United States Patent

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[15] 3,686,494

[45] Aug. 22, 1972

[54] **LIGHT DISPLAY APPARATUS**

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[22] Filed: **Jan. 15, 1970**

[21] Appl. No.: **3,175**

[52] **U.S. Cl.** **240/10.1**, 240/49

[51] **Int. Cl.** **F21p 3/00**, F21v 1/10

[58] **Field of Search** 240/10.1, 49; 353/1, 4

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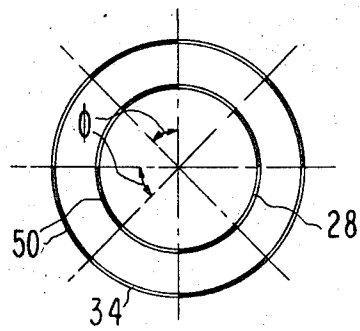
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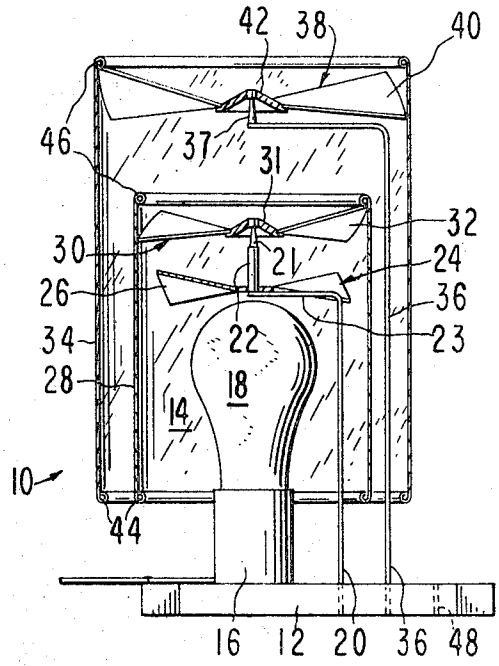
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[57] **ABSTRACT**

Light display apparatus for providing a kaleidoscopic projection on a wall or surface. Concentric cylinders each including a rotor having a plurality of rotor blades associated therewith are caused to be rotated in opposite directions. The rotation is caused by vertically rising air heated by a light source located within the concentrically arranged cylinders. The rotor blades are oppositely pitched so as to cause the opposite rotation thereof. Preferably a stationary stator is used to initially guide the flow of the heated air. Desirably, at least a portion of each cylinder is provided with a colored design or pattern.

2 Claims, 3 Drawing Figures





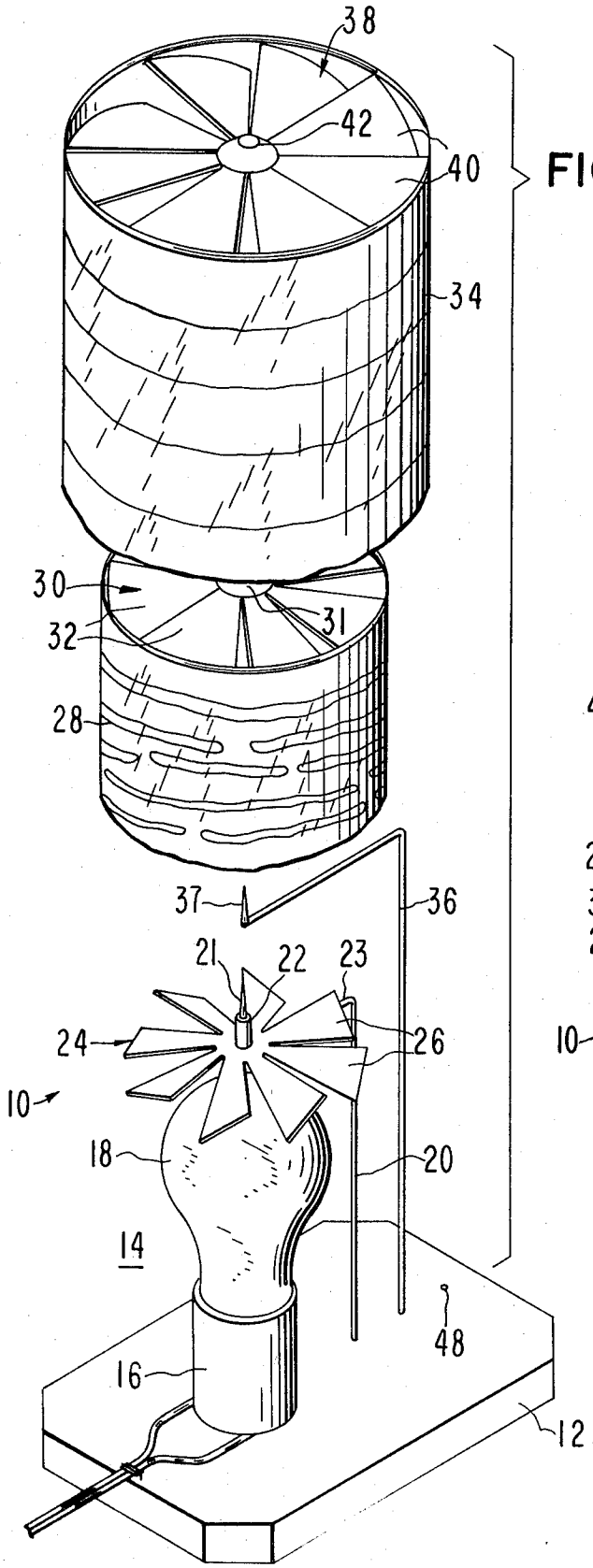


FIG.1

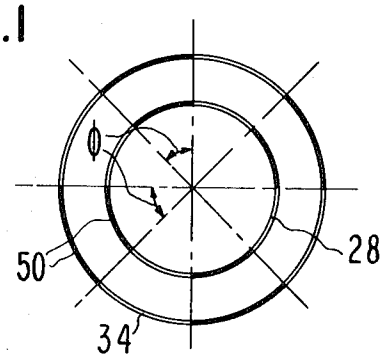


FIG.3

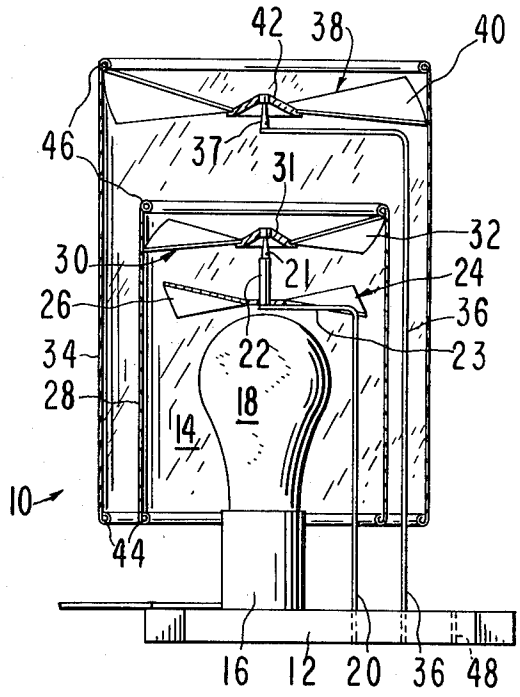


FIG.2

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LIGHT DISPLAY APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to light display apparatus and more particularly to light apparatus comprising oppositely rotating concentric cylinders surrounding a light source which projects a kaleidoscopic pattern of light on a wall or surface.

Various novelty light devices are presently available on the market. These include a number of devices, for example, which are directed particularly toward the youth market. None of these, however, has value other than as mere decorative objects. Often these are simply viewed by the observer and do not project on a wall or surface.

In some commercial enterprises such as in various psychedelic-type night clubs a number of visual displays are presented for the benefit of the people in attendance but these often involve elaborate banks of lights and associated electronic and/or electromechanical equipment, none of which is satisfactory for use, for example, in one's home since the expense and bulk of these displays are prohibitive to the average buyer.

Other novelty and decorative devices use what is referred to as "heat fans." A single cylinder is rotatably mounted so as to enclose a light source such as an ordinary incandescent light bulb. A rotor or heat fan is located at one end of the cylinder. As the light source heats the surrounding air, the air rises vertically and causes rotation of the cylinder as a result of the action of the moving air on the cylinder. Typically, such cylinders have an ornamental surface or include words of advertising thereon, etc., the rotation of which is viewed by the observer. A few of these are used to project a pattern or image on a display surface. However, the resulting display is merely one producing a spinning type display which is repeated over and over.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an improved light display apparatus;

It is further an object of the present invention to provide an improved light display apparatus for displaying a continuing and constantly changing moving pattern of colored light on a wall or surface;

It is further the object of the present invention to provide an improved light display apparatus which is both inexpensively made and easily operable by the user and yet is both reliable and dependable.

In accordance with the present invention at least two concentrically arranged transparent cylinders are rotatably mounted to enclose a suitable light source. Each cylinder includes a rotor or heat fan located at one end thereof, about which the cylinder rotates. The air surrounding the light source is heated and rises vertically. Since the blades of the rotor are oppositely pitched the rising heated air causes the cylinders to rotate oppositely relative to one another. The cylinders may be impregnated with suitable transparent color designs or patterns. Due to the opposite rotation of the cylinders the light projected from the light source through the walls of the cylinders onto a wall or display surface in proximity therewith provides a kaleidoscopic display of lights and colors. In the preferred embodiment of the present invention a stationarily mounted

stator is located within the concentric cylinders and in proximity with the light source to thereby direct the vertically rising air so as to impinge upon the rotor blades to maximize the rotation of the cylinders.

In accordance with another aspect of the present invention generally vertical bars of a reflecting pigment are painted on the surface of the cylinders. These bars on each cylinder have circumferential widths subtending equal angles. With this arrangement the rotating cylinders come in and out of alignment, i.e., the nonreflective portions alternately align and disalign. This results in a strobe-like display on a wall or surface in the form of a precession of light bars.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view incorporating the present invention;

FIG. 2 is a cross-sectional plan view of one embodiment of the present invention; and

FIG. 3 is a top view of concentrically arranged cylinders in accordance with another aspect of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 and 2 wherein identical parts of the present invention are referred to by the same reference numerals, there is shown a light display apparatus 10 incorporating the present invention. Light display apparatus 10 includes a base support member 12 to which is secured a lamp 14 having a socket 16 and a light bulb 18. A support member 20 of a generally inverted L-shape is secured to the base 12, as shown. The other end, which includes a pointed bearing surface 21, is positioned above the light bulb 18 and in axial alignment therewith. The bearing portion 21 has an enlarged lower portion 22 around which a stator 24 is placed. The stator is stationarily located and may not rotate due to the upper portion 23 of the first support member 20 which engages at least one of a plurality of stator blades 26.

A first cylinder 28 having a heat fan or rotor 30 with a plurality of rotor blades 32 is rotatably mounted on the bearing surface 21 as may best be seen by reference to FIG. 2. The rotor 30 includes an indented central portion 31 for receiving the pointed bearing surface 21 and for properly aligning the cylinder 28 relative to the lamp 14. Details of the means by which the rotor is mounted within the cylinder will be given subsequently.

A second cylinder 34 is concentrically mounted relative to the first cylinder 28 by use of a second support member 36 which also includes a pointed bearing surface 37 mounted thereon. The cylinder 34 has mounted at one end therein a second rotor 38 having a plurality of rotor blades 40 oppositely pitched relative to the blades 32 of rotor 30. The second rotor 38 includes a central portion 42 for receiving the bearing surface 38.

The cylinders 28 and 34 are of a transparent material such as acetate or other form of polyester plactic. Any suitable design or pattern is painted or otherwise applied on or within the walls of each of the cylinders. This may be done during manufacture of the cylinders or by the ultimate purchaser of the display apparatus 10. Desirably the colored portions are transparent or at least translucent. By being transparent a more sharply defined projection will result on the display surface.

In operation heat radiated by the lamp **14** rises vertically. The blades **26** of stator **24** cause the rising air to impinge more directly against the surface of blades **32** so as to impart greater kinetic energy to rotor **30** than would occur without the stator. As the heated air continues to rise it then passes through rotor **38** whose blades **40**, as previously described, have a pitch opposite to those of the first rotor **30**. Thus as the rising air passes through rotor **38** the cylinder **34** is caused to be rotated oppositely to that of cylinder **28**. When the light display apparatus **10** is then placed along a wall or other suitable display surface, light transmitted from the light source will encounter a changing pattern resulting from the continually rotating cylinders. Thus the light emitted from the display **10** will be projected as a continuously changing moving kaleidoscopic display of light and color. The effect produced is far different from that if a single cylinder, the effect of which was previously described.

As may be best seen in FIG. **2**, the cylinders **28** and **34** include upper and lower circumferential ribbed portions **44** and **46**, respectively. These ribbed portions maintain the cylinders in a substantially circular cross section and give rigidity to each of the cylinders. One way by which these cylinders may be formed is by taking a flat portion of the transparent material and wrapping it around a form or mold having the desired cross sectional diameter. A heated surface or heat plate having a circular inscribed portion is then used to form the ribbed portions **44** and **46**. This is accomplished by pressing the cylinder on the inscribed portion of the heat plate until the plastic begins to melt. As it melts the edges curve either inwardly or outwardly to form the ribbed portion. The cylinders are then allowed to cool, forming the rib. In the preferred embodiment at least the upper rib is curled inwardly. This permits a surface upon which the rotor is secured so that it remains within the cylinder during operation.

The light bulb **18** may be any suitable light bulb such as an ordinary incandescent light bulb. Of course, the intensity of the projected light display will be a function of the size and output capability of the lamp. In the preferred embodiment, the filament (not shown) of the light bulb **18** is horizontally situated within the bulb **18**, It has been found that a horizontal filament provides a sharply defined projection, compared with, for example, a lamp having a vertical filament. A clear rather than frosted-type light bulb is also desired for the same reason.

The rotors **30** and **38** and stator **24** may be made of any suitable material. However, the central portions **31** and **42** of the rotors should have surfaces having low friction characteristics to minimize rotational losses. Harder metallic material such as tin or steel are desirable. Alternately an inexpensive jewel bearing may be press fit into the central portion of the rotors. The rotors **28** and **38** and stator **24** may be formed by cutting out circular discs, cutting the desired blades, and twisting the blades in accordance with the desired pitch.

It should be understood that stator **24** while providing optimum performance is not absolutely required for the light display **10**. By properly adjusting the pitch on the respective rotors it is possible to get opposite rotation of the rotors without the use of the stator. However, as a practical matter and as a way of optimizing and maximizing the relative speeds of cylinders **28** and **34**, the stator is desirable. Furthermore, additional stators may be used to increase the performance of the light display apparatus. For example, a stator may be positioned on support member **36** in a position immediately below rotor **38**.

An additional hole **48** is provided in base **12**. This hole may be used for an additional support member to support another cylinder (not shown). Any number of such support members and concentrically arranged cylinders may be used, but such use is limited by the relatively small rotational power provided by the heated air rising from lamp **14**.

In constructing the support members **20** and **36**, the bearing surfaces **21** and **38**, respectively may be formed by welding a small pointed pin to the main portion of the respective support members. Alternately, the support member may be cut or ground to a suitable point. In another aspect of the present invention a strobe-like projection may be displayed by utilizing the general principle of the present invention. Referring now to FIG. **3**, a series of vertical bars **50** are painted on or impregnated within the entire length of each of the first and second cylinders **28** and **34**. The width of each bar corresponds to the circumference of the cylinder subtended by the angle ϕ. The material used to provide the vertical bars **50** is reflective so that no light is displayed whenever the reflecting portions are out of alignment. As the inside cylinder **28** rotates oppositely to that of the outside cylinder **34**, it may be seen that the clear portions of each of the cylinders will continually align and re-align. This results in a strobe-like projection on a display wall or surface and, depending upon the relative rates of rotation may be in the form of a rotating precession of on-and-off light sequences. The transparent portions between the vertical bars may be colored to give a sequence of multicolored flashes. Similarly, patterns or pictures could be impregnated on these portions.

A generally semicircular shield (not shown) may be placed around the light bulb **18**. The shield should be of a light-absorbing material. This has the advantage of preventing a viewer from being distracted from the display pattern as a result of the light produced by the lamp **14** itself. A light-absorbing rather than a light-reflecting material is desirable since a light-reflecting surface has a tendency to diffuse the light and less defined projections result. Alternately, a light-absorbing material may be painted on the surface of the light bulb **18** to accomplish the same purpose as a shield or reflector would.

The form of the projected display on the display surface or wall is virtually unlimited since any type of pattern having any shape or form or any combination of colors may be placed on either of the cylinders and because of relative movement of the cylinders relative to each other the resulting light display is continually changing. Furthermore, by replacing one or more of the cylinders, new colors and new designs may be projected. Thus, an individual may change the display according to his particular desire or mood. Furthermore, it is not necessary that the color designs on either of the cylinders be done by the manufacturer. Rather, this may be left up to the individual consumer who may paint or impregnate the design and colors according to his own imagination and taste.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention as limited only by the scope of the appended claims.

I claim:

1. Light display apparatus for use near a wall or surface for projecting a strobe-like pattern of light thereon, comprising

light source suitable for projecting an image of objects located in the vicinity thereof on a wall or surface;

a first cylinder of a material capable of transmitting light therethrough;

a first rotor having a plurality of rotor blades associated therewith, said rotor being secured axially within one end of said first cylinder;

first mounting means for rotatably mounting said first cylinder so as to enclose at least a portion of said light source and whereby said first cylinder is caused to rotate by vertically rising air heated by said light source;

a second cylinder of a material capable of transmitting light therethrough and having a diameter greater than that of said first cylinder;

a second rotor having a plurality of rotor blades associated therewith, said rotor being secured axially within one of said second cylinder, and wherein said plurality of rotor blades are oppositely pitched relative to said plurality of rotor blades associated with said first rotor;

second mounting means for rotatably mounting said second cylinder substantially concentrically around, and enclosing at least a part of, said first cylinder and whereby said second cylinder is caused to rotate in an opposite direction from that of said first cylinder;

wherein said light source comprises a lamp having a horizontally oriented filament;

a stator having a plurality of blades associated therewith and means for mounting said stator so as to direct the flow of heated air toward said first and second rotors; and

wherein said first and second cylinders include a plurality of vertical bars of a reflecting pigment, and wherein said bars on said respective cylinders have circumferential widths subtending equal angles.

2. Light display device for use on a wall or surface for projecting a strobe-like pattern of light thereon, comprising:

a light source suitable for projecting an image of objects located in the vicinity thereof on a wall or surface;

concentrically arranged transparent cylinders surrounding said light source;

rotor means associated with each of said cylinders for rotating said cylinders such that successive cylinders are rotating in the opposite directions, said rotor means being rotated by vertically rising air heated by said light source impinging thereon, and wherein the light from said light source is directed through said cylinders and projects a pattern of light on said surface of a wall; and

wherein said cylinders including plurality of axially-extending reflecting bars on the walls thereof to form a plurality of reflecting and non-reflecting portions, and wherein said bars on said respective cylinders have circumferential widths subtending equal angles.

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