

[54] LAMP FIXTURE HAVING DICHORIC
FILTER ARRANGEMENT FOR
SELECTIVELY DIRECTING HEAT AND
LIGHT

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Related U.S. Application Data

[63] Continuation of Ser. No. 117,484, Feb. 22, 1971,
abandoned.

[52] U.S. Cl. 240/41.34 R, 240/47, 240/103 A

[51] Int. Cl. F21I 15/02

[58] Field of Search 240/47, 103 A, 41.35

[56] References Cited

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Primary Examiner—Samuel S. Matthews

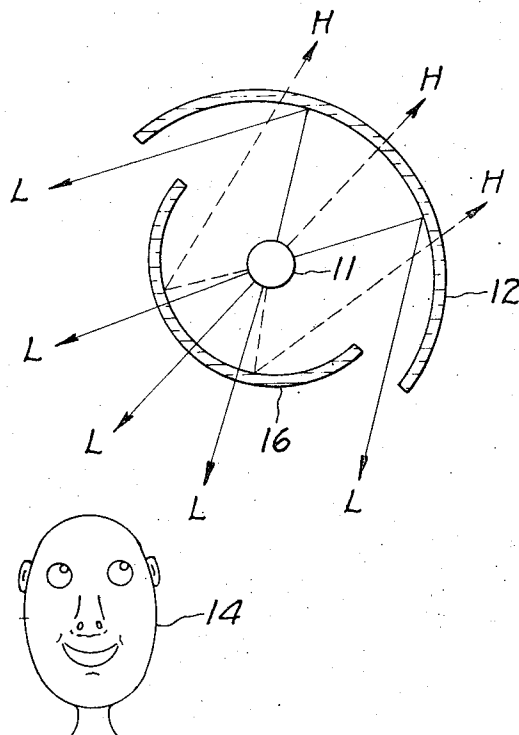
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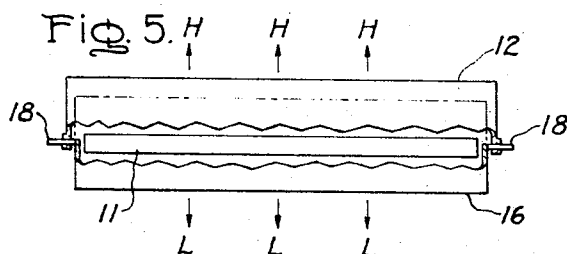
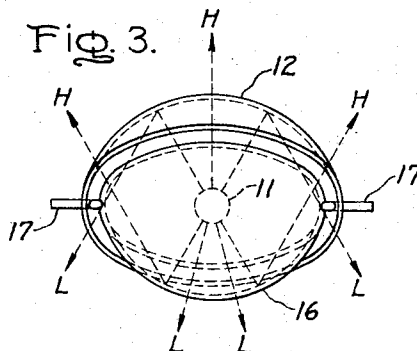
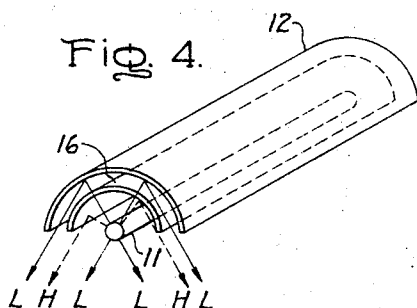
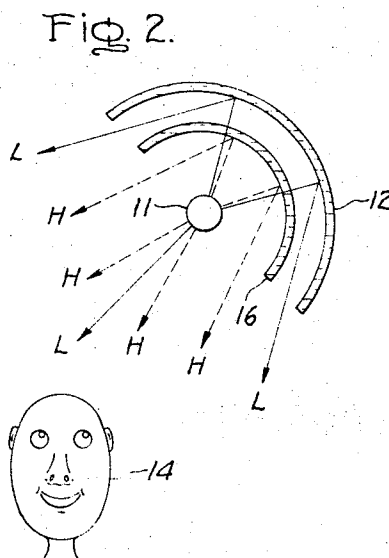
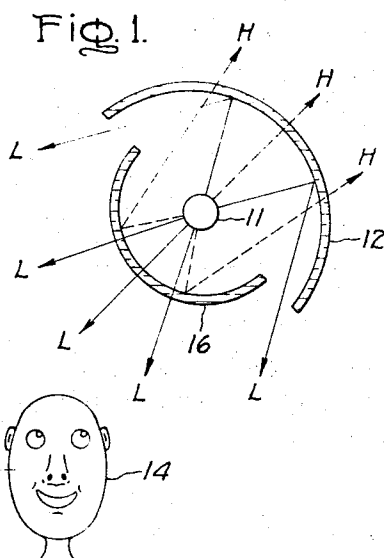
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[57] ABSTRACT

A fixture for a lamp which emits both light and heat. A first dichroic filter which reflects light and transmits heat, and a second dichroic filter which reflects heat and transmits light, are movably positioned relative to each other near the lamp, so as to be capable of selectively directing both heat and light from the lamp in a given direction, or directing light only from the lamp in a given direction.

5 Claims, 5 Drawing Figures





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LAMP FIXTURE HAVING DICHROIC FILTER ARRANGEMENT FOR SELECTIVELY DIRECTING HEAT AND LIGHT

CROSS-REFERENCES TO RELATED APPLICATIONS

This is a continuation of application Ser. No. 177,484, filed Feb. 22, 1971, now abandoned.

BACKGROUND OF THE INVENTION

The invention is in the field of lighting fixtures, and is particularly directed to the use of dichroic filters for controlling the heat emitted by light sources.

Most of the commonly used light sources emit heat, in addition to light. Incandescent lamps and arc lamps generally emit relatively greater amounts of heat, and fluorescent lamps emit relatively less heat, in comparison to the amount of light emitted. In certain lighting applications, such as general room illumination in cold weather or illumination of tropical fish in a merchandise display, it is desired that the heat of the lamp accompany the illumination. In certain other lighting applications, such as general room illumination in hot weather or illumination of flowers in a merchandise display, the heat produced by the light source is undesirable, and for such purposes dichroic filter lamps have been developed which emit light in one direction and emit the heat in the reverse direction. Dichroic filters can be made which will reflect or transmit various wavelengths of radiation. For example, one type of dichroic filter reflects visible light rays and transmits infrared (heat) rays, and another type functions in reverse so as to transmit light rays and reflect heat rays. Such filters usually are made by coating a plurality of layers of certain materials onto a transparent support member such in glass. In many lighting applications, it is awkward or unfeasible to change the type of lamp, from "warm" type to "cool" type, or vice versa, as the need or desire changes for having heat from the lamp accompany, or not accompany, the light therefrom.

SUMMARY OF THE INVENTION

Objects of the invention are to provide an improved lamp fixture, and to provide a dichroic filter arrangement which is quickly and readily adjustable for selectively causing heat from a light source to accompany, or not accompany, the light therefrom.

The invention comprises, briefly and in a preferred embodiment, a first dichroic filter member positioned with respect to a light source and adapted to reflect light from said light source in a given direction, said first dichroic filter member being further adapted to transmit therethrough heat from said light source, and a second dichroic filter member movably mounted so as to be alternatively positionable between said light source and said first dichroic filter member or on the opposite side of said light source away from said first dichroic filter member, said second dichroic filter member being adapted to reflect heat and transmit light from said light source. Preferably, said first and second dichroic filter members are in the general shape of either a hollow hemisphere or a hollow semicylinder, contoured in a parabolic or other desired configuration.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a cross-sectional view of a preferred em-

bodiment of the invention, showing two dichroic filter members arranged to reflect light in one direction and heat in the opposite direction;

FIG. 2 is a cross-sectional view of the same apparatus as FIG. 1, with the dichroic filters positioned so as to reflect both heat and light from the lamp in the same direction;

FIG. 3 is a perspective view, toward the bottom thereof, of an arrangement of dichroic filters in the shape of hollow hemispheres;

FIG. 4 is a perspective view of an arrangement in which the dichroic filters are in the shape of hollow semi-cylinders; and

FIG. 5 is a side view of the embodiment of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1, a light-emitting source 11 (which also emits heat) is held in position by means of a socket or other suitable arrangement, and may be a conventional household light bulb, or other type of lamp such as a fluorescent lamp, arc lamp, or metallic-vapor lamp. A first dichroic filter member 12, of the type which reflects visible light and transmits heat, is positioned near the light source 11 and is contoured to direct the light in a given direction, such as toward a person 14, as indicated by the light rays designated "L." A second dichroic filter member 16, of the type which reflects heat and transmits light, is movably positioned with respect to the light source 11 and first filter 12, and is contoured in a curved shape as shown, so as to be rotatable generally about the light source 11. When the second filter member 16 is in the position shown in FIG. 1, i.e., on the other side of the light source 11 from the first filter member 12, it reflects heat from the light source 11 rearwardly, away from the direction of the reflected light rays "L," and through the first dichroic filter member 12, as indicated by the heat rays "H." Light from the source 11 and from the reflector 12 is readily transmitted through the second dichroic filter member 16, so that in the arrangement of FIG. 1 light is effectively and efficiently directed in a desired direction, unaccompanied by heat from the light source 11.

When the second dichroic filter member 16 is swung into the position shown in FIG. 2, i.e., to a position between the light source 11 and the first dichroic filter member 12, it reflects the heat rays "H" in the same given direction as the light rays "L," as indicated in FIG. 2. The light rays reflected from the first filter member 12, pass efficiently and unobstructed in both directions through the second filter member 16, whereby the overall effectiveness and efficiency of light directed in the desired direction, both as reflected from the member 12, and as emitted directly from the light source 11, is the same in the arrangements of each of FIGS. 1 and 2. The filter member 16 may be pivoted as will be described in connection with FIGS. 3 and 4, so as to be manually adjustable to the desired position. If desired, mechanical means such as chain, handle, or lever means, may be provided to assist in readily making the adjustment. In the position shown in FIG. 1, in which the light fixture of the invention emits light only, without heat, in a desired direction, the fixture is particularly suitable for use as a reading lamp in a warm room, or as a lighting fixture in a store, where it is desired to illuminate merchandise without adding heat to the vicinity. In the position shown in FIG. 2, the light

fixture is particularly suited for use as a reading lamp in a cold room where heat from the light source 11 adds desired warmth, and also is suitable as a display lighting fixture where it is desired to add heat to the vicinity of the displayed merchandise.

Each of the dichroic filter members 12 and 16 may be made in well-known manner, such as by depositing layers of suitable material onto a support member of clear material such as glass or plastic. In the embodiment shown in the drawing, the dichroic filter coatings are on the concave surfaces of the members 12 and 16. Multiple layer dichroic filter construction techniques have been described in numerous publications, and U.S. Pat. No. 3,188,513 to Hansler references some publications relating to dichroic filters for reflecting light and transmitting heat, and for reflecting heat and transmitting light.

In the arrangement shown in FIG. 3, the dichroic filter members 12 and 16 are generally in the shape of hollow hemispheres, the filter member 16 being supported by pivotal mounting means 17 so that the filter member 16 is rotatable about an axis extending approximately along a diameter thereof and through the light source 11, so that it can be positioned as shown in FIG. 3, which corresponds to the arrangement of FIG. 1, or alternatively may be rotated to correspond to the arrangement shown in FIG. 2, so as to cause heat from the light source to accompany the light.

In the embodiment shown in FIGS. 4 and 5, the light source 11 is of elongated shape, such as a cylindrical incandescent lamp or discharge lamp, and the dichroic filter members 12 and 16 are in the shape of hollow semicylinders, the filter member 16 being supported by pivotal means 18 so as to be rotatable about an axis extending generally coextensive with the axis of the filter member 16 and with the axis of the light source 11. In the position shown in FIG. 4, the second filter 16 causes heat to be directed so as to accompany the light, whereas in FIG. 5 the second filter member 16 is shown in a position corresponding to the position shown in FIG. 1, so that heat from the light source 11 does not accompany the light therefrom.

While the second reflector member 16 is shown as being generally smaller than that of the first filter member 12, and arranged to be positionable between the light source 11 and first filter member 12, it could, if desired, be made larger than the first filter member 12, so as to be swingable behind the first filter member 12 with respect to the light source 11. A socket for the light source 11 may be carried by one or the other of the filter members 12 and 16, or may be mounted independently of the filter members.

While preferred embodiments of the invention, and modifications thereof, have been shown and described, other embodiments and modifications thereof will be-

come apparent to persons skilled in the art, and will fall within the scope of invention as defined in the following claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A lamp fixture for use with a light source which emits heat in addition to light, wherein the improvement comprises a first dichroic filter member adapted to reflect light and transmit heat from said light source and fixedly positioned with respect to said source at a given distance therefrom to reflect light from said source in a given direction, and a second dichroic filter member adapted to reflect heat and transmit light from said light source, and mounting means movably positioning said second filter with respect to the position of said light source whereby said second filter can be selectively rotated about said position of the light source to positions on opposite sides thereof in alignment with said given direction of light so as to reflect heat from said light source in said given direction or away from said given direction.

2. A lamp fixture as claimed in claim 1, in which said first and second filter members are in the shape of hollow hemispheres with the concave surfaces thereof facing toward said position of the light source and contoured to respectively reflect said light and heat in predetermined patterns, and in which said mounting means comprises pivotal means permitting said second filter member to be swung about an axis extending substantially along a diameter thereof and through or near said position of the light source.

3. A lamp fixture as claimed in claim 2, in which said second filter member is positioned relatively closer to said position of the light source than is said first filter member, whereby said second filter member can be rotated to a position between said first filter member and said position of the light source.

4. A lamp fixture as claimed in claim 1, in which said first and second filter members are in the shape of hollow semicylinders with the concave surfaces thereof facing toward said position of the light source and contoured to respectively reflect said light and heat in predetermined patterns, and in which said mounting means comprises pivotal means permitting said second filter member to be swung about an axis extending substantially along the axis of said second semicylinder and through or near said position of the light source.

5. A lamp fixture as claimed in claim 4, in which said second filter member is positioned relatively closer to said position of the light source than is said first filter member, whereby said second filter member can be rotated to a position between said first filter member and said position of the light source.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,769,503 Dated October 30, 1973

Inventor(s) Sang-Chul Kim

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Title, change "DICHORIC" to --DICHROIC--

Signed and sealed this 5th day of March 1974.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents