May 29, 1951 R. F. HETHERINGTON 2,554,781

MINIATURE ROTATABLE BEACON LIGHT

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FIG. 1.

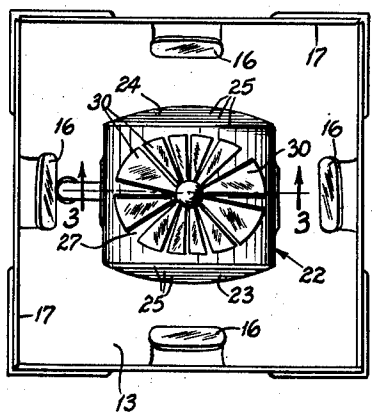


FIG. 3.

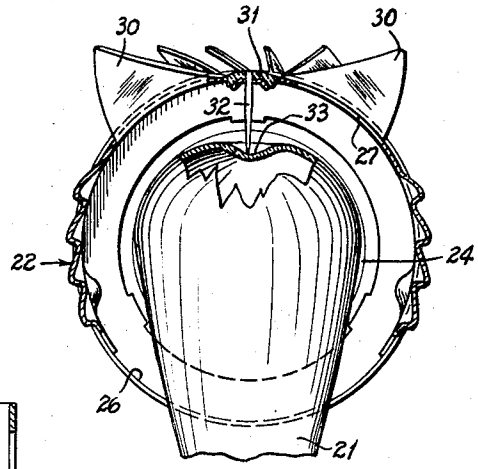
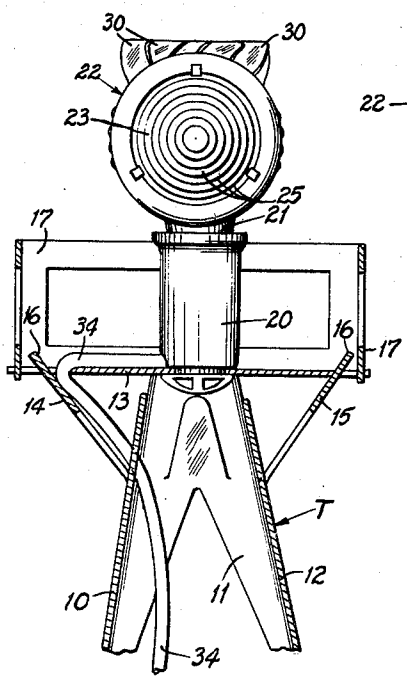


FIG. 2.



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MINIATURE ROTATABLE BEACON LIGHT

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1 Claim. (Cl. 240—10.1)

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This invention relates to improvements in a miniature rotatable beacon light, and more particularly to an illuminable motion device of a type which is particularly adapted for certain motion toys, advertising displays, and other relatively small assemblies of this type in which a self-energizing source of apparent motion of a beam of light is a desirable feature.

This applicant is aware that various motion devices for the general purposes noted, have been utilized, but with indifferent success, over a long period of years. However such devices, as far as is known, involve an inordinate number of parts, are extremely delicate in construction, are subject to adverse effects due to stray air currents, and in other ways fall short of attaining an illuminating device suitable for the purposes named. It is accordingly a principal object of the present invention to realize a simple, inexpensive and foolproof assembly of this general nature, suitable for a wide variety of fields of application, and which need not be characterized by more than a single moving part.

A further and more particularized objective, is realized in an improved bearing assembly involving no more than a simple formation of an illuminant such as an incandescent light bulb, together with a single pin element coacting with the formed bulb, to constitute a virtually frictionless pin type bearing.

Yet another object of the invention is realized in a combination of a standard type of illuminant, a support for such illuminant and a rotatable hood of simplified construction, and utilizing the rising warm air currents incident to energization of the incandescent bulb, as a source of motion.

The foregoing and numerous other purposes and objectives of the present invention will more clearly appear from the following detailed description of a presently preferred exemplary embodiment of the invention, particularly when considered in connection with the accompanying drawing, in which:

Fig. 1 is a top or plan view of a miniature electric beacon light assembly;

Fig. 2 is a side elevation of the upper portion of the assembly of Fig. 1, and

Fig. 3 is a somewhat enlarged fragmentary sectional view taken in a vertical plane, particularly as viewed along line 3—3 of Fig. 1.

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Referring now by characters of reference to the drawing and first to Fig. 2, the example selected for illustration is a miniature airways beacon, made in close simulation of the full scale airways guide lighting apparatus customarily employed for marking and directional purposes along commercial air lines. In the example, a tower T, only the upper portion of which is shown, comprises a four-sided structure, three of the sides of which are indicated at 10, 11 and 12, and which is surmounted by a platform 13 shown as being substantially square in proportion, as will appear from Fig. 1. The tower generally indicated at T, and the platform structure, are formed as a relatively rigid unit which includes four strut or brace elements, only two of which are shown at 14 and 15, and terminating in widened end tab or tongue portions 16, which serve with platform slots as a means of attachment of the struts to the horizontal member 13.

Inwardly of each of the margins of platform 13 is a fence or wall, these wall elements being indicated at 17. They are preferably but without restriction, mounted by insertion of lower marginal portions of each wall element, into suitable slots (not shown) in the platform 13. The extent of perforation of each of the wall members 17 or certain thereof, is a matter of choice, although it is preferred that the extent of such perforation be kept at a minimum. As will appear, the wall elements 17 serve a distinct function in that they constitute a shield around the lower portion of the movable assembly which, as will appear, depends for its function upon heated, hence rising air currents. It is accordingly a preference that the wall members 17 be spaced from the lighting and heating agency as shown, and that these extend upwardly to a height best determined by trials with each assembly, so as to shield the motion assembly from unwanted cross air currents. It may be here noted that the tower, platform, wall elements and other fixed parts of the structure may be formed of sheet steel or other metal, or if desired, of a cardboard, sheet plastic or other material suitably die cut and susceptible of packaging in a relatively flat, knock-down unit easily erected without special tools or skill.

Proceeding now to describe the illuminant and the movable parts of the assembly from which is derived the motion effects desired, these include

in the example shown, a fixed base or socket 20 constituting a shell exteriorly insulated and receiving in its upper open end, an incandescent light bulb 21. The socket 20 and light bulb 21 are or may be of conventional construction, and in a miniature motion device may consist of the usual miniature or candelabra types, the base and bulb of course conforming.

As will appear, the bulb 21 is substantially enclosed by a hood structure or housing generally indicated at 22, and which in the present example is made in simulation of a searchlight housing. Its generally cylindrical form results in a symmetrical body. It is preferably provided with transparent plastic end closures or transparencies 23 and 24 which may, if desired, be in color, for example one thereof a red sheet plastic and the other, for example, green in color or clear as may be desired. It is a preference that both ends of the cylindrical hood structure 22 be closed, for best performance. The end transparencies 23 and 24 may also as desired, be given a ribbed conformity and provided with annular projections such as indicated at 25, thus giving a heightened effect of realism in simulation of the refracting rings of certain beacon lenses. The hood 22 is provided with a relatively large circular bottom opening 26, the diameter or in any event the area of which is sufficient to pass the bulb 21, and hence to enable easy insertion of the hood over the bulb, and in the event of minor swinging movements of the hood, the size of the opening will obviate frictional engagement of the margins of the opening 26 with the bulb.

The hood is further provided with a top opening indicated at 27 (Fig. 1), and which is partly occupied by a radial series of air reaction vanes 30. Each of these, as will appear, is suitably pitched so as to result in a turning moment imparted to the hood incident to the upward travel of the warm air through the bottom and out the top openings of the hood 22, when the incandescent bulb 21 is energized.

If desired, the vane elements 30, resulting in a small propeller fan structure, may be struck out of integral upper portions of the hood which may be of sheet metal, or may be separately formed and inserted in the opening 27 and secured at their ends to the marginal regions of the top hood opening. Preferably in the center of opening 27 is a small circular area intermediate the end margins of the cylindrical wall of the hood, the location of this opening being apparent from Figs. 1 and 3, inasmuch as it is occupied by a body of a setting plastic material 31. The purpose of the body of plastic 31 is to retain and rigidly to support in fixed, depending, vertical position, a bearing pin 32, which pin extends vertically inwardly of the upper surface of the hood and along a line which intersects the center of gravity of the hood assembly. It follows from this, that the pin serves as the sole support for the hood, and that the hood is thus carefully balanced for rotation about an axis identified with the pin 32.

As a convenient and simple form of bearing in a device of this kind, it has been found that an incandescent bulb such as shown at 21, being a vacuum tube and characterized by the usual glass envelope, may be heated at its outer end or tip in the area identified in the present drawing with the location of the point of the pin 32. Such heating can be done quickly and exteriorly with the aid of a small Bunsen flame, and when this region of the glass is barely softened, the vacuum will serve to pull in, in the outer end of the bulb, a dished region, dimple or socket indicated at 33, best shown by Fig. 3, and in which the free end of the pin is journalled in an almost frictionless relation.

The electrical socket 20 is of course connected to suitable energized electrical conductors, as through a duplex supply cord or the like, indicated at 34. Bulb, socket and similar equipment suitable for this usage are commercially available for direct connection into 110 volt circuits.

It is believed that in view of the detail of description given in respect to the several parts and their relation, the operation and mode of usage will be at once apparent, although it may be noted for completeness that when the illuminant 21 is energized, it is both a light source and a heat source, and thus after only a short warming period, the relatively narrow body of air intervening the bulb and the inside wall surface of the hood, will become rapidly heated, and will rise through the spaces between the reaction vanes or blades 30, and in so doing will impart a rotative movement to the hood. It has been found that when constructed substantially in the proportions shown, the assembly will exhibit a rate of rotative movement of the hood or beacon about the same as that which conventionally prevails in full size airways beacons.

In devices of this kind considerable difficulty has heretofore been experienced due to air currents other than that utilized for energization of the device, and which are herein generally referred to as cross currents. Such adverse effects have been found by experience to be virtually obviated, or at any rate minimized, by the location of a barrier which in the present case is identified with the wall elements 17. Although these are shown as terminating slightly below the lower margins of the hood, they have nevertheless been found markedly effective in stabilizing the action of the device.

It will have appeared that as the hood is rotated, opposite substantially horizontal light beams will be transmitted from the ends of the hood, all with an effect of attractive realism. It should be understood of course that the device although shown in connection with a toy article, may nevertheless be employed for producing motion of beams of light in any number and arrangement desired, as in many advertising and other devices.

Although the invention has been described by a particularized reference to an exemplary embodiment, the detail of description should be taken as instructive, rather than limiting in nature, since numerous variants are possible within the scope of the claim hereunto appended.

I claim as my invention:

A miniature beacon light assembly including a tower, a platform near the top of the tower, a light bulb, a base carrying the bulb and through which the bulb is energized, the base being carried by and extended vertically above the platform, a socket formed in the top of the bulb, a cylindrical hood in simulation of a searchlight or beacon, and extending about the bulb so as substantially to enclose same, a vertical pin within the hood, the pin terminating in, and being journalled in said bulb socket, the hood having a substantially circular light transmitting area in at least one of its ends, the hood being further provided with top and bottom openings, a series of radial propeller type vanes in the top opening of the hood, and peripherally attached to the perimeter of the top opening of the hood

so as to dispose the vanes substantially in a circle close to but just above the bulb, the bottom opening of the hood being of a size freely to pass and normally to clear the light bulb and base, and a wall structure carried by the platform outwardly of the base and bulb, and extending upwardly substantially to the region of the bottom opening of the hood, and tending to shield the lower portion of the hood against cross currents of air.

RALPH F. HETHERINGTON.

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