United States Patent

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[72] Inventor **Lawrence E. McCurdy**
224 W. 13th St., Apt. 3R, New York, N.Y. 10011

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[54] **SOUND SYNCHRONOUS OPTICAL VIEWER**
7 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **350/145,** 40/28.3, 351/158
[51] **Int. Cl.** **G02b 27/02**
[50] **Field of Search** 350/130, 132, 133, 134, 141, 143, 145, 146; 40/28.1, 28.2, 28.3; 351/158; 84/464

[56] **References Cited**

UNITED STATES PATENTS

3,524,272	8/1970	Elwell	40/28.1
3,247,750	4/1966	Sklar	84/464
2,349,013	5/1944	Sparling	350/141

Primary Examiner—David Schonberg
Assistant Examiner—Paul A. Sacher
Attorney—Max L. Libman

ABSTRACT: A music-enhancing optical viewer shaped and worn like ordinary eyeglasses or goggles has a separate light source for each lens, the illumination of which is respectively controlled by the instantaneous output voltages from the respective channels of a stereo music source so that the light produced by each source varies with the associated sound channel output. Parti-colored filter means between each light source and the wearer's eye, different for each eye, cause varied color effects to be produced which are related to music produced by the stereo music source.

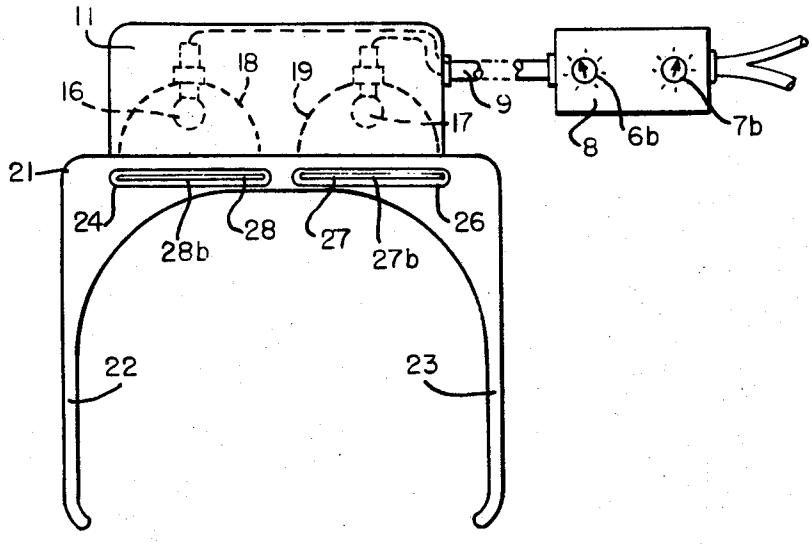


FIG. 1.

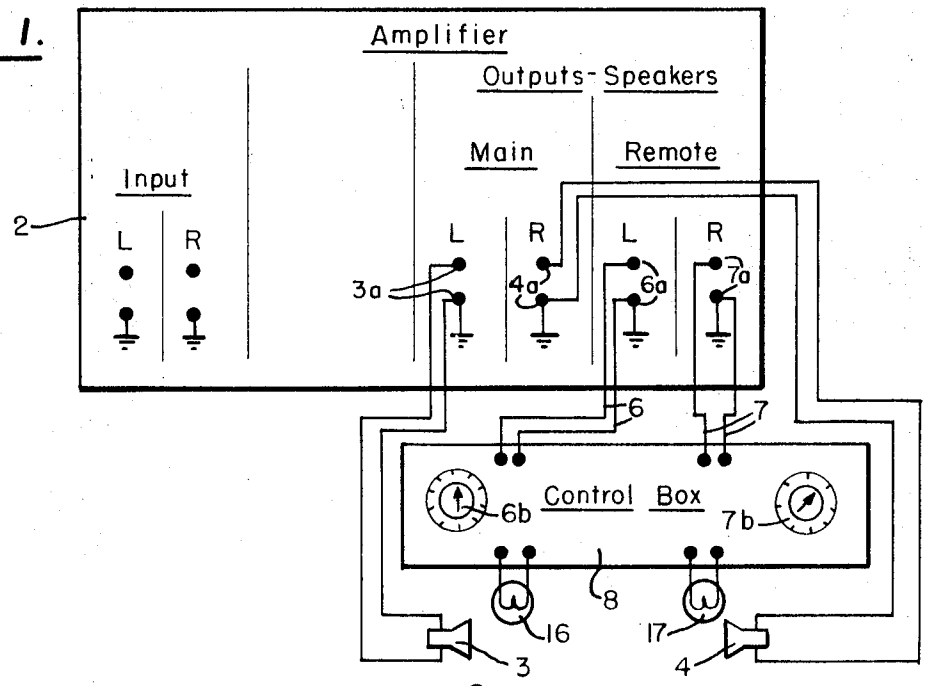


FIG. 2.

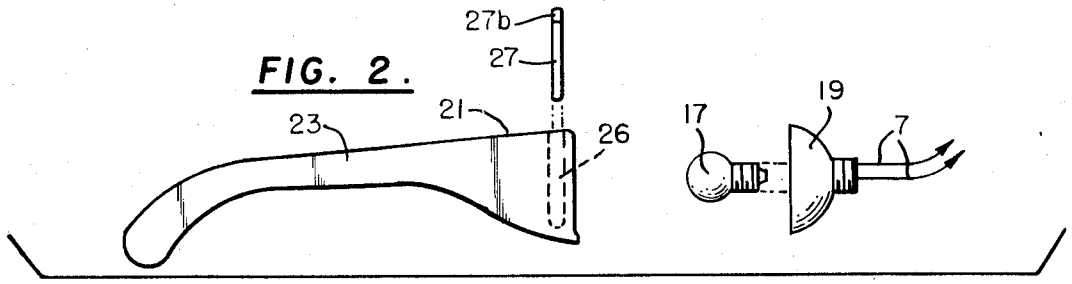


FIG. 4.

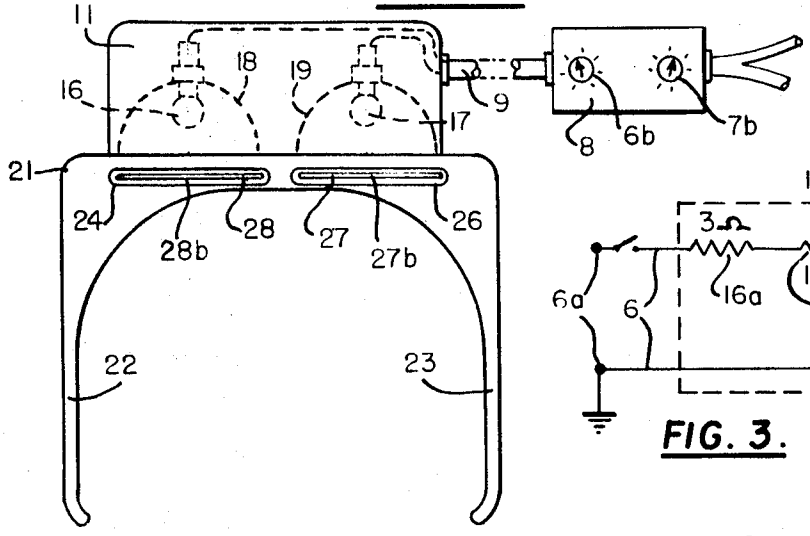
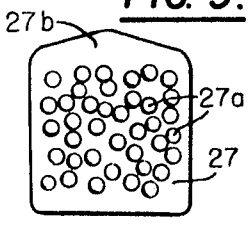


FIG. 5.



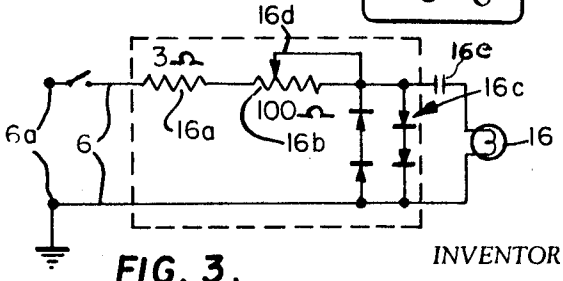


FIG. 3.

INVENTOR
Lawrence E. McCurdy

BY Max L. Libman

ATTORNEY

SOUND SYNCHRONOUS OPTICAL VIEWER

The present invention relates to a device which is intended to be used with a stereo music player to enhance the audio effect by producing synchronously therewith a visual color effect related to the music. The device is shaped and worn like ordinary eyeglasses, or rather like goggles, since it is preferably provided with a front piece shaped to exclude extraneous light, and to admit light through the eyeholes produced by two separate, voltage-controlled light sources, e.g. ordinary electric flashlight bulbs, one for each eyehole, which are respectively connected to the right and left audio outputs of a stereo music player. Preferably the output voltage from the right channel of a stereo music source is used to control the light in the right side of the eyephones, while the left channel is used to control the light in the left side. This light reaches the eye only through a particolored light filter for each eye comprising in effect a series of small light filters placed in a random pattern between the light source and the eyes of the user, who sees a mosaic of small, illuminated, colored discs or areas formed by the lenses. The original music source thus stimulates two senses at the same time. The perception for the visual sense corresponds cross-modally with the perception for the audio sense. An additional benefit of the eyephones (as the device will be called) is the complete exclusion of distracting and irrelevant visual stimuli, which increases attention and perceptual sensitivity of the auditory sense.

The specific nature of the invention, as well as other objects and advantages thereof, will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings, in which:

FIG. 1 is a diagram showing the manner of interconnecting the eyephone and stereo speakers for use together;

FIG. 2 is an exploded side view of the eyephone device;

FIG. 3 is a wiring schematic diagram showing the control box and its sensitivity and safety circuit;

FIG. 4 is a top view of the assembled eyephone ready for use; and

FIG. 5 is a view showing one manner of construction of the filter lens.

The present invention is intended to be used with a stereo sound system such as a record player or tape recorder. The amplifier of such record players typically contains a terminal plate on the back side as indicated at 2 in FIG. 1, which is provided with output terminals for connection to loudspeakers, and usually include extra terminals for remotely placed speakers, etc. As indicated in FIG. 1, the loud speakers associated with the music player are shown at 3 and 4 as connected to the main speaker terminals of the amplifier in the usual fashion. The eyephones of the present invention are also provided with two sets of leads, one for the left light and one for the right light, as will be explained below, and these leads indicated at 6 and 7 respectively are connected to the auxiliary or remote terminals of the amplifier as shown in the diagram. If such terminals are not available, the lines 6 and 7 may be connected to the same terminals respectively as the speakers, since they are in any case intended to be operated in parallel with the loud speakers, and therefore terminals 6*a* of line 6 could be connected to the left terminals 3*a* of speaker 3, while terminals 7*a* could be connected to the terminals 4*a*.

FIG. 3 shows the circuit connections within the control box 8, which may physically be a separate unit installed in the cord 9 (FIG. 4) which contains the leads for both lamps, or alternatively the unit could be included in the housing 11 shown in FIG. 4 which contains the lamps, with the control elements 7*b* and 6*b* mounted respectively on the right- and left-hand side of the housing 11.

The control circuit is the same for each line, and is shown in FIG. 3 for line 6, which supplies the left light bulb 16 through a fixed resistance 16*a* which may be typically 3 ohms, for the case where the lamp 16 is a flashlight bulb of the size suitable for a single cell flashlight (type No. 131), which is designed to operate at 1.3 volts. A variable series resistor 16*b* enables the user to adjust the intensity of the light to the degree which he prefers, while the assembly 16*c* of silicon diodes insures that a voltage too high for comfort cannot be applied to the lamp 16. For example, with a lamp intended to operate at approximately 1.3 volts, two silicon diodes are used, each requiring a forward bias approximately 0.6 to 0.7 volts before conduction occurs so that two in series require the desired maximum of approximately 1.3 volts before they can conduct, thus preventing the possibility of overvoltage on the lamp 16. The adjustable resistor 16*b* can, of course, be used to reduce the voltage to any desired point. A condenser 16*e* of about 150 mfd. is preferably added to attenuate the lower frequencies so as to deemphasize the "heat" and emphasize the effect of solo work.

The lamps 16 and 17 are mounted in parabolic reflectors 18 and 19 as shown in FIG. 4 mounted within housing 11, which may be of plastic and is attached to the frame 21 of the eyephones in any desired manner, which must however permit replacement of burned out bulbs, as by temporarily removing the colored lens.

The frame 21 may contain the usual eyeglass temple pieces as shown at 22 and 23, or may be held in place by a strap behind the user's head if desired. The frame is provided with slots 24 and 26 for receiving the filter units, which will be referred to as lenses for convenience, although they are not lenses in the conventional sense. These are actually filter units, and may assume any convenient form, one preferred form being shown in FIG. 5, where the lens base is simply a small plate of opaque material such as black plastic in which a number of small holes 27*a* have been bored. By way of example, there may be approximately 40 such holes in a single lens, each hole being five thirty-seconds inch in diameter and the holes being spaced an average of one-fourth inch apart in a generally random pattern. Each hole is individually covered with a colored piece of plastic about three-sixteenths inch in diameter which is glued or pasted onto the baseplate 27 over each hole, or may be fastened by any other means. In any event, the general purpose is to provide a particolored filter effect with a large number of different filter colors interspersed at random throughout the area. The user sees a mosaic of small, illuminate, colored discs formed by the filter areas. When corresponding areas of the retina of both eyes are stimulated simultaneously, the visual nervous system combines the two images into one. This means that the image seen on the left lens of the eyephones is superimposed on the image seen on the right lens. The two images become spatially indistinct, resulting in one central visual field. If a colored hole of one lens corresponds exactly with a colored hole of the other lens, the perceived image will change color depending on which channel is dominant.

Using the eyephones provides each selection of music with its own corresponding visual program. If no change in the eyephones is made, repeating a selection of music will repeat the corresponding visual program. Changing from one selection of music to another completely changes the visual program. A personal sense of heightened involvement is experienced when using the eyephones. Since the light fluctuations will duplicate the fluctuations of a passage of music, the music becomes abstractly animated and thus, more interesting.

An important distinction between the present invention and "room environment" light-plus-sound systems is that with the latter, each eye sees all of the light, whereas in the present system each eye sees, in effect, a different but related program, producing a much more interesting and variegated total effect.

While the effect will remain the same for a given selection if the lenses are unchanged, the lenses are preferably made removable by means of slots 24 and 26 in the frame so that they can be changed to suit personal preferences. For this purpose a small tab 27*b* is preferably provided so that the lenses can be readily interchanged.

Slots 24 and 26 are preferably sized to accommodate standard picture slides; this allows pictures taken by a camera to

be used as lenses, which provides a great diversity of lens choice under the creative control of the owner.

It will be understood that the invention is not limited to the exact embodiment shown and that various modifications can be made in construction and arrangement within the scope of the invention. For example, the color pattern distribution may be regular instead of random, and the filters may be glued to or painted on a piece of clear plastic without holes or perforations; also, the lenses may be each of one solid color, different for each eye, if desired.

I claim:

1. a. A music-enhancing optical viewer comprising

b. a goggle frame having a front piece with two eyeholes, and retaining means for holding said front piece on the head of a user with the eyeholes in front of the user's eyes,

c. a variable electric light source for each eyehole positioned to illuminate its respective eyehole,

d. each said light source being responsive to the instantaneous electrical value of voltage supplied to it to produce light of an instantaneous intensity related to the instantaneous value of said voltage,

e. color filter means in each eyehole between said light source and the user's eye, and

f. means for connecting each light source to one output of respective right and left outputs of a stereo music reproducing source.

2. The invention according to claim 1, said filter means being different for each eye.

3. The invention according to claim 2, each said filter means having a number of different-colored filter areas.

4. The invention according to claim 3,

g. each said filter means comprising a light impervious lens piece covering one eyehole,

h. each said lens piece having a number of small perforations spaced throughout its area,

i. each perforation having a small color-filter covering it,

j. said small color-filters being of different colors.

5. The invention according to claim 4, said goggles having means for removably supporting said filter means in position at said eyeholes.

6. The invention according to claim 1, said last means including voltage regulator means for limiting the maximum voltage transmitted to said light sources, and thus to limit the maximum brightness of each light source.

7. The invention according to claim 6, said regulating means including variable resistor means for setting the maximum brightness of the light sources.