Aug. 12, 1941. E. H. LAND 2,252,324

INCANDESCENT ELECTRIC LAMP COATED WITH A LIGHT POLARIZING MATERIAL

Filed Oct. 4, 1938

Fig. 1.

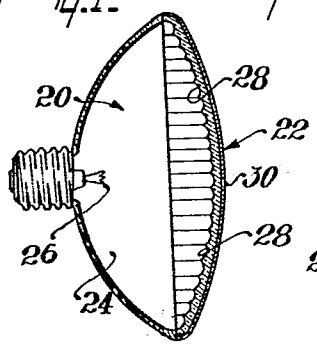


Fig. 2.

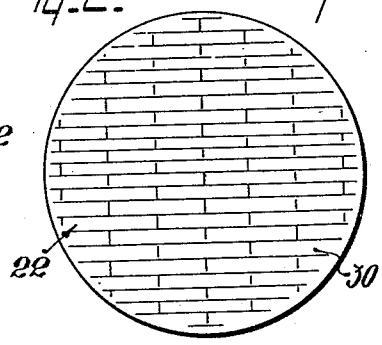


Fig. 3.

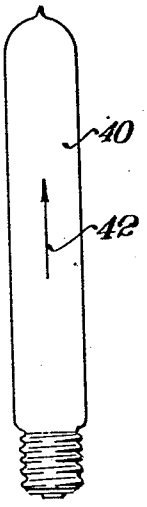


Fig. 4

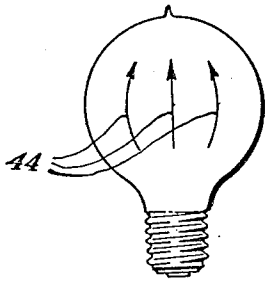
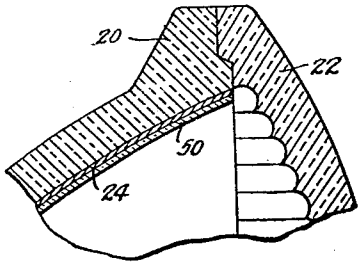


Fig. 5.



INVENTOR
Edwin H. Land
BY
Brown & Jones
ATTORNEYS

Patented Aug. 12, 1941 2,252,324

UNITED STATES PATENT OFFICE

2,252,324

INCANDESCENT ELECTRIC LAMP COATED WITH A LIGHT POLARIZING MATERIAL

Edwin H. Land, Boston, Mass., assignor to Polaroid Corporation, Dover, Del., a corporation of Delaware

Application October 4, 1938, Serial No. 233,218

7 Claims. (Cl. 176—34)

This invention relates to a new and improved incandescent electric lamp coated with light-polarizing material.

An object of the invention is to provide such a lamp wherein the coated portion is non-planar.

Another object of the invention is to provide an envelope for an incandescent light source adapted to polarize in a predetermined manner the beam emitted from the source.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 represents a side view in section of a device embodying one form of the invention;

Fig. 2 represents a view in front elevation of the device shown in Fig. 1;

Fig. 3 represents a modified form of the device shown in Fig. 1;

Fig. 4 represents a still further modification of the invention; and

Fig. 5 is a detailed view in section showing a still further modification of the device shown in Fig. 1.

Heretofore light-polarizing elements of relatively large surface area have been commercially available in two forms. The material sold under the trade name "Polaroid," which comprises a suspension of oriented polarizing particles in a light-transmitting medium, has been available in sheet form or has been laminated to or between light-transmitting supporting elements, such as sheets of glass or plastic material. It has not lent itself readily to distortion in more than one direction. The sheets or films can be readily formed into cylindrical bodies, but they are not easily distorted from a planar to a convex or concave form. Furthermore, considerable difficulty has been encountered in employing a polarizing film of this type as a coating for preformed articles, such as electric lamp bulbs, bowls and the like.

The other form of polarizing material available commercially comprises an oriented film or layer of polarizing crystals grown or deposited on a supporting plate. In this form of polarizer the supporting plate has invariably been smooth and flat, and large areas of polarizing material have not been available.

There is now available another polarizing material sold under the trade name "Polaroid" which comprises an exceedingly thin layer or film of oriented polarizing particles in a light-transmitting medium, the particles being present in a highly concentrated condition and the suspension itself having a thickness of approximately .0004 inch or less. Such a film or foil of light-polarizing material may be readily transferred from a support, such for example as a resilient, flexible rubber support, to a surface of any shape or size. It is available in large areas. It may be applied to convex or concave surfaces, or to spherical surfaces, or to plane surfaces so as to form thereon a light-polarizing film adapted to predeterminedly polarize light transmitted by the surface.

Such a polarizing film may comprise preferably a suspension of needle-shaped polarizing crystals of herapathite or a similar compound in a light-transmitting suspending medium, such as a cellulosic medium, for example cellulose acetate, or a polymerized vinyl compound such as the compound sold commercially under the trade name "Vinylite XYSG." The polarizing suspension may be formed by rubbing or smearing a suspension of the unoriented crystals upon a suitable support, orientation being effected by the smearing or rubbing of the suspension.

Transfer of the polarizing film from the initial support to the surface to be coated may be accomplished by applying to the exposed surface of the film or to the surface to be coated an adhesive for the film or a mixture of a solvent and softening agent for the film. The film may then be pressed against the new supporting surface and the initial support stripped from the film. The coating may then be protected by applying thereto a suitable waterproofing compound, such for example as a Beetle resin, or any other thermo-setting resin, or any other suitable protective substance.

The polarizing film of the character described is adapted to conform to the surface to which it is transferred, or to the surface on which it is initially formed. Arcuate, spherical, convex, concave and other curved surfaces may thus be coated with a polarizing film so that the surfaces may be adapted to providing polarizing areas.

While such a method of forming polarizing areas within the scope of this invention is preferred, it is to be understood that other means may be employed without departing from the invention. For example, where the heavier type of polarizing film is employed, or where a coating of the above described type is affixed to a pliable sheet of plastic, the polarizing surface may be curved within the limits of curvature of the film or support. All of such curved polarizing elements may be adapted for use in the present invention.

A principal use for the product of the present

invention is as an envelope or a portion of an envelope for an electric lamp of the incandescent bulb type. Four forms of such lamps are shown in the drawing in Figs. 1 to 5 inclusive.

Figs. 1, 2 and 5 illustrate two forms of electric lamp especially adapted for use in headlight glare elimination. In this type of lamp the envelope or bulb comprises two distinct portions,—a reflecting portion **20** and a lens portion **22**. The reflecting portion may be generally parabolic in shape and may have its inner surface coated with a metallic film **24** which acts as a reflector. The filament **26** of the bulb may be positioned at the focus of the parabolic portion of the bulb. The lens portion **22** of the bulb may be adapted to control the spread of the beam emitted from the lamp. The lenticules **28** may be either on the inner face, as shown in the drawing, or the outer face of this portion of the bulb. In the use of the present invention in connection with a device of this kind, the polarizing film may be applied either to the inner face of the metallic reflecting portion **24** or to that face of the lens portion which is left smooth and which may be either the inner or outer face. In the form shown in Fig. 1 the polarizing film **30** has been applied to the outer face of the lens portion **22** of the bulb, and in the form shown in Fig. 5, the polarizing film **50** has been applied to the reflecting portion **24** of the bulb.

In Fig. 3 there is shown a light bulb of the so-called lumiline type, i. e., a long, cylindrical bulb. In the practice of the present invention the outer surface of the envelope **40** of this bulb may be coated in the manner described with a polarizing film or coating. The arrow **42** is to be understood as indicating the direction of orientation of the polarizing axis of the crystals in the coating. The coating may be applied to the envelope of the lamp to give any desired vibration direction to the emitted beam.

In Fig. 4 there is shown an electric light bulb **43** of the usual shape. This also may be coated with a light-polarizing film. Here the arrows **44** are to be deemed indicative of the direction of the polarizing axis of the film on the surface of the envelope of the bulb. It is to be understood that the film may be applied to the bulb in such a way as to cause light emitted from various portions of the bulb to be polarized in any predetermined manner. Portions of the bulb, for example, may be so coated with the polarizing film that the light emitted therefrom is vibrating in a direction at right angles to the direction of vibration of light emitted from other portions of the lamp. So also the polarizing film may be applied only to predetermined portions of the bulb, so that only light rays emitted in a predetermined direction are polarized. All such modifications are to be deemed to fall within the scope of my invention.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

The coated surface may be of any desired size and shape. It may be reflecting or light-transmitting, transparent or translucent.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure as Letters Patent is:

1. An incandescent lamp comprising, in combination, a filament light source, an envelope therefor a portion at least of which is transparent, at least a portion of said envelope being non-planar, said envelope substantially encompassing said source, a non-planar portion at least of said envelope being coated with a material which polarizes transmitted light, said coating being affixed to and positioned on said envelope to intercept light beams emanating from said source.

2. An incandescent lamp comprising, in combination, a filament light source, an envelope therefor a portion at least of which is transparent, said envelope substantially encompassing said source, the transparent portion of said envelope being non-planar and being coated with material which polarizes light by transmission thereof, said material being affixed to said envelope and intercepting beams emanating from said source and traversing the said transparent portion of said envelope.

3. An incandescent lamp comprising, in combination, a filament light source, an envelope therefor a portion at least of which is transparent, said envelope substantially encompassing said source, the transparent portion of said envelope being non-planar and being coated on its outer surface with material which polarizes light by transmission thereof, said material being affixed to said surface and intercepting beams emanating from said source and traversing the said transparent portion of said envelope.

4. An incandescent lamp comprising a filament light source, an envelope therefor comprising transparent non-planar and reflecting portions, said envelope substantially encompassing said source, a coating of light-polarizing material affixed to the transparent portion of said envelope, said coating polarizing light by transmission and being positioned to intercept rays emanating from said source and reflected from the reflecting portion of said envelope.

5. An incandescent lamp comprising a filament light source, an envelope comprising transparent and non-planar reflecting portions and substantially encompassing said source, and a coating of light-polarizing material affixed to the reflecting surface of said envelope and polarizing light by transmission and positioned to intercept rays emanating from said source and impinging upon said reflecting surface.

6. An incandescent electric lamp having the outer non-planar surface of the transparent envelope thereof adhesively coated with a light-polarizing material which polarizes by transmission light emanating from said lamp.

7. An electric light bulb having the outer non-planar surface of the transparent envelope thereof adhesively coated with a suspension of light-polarizing particles in a transparent suspending medium, the particles being so oriented within the medium as to polarize in a predetermined manner light emanating from within said bulb.

EDWIN H. LAND.