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ILLUMINATING APPARATUS

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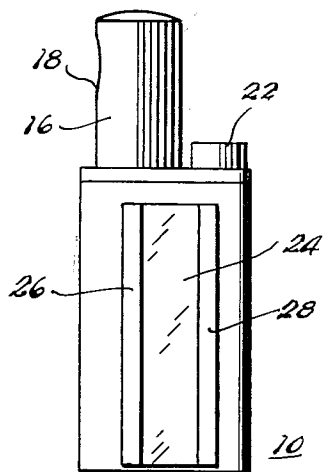


Fig. 2.

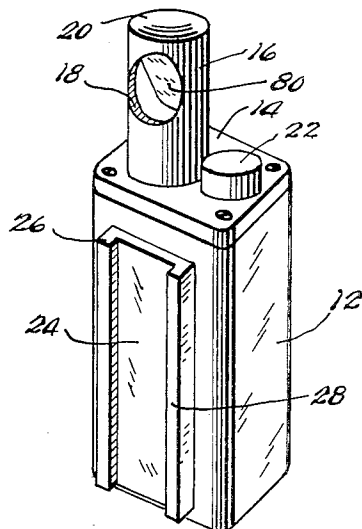


Fig. 1.

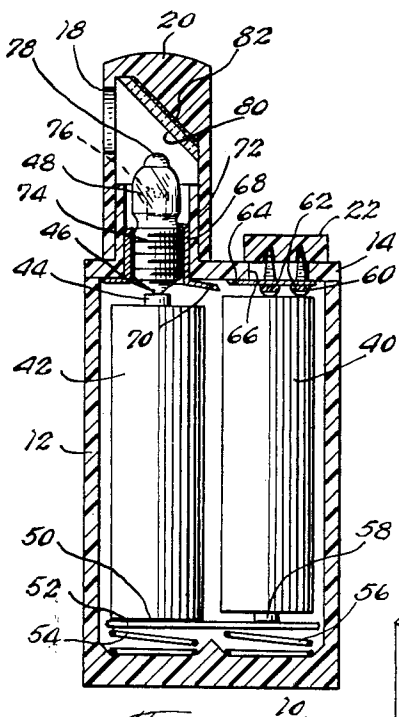


Fig. 3.

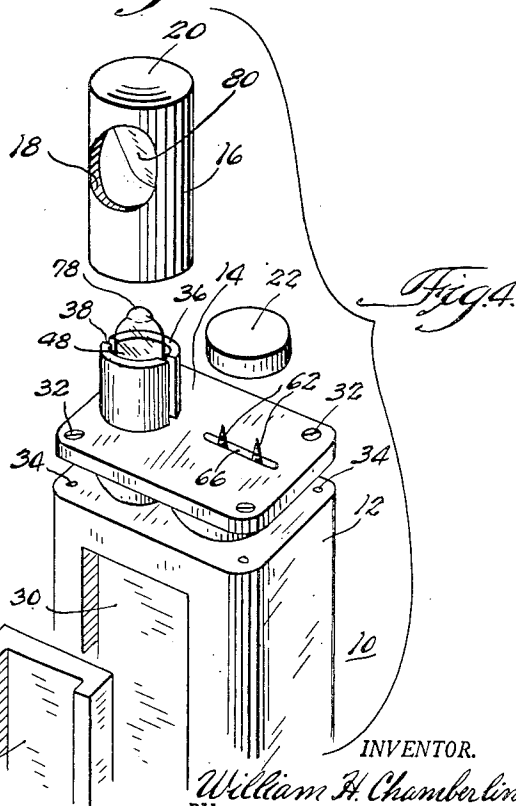


Fig. 4.

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1

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ILLUMINATING APPARATUS

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2 Claims. (Cl. 240—10.65)

This invention relates to illuminating apparatus, and more particularly to an improved illuminating device especially adapted for portable use.

It is an important object of this invention to provide an improved illuminating device especially adapted for portable use under various emergency conditions.

It is another important object of this invention to provide an improved illuminating device which is readily positionable at various angles and in various orientations to direct a collimated light beam in a predetermined direction.

Emergencies after dark, especially automobile breakdowns on the highway, are often made doubly trying and hazardous because of a lack of emergency lighting equipment. A very small source of light, if primarily directed on the object being repaired, will make an otherwise difficult, futile task one of great simplicity. This is especially true when such mundane tasks as changing a tire must be performed, where a plurality of small machine nuts must be removed and stored while one wheel is removed, a second wheel accurately aligned with the projecting studs of a wheel drum, and the securing nuts replaced and tightened in position. To provide satisfactory illumination for such a task it is necessary to provide a relatively low intensity light over a small work area, and it is preferred that the apparatus for providing such a light be completely self-contained, readily positionable at various angles, and mountable on adjacent vehicle parts such as fenders or body panels. It is further desired that the light source be positionable relatively close to the work area, whereby a collimated beam of light may be concentrated in a relatively small area at the work position. It is further desirable that such an emergency light source be combined into a package which is small and compact and which will have a neat appearance and have a size and shape adapted for convenient storage for emergency use.

Therefore it is another object of this invention to provide a small, compact, completely self-contained lighting unit for portable use.

It is another object of this invention to provide a source of collimated light in which the light beam is directable at various angles from a supporting structure.

It is still another object of this invention to provide a supporting structure which may be maintained in any desired position and in fixed relationship on a metallic surface.

It is still another object of this invention to provide an illuminating device utilizing magnetic means for securing and positioning a relatively movable light source.

Further and additional objects of this invention will become manifest from a consideration of this specification, the accompanying drawings, and the appended claims.

In one form of this invention a molded case is provided having a cavity to receive a source of electric energy therein and having affixed thereto to cover a plate in which are secured a switch mechanism and a retainer

2

for an incandescent bulb. The switch is adapted to interrupt or complete the electric circuit between the energy source and the light bulb as desired by an operator. Secured to one face of the case is a permanent magnet preferably made from a high-retentivity material such as Alnico. Enclosing the light bulb is an apertured cylindrical housing in which an angularly disposed mirror is mounted. The housing is rotatable about the axis of the light bulb whereby a light beam will be directed outwardly from the housing transversely to the axis of the bulb and in any desired direction. The bulb may be of the self-focusing type wherein a globule of glass is formed in the tip portion of the bulb to act as a condensing lens and form a beam of light as it is emitted from the bulb.

Without the focusing or collimating means and the rotatable reflecting surface a useful device is provided by which a light source may be located in any desired position with respect to a work area. However, to utilize the smallest, most compact light source for the task, it is additionally desirable to direct and concentrate the light on a relatively small area, as by the collimating means described. If the light beam bears a fixed relationship to the plane of the supporting magnet, the direction of the light beam would be limited to a single plane bearing a fixed spacial relationship to the supporting body, such as a plane parallel to the mounting surface as shown in the illustrated embodiment. This invention results in greatly increased versatility by providing a reflecting surface mounted on the axis of the light beam and at a substantial angle with respect thereto. By providing a rotatable mounting for the angular reflector, two variables are provided whereby the light beam may be projected in any direction from the device. With respect to any generally planar magnetic surface, the device of this invention may be positioned with the primary light beam oriented in an infinite number of directions, all parallel to the plane of the magnetic surface. For each of these positions, the angular reflector may be rotated through 360°, providing an infinite number of possible projection angles corresponding to each position of the device. With these two available variables it is believed clear that all possible spacial projection angles are attainable by two simple adjustments of the device to be described.

For a more complete understanding of this invention reference should now be made to the accompanying drawing, wherein

Figure 1 is a perspective view of one embodiment of this invention;

Figure 2 is an elevational view of the embodiment of Fig. 1 and illustrates the actual size of one device;

Figure 3 is an enlarged sectional view of the structure of Fig. 1; and

Figure 4 is an exploded view of the upper portion of the embodiment of Fig. 1.

Referring now to the drawings, one embodiment 10 of this invention is illustrated, comprising generally an elongated case 12 having a cover plate 14 secured thereto. A cylindrical housing 16 is rotatably positioned on top of the cover plate 14 and has a circular aperture 18 in the cylindrical surface thereof which will pass a beam of light generated by a light bulb contained within the housing and reflected by a reflecting surface 80. The cylindrical housing 16 is closed at one end by a cap 20 and is open at the other end to engage a corresponding extension from the cover plate 14. A switch button 22 is secured to the cover plate 14 adjacent to the cylindrical housing 16 and is slidable between off and on positions.

While the switch button is shown in position on the top of case 12 in the illustrated embodiment, it is believed clear that the switch button may be positioned on the opposite end surface of case 12 or on a side thereof. A permanent magnet 24 is fixed to one face of the

case 12 and has a pair of pole pieces 26 and 28 extending outwardly from the body portion of the magnet to provide a better magnetic circuit in contact with an automobile body or other magnetic material and consequently a more tenacious mounting for the device. While the magnet 24 may be constructed of magnet steel or other well-known inexpensive magnetic materials, it is desirable that a high-retentivity alloy such as Alnico be employed to insure more positive positioning of the device.

As shown in Fig. 4 the magnet 24 is preferably positioned in a recess 30 in the case 12 whereby it may be more positively secured against inadvertent removal or breakage. As further shown in Fig. 4, the cover plate 14 may be secured to the case 12 by a plurality of threaded members 32 adapted to engage corresponding apertures 34 in the case 12. Conventional machine or wood screws may be employed for this purpose. This, however, is merely exemplary of one method of attaching the cover plate 14, and it is believed clear that any locking arrangement such as a snap cover or spring latch could be employed. Integrally formed with and extending upwardly from the cover plate 14 is a slotted cylindrical tube 36 having an outside diameter substantially equal to the inside diameter of the cylindrical housing 16. Slots 38 are formed in the tube 36 to render it somewhat resilient to engage the inner surface of housing 16 and thus support the housing with its aperture 18 directed in any desired orientation.

The embodiment of Fig. 1 is illustrated in section in Fig. 3 from which the electrical circuitry and construction may clearly be understood. A pair of pen light type dry cells 40 and 42 are placed in side-by-side relationship with the positive terminal 44 of one of the batteries 42 in engagement with the central contact 46 of a light bulb 48. The negative terminal of battery 42 is the zinc case of the battery which is exposed at its lower end 50 and engages a conducting plate 52 which substantially fills the opening within case 12 and is resiliently urged upwardly by a pair of coil springs 54 and 56. The second battery 40 is positioned substantially parallel with the battery 42 with its positive terminal 58 in engagement with the metallic plate 52. The negative terminal of battery 40 is contacted by a pair of screws 60 and 62 which extend through a conducting switch plate 64 to engage the insulating switch button 22. The screws 60 and 62 pass through a slot 66 in the cover plate 14 and retain the switch button 22 and plate 64 in spaced relationship on opposite sides of the cover plate 14. A metallic socket 68 is adapted for a pressed fit within the slotted tube 36 and has a tongue 70 extending outwardly therefrom and engageable by the switch plate 64. The socket 68 also has a flange 72 formed about its upper edge to engage the threaded portion 74 of the bulb 42.

As shown in Fig. 3, the switch button 22 is in the off position. By shifting the button 22 to the left in Fig. 3 the switch plate 64 is also shifted to the left and into engagement with the tongue 70 extending outwardly from the socket 68. When in this position a circuit is completed from tongue 68 through switch plate 64, battery 40, metallic plate 52, battery 42, bulb contact 46, filament 76, the threaded portion 74 of bulb 48, and bulb socket 68. The bulb 48 here utilized has a glass globe 78 in its uppermost portion which provides a prefocusing and collimating means for the light source. If this type bulb is not employed it is desirable to provide condensing lenses or the like for producing a light beam. The beam shines upwardly from the bulb in Fig. 3 and impinges upon an angularly positioned mirror surface 80 secured within cylindrical housing 16. The mirror 80 is here shown positioned at approximately 45° against an angular portion of the cylinder cap 20 and secured thereto by the cement insert 82. However, it is contemplated that the housing may initially be formed with substantially

parallel sides and a flat top, and a cement filler may be added to build up a 45° angle whereby the mirror may be secured thereto, or the surface of the housing may be metalized by any one of a plurality of known methods whereby the mirror surface will be integral with the housing.

While the embodiment here disclosed uses two pen light type batteries it is believed clear that a single battery might be utilized to produce an aesthetic structure, in which embodiment it is considered desirable to position the switch button 22 at the bottom of the battery 42.

It is further believed clear that while pen light type batteries have here been utilized in order to produce a small emergency lighting device which may readily be stored in small, easily accessible places such as the glove compartment of an automobile, larger cells may be employed whereby greater light intensities or longer battery life are attained. It is also believed clear from this description that various switch techniques might be employed and various types of bulbs may be utilized without departing from this invention. While it is contemplated that the casing 12, cover plate 14, and cylindrical housing 16 are made of a molded plastic material, the invention is in no way limited to this type of construction but may be produced from cast plastic materials drilled and machined to the desired shapes or from properly insulated metal containers or any other desirable structural material.

Without further elaboration, the foregoing will so fully explain the character of my invention that others may, by applying current knowledge, readily adapt the same for use under varying conditions of service, while retaining certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. Illuminating apparatus comprising a case having at least one substantially planar outer surface, electric battery means secured within said case, an electric lamp having a light source therein energizable from said battery means, switch means mounted on said case for connecting said battery means and said light source, a permanent magnet mounted on said planar outer surface for supporting the apparatus juxtaposed against a body of magnetic material, a substantially cylindrical enclosure extending from said case substantially parallel to said planar outer surface, said lamp being mounted in and substantially surrounded by said cylindrical enclosure, lens means in spaced relationship to said light source to produce a light beam substantially parallel to the axis of said cylindrical enclosure, a substantially cylindrical housing rotatably mounted on said enclosure for rotation through substantially 360° and having a closed outer end and a transverse circular opening adjacent thereto, and reflecting means mounted within said housing at substantially 45° to the axis of said housing to direct the light beam outwardly through the aperture in said housing.

2. The illuminating apparatus of claim 1 wherein said case has side portions substantially normal to said outer surface, said substantially cylindrical enclosure extending outwardly from said side portions.

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