extends from the terminal strip 25 to the magnetized contact 8 of the relay, and a lead 28 is connected between the terminal strip 26 and the shell of the lamp socket 17. The center contact of the socket is grounded on the metal strip 19, and this is in turn grounded on the magnet, and thereby on the relay contact arm 6, by a lead 29 which extends from strip 19 to a soldering lug under one of the bolts 30 which secures the magnet 4 to the base 1. A rectangular cup-shaped metal shell 31 is slipped over and frictionally retained on the rim of the base 1 to enclose the dry cells and associated elements.

A miniature lamp bulb 32 in the socket 17 is

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preferably of the type in which the outer end of the glass envelope is formed as a lens for focusing the light beam, and the light bulb is entirely or substantially entirely within the interior space of the C-shaped magnet 4. A transparent strip or sheet 33 of a colored plastic or glass, preferably of red color, is cemented to the magnet to overlie the lamp bulb. The metal strap 19 which carries the lamp socket is not fixed to the instrument base 1 but may be moved back, after the dry cells are removed, to the extent permitted by the soldered connecting wires, for removal and replacement of the lamp bulb.

The moving coil 5 turns clockwise with decreasing current therethrough, and the relay sensitivity is so related to the photocell output that the relay contacts 7, 8 close at a preselected current corresponding to the lower limit of illumination for the work to be performed. The lamp circuit is thereby completed to produce a bright red glow within the casing. The darkness alarm is placed at the back of a desk or work bench in any convenient position such that it will not interfere with the work to be performed but will be quickly noticed when the lamp is lighted as a result of decreasing solar illumination. The worker then turns on lights in the room and resets the darkness alarm by tilting the casing about its right side, as viewed in Fig. 2, thereby turning the casing with respect to the pendulum lever 9 to separate the magnetic contact 7 of arm 6 from the magnetized contact 8.

When thus reset, the darkness alarm may be returned to the desk or work bench to serve anew as an alarm in the event that there are additional lights which may be turned on when the solar illumination decreases to a lower value at which the further artificial illumination is required. Alternatively, the darkness alarm may be placed with its right side, as viewed in Fig. 2, on the desk or work bench, thereby rendering the alarm inoperative since the weighted reset lever 9 will then hold the relay contact arm 6 away from the magnet contact 8. The alarm may be rendered inoperative, for transport or shipping without drain on the dry cells, by removing the rear closure 31 and inserting a piece of paper or cardboard between the spring terminal 15 and the adjacent cell terminals.

An embodiment of the invention for operation in the usual 110 volt alternating current light and power circuit may be of somewhat simpler construction since the relay contacts 7, 8 and resetting lever 9 can be, and preferably are, omitted, see Fig. 4. The lamp bulb is continuously energized by means of a conventional two-wire conductor 34 and plug 35, and the pointer 5' of the moving system carries an opaque vane or flag 36 which overlies the focussing tip of the lamp bulb 32 so long as the light intensity at the photocell 12 is at or above the preselected minimum value for the work to be performed. As shown in Fig. 3, the lamp bulb is shielded laterally by the C-shaped magnet 4, and the observable red glow from the continuously energized lamp bulb 32 is negligible so long as the opaque vane remains over the center of the lens tip of the bulb 32. A stop 37 is supported by the magnet 4 to prevent the opaque flag 36 from moving beyond center position above the lamp bulb when the solar illumination rises above the minimum value at which the alarm is to operate.

The small size of the alarm will be apparent from Fig. 4 as the alarm device and the conven-

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tional electrical plug 35 are drawn to the same scale.

It is to be understood that the invention is not limited to the particular embodiments herein illustrated and described since various modifications which may occur to those familiar with the design and construction of relay circuits fall within the spirit and scope of my invention as set forth in the following claims.

I claim:

1. In a portable darkness alarm, a casing including a base and a cover having a transparent top wall, an instrument carried by the base and including an approximately C-shaped permanent magnet and a pivotally mounted coil, a photocell and means supporting the same beneath said transparent top wall of the casing cover, means connecting said photocell across said coil, a lamp bulb located within the interior space of and shielded laterally by the magnet, and means controlled by said coil upon decrease in the illumination at the photocell to a preselected value to radiate a light beam from said bulb through said transparent wall of the casing cover.

2. In a portable darkness alarm, the invention as recited in claim 1, wherein said means controlled by said coil includes a dry cell carried by said base, and circuit elements including relay contacts operable by said coil for completing an energizing circuit connecting said lamp bulb to said dry cell.

3. In a portable darkness alarm, the invention as recited in claim 2, wherein said relay contacts are magnetic, in combination with manually controlled means for resetting said magnetic contacts after an engagement thereof.

4. In a portable darkness alarm, the invention as recited in claim 3, wherein said resetting means includes a weighted lever operative upon turning said casing to position the base thereof in a vertical plane to separate said contacts, whereby said darkness alarm may be rendered inoperative by turning said casing to rest upon a side wall thereof.

5. In a portable darkness alarm, the invention as recited in claim 3, wherein said resetting means includes a weighted lever pivoted for angular movement about an axis parallel to the sides of said casing, one end of said lever being relatively movable upon tilting of the casing about said axis to separate said contacts.

6. In a portable darkness alarm, the invention as recited in claim 1, wherein a transparent colored sheet overlies said lamp bulb.

7. In a portable darkness alarm, the invention as recited in claim 1, in combination with a two-wire conductor and plug for connecting said lamp bulb to a source of current for continuous energization thereof, and wherein said means controlled by said coil includes a pointer and an opaque vane carried thereby for angular movement out of the path of the light beam from said lamp bulb when the illumination falls below the preselected value.

8. In a portable darkness alarm, the invention as recited in claim 7, in combination with a transparent colored sheet over said lamp bulb, and wherein said lamp bulb includes a lens for focusing the light beam substantially upon said colored sheet.

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No references cited.