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Charas

[11] **3,838,417**

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[54] **VISUAL COLOR RESPONSE APPARATUS**

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[52] **U.S. Cl.** ..... **340/366 B,** 340/148
[51] **Int. Cl.** **G08b 5/38**
[58] **Field of Search**..... 340/366 B, 148; 84/464

[56] **References Cited**

UNITED STATES PATENTS

3,478,637 11/1969 Reed 84/464

Primary Examiner—Harold I. Pitts
Attorney, Agent, or Firm—Hubbell, Cohen & Stiefel

[57] **ABSTRACT**

An apparatus for producing a visual color response in an observer includes a flashing stoboscopic light and a means for controlling the flashing frequency of this light so as to provide a light signal having a predetermined flashing frequency substantially within the range of at least 1 to 16 cycles per second for producing at least a selected predetermined color within the visible light spectrum as the visual color response, the color being dependent on the flashing frequency, a different color being produced at a different flashing frequency. Means, such as a tape recorder in conjunction with a headset to which the strobe can be attached, are also provided for substantially simultaneously producing an audio response in the observer correlated with the visual response. The flashing frequency is preferably controlled independently of the audio signal, such as music, although subjectively correlated to the mood of the music.

11 Claims, 2 Drawing Figures

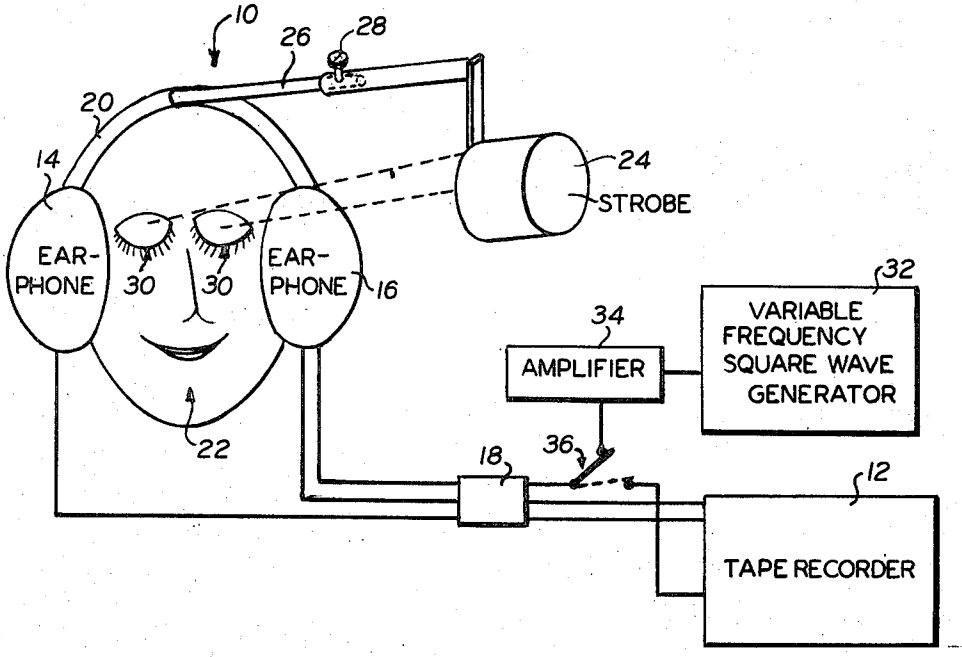


FIG. 1.

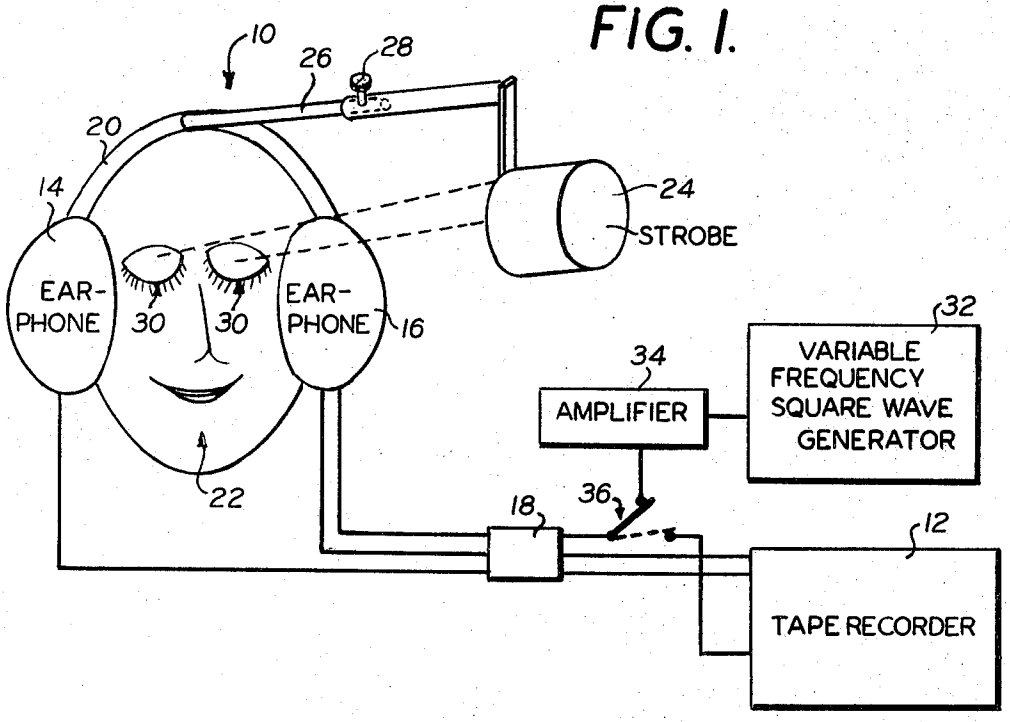
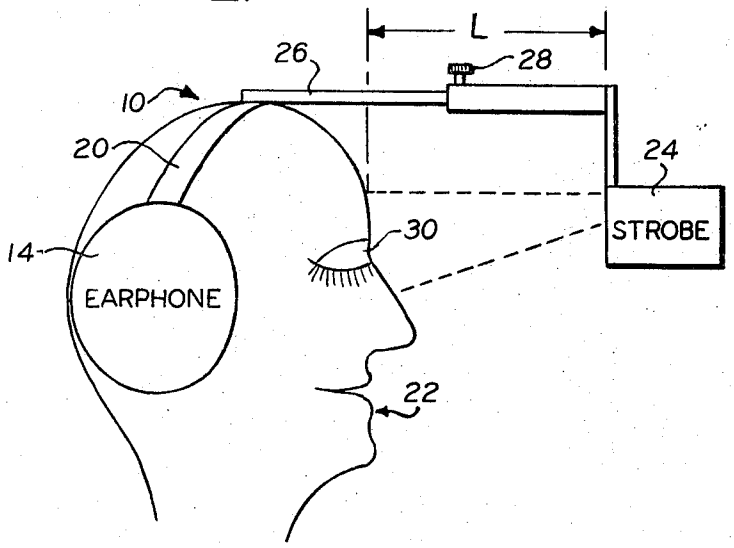

10
26
28
20
14
24
STROBE
EAR-
PHONE
30
30
EAR-
PHONE
16
32
34
AMPLIFIER
VARIABLE
FREQUENCY
SQUARE WAVE
GENERATOR
22
18
36
12
TAPE RECORDER

FIG. 2.


L
26
28
10
20
24
STROBE
30
14
EARPHONE
22

VISUAL COLOR RESPONSE APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to devices for producing a controllable visual color response in an observer.

2. Description of the Prior Art

The use of colored light in conjunction with recorded music is well known such as disclosed in U.S. Pat. Nos. 3,478,637; 3,163,077; 3,240,099 and 3,478,837. However, all these prior art light systems are directly controlled by the recorded music and the light produced is merely due to the turning on of lights of a particular selected color rather than by utilizing a single light whose flashing frequency is variable to produce different visual color responses in an observer by variations in this flashing frequency rather than by the use of colored filters. These prior art devices operate by merely turning on the appropriate light dependent on the frequency of the portion of the music being played. In addition, with the advent of modern discotheques, the use of stroboscopic lamps in conjunction with music has become widespread, such as the type exemplified in U.S. Pat. No. 3,478,837. However, none of these prior art devices is concerned with utilizing such a stroboscopic lamp as a means for providing a visual color response in an observer which may be varied in accordance with variations in the flashing frequency of the strobe and, accordingly, the strobe is merely utilized for the eerie "pop culture" effect it produces. Thus, none of the prior art devices have utilized a strobe as a means for providing a visual color response in an observer which may be varied in accordance with variations in the flashing frequency of the strobe to produce predictable visual color responses.

SUMMARY OF THE INVENTION

An apparatus for producing a visual color response in an observer includes stroboscopic means for providing a flashing stroboscopic light signal having a predetermined controllable flashing frequency to the observer for producing this visual response and means for controlling the flashing frequency of the stroboscopic light signal to provide a light signal having a predetermined flashing frequency substantially within the range of at least one to sixteen cycles per second for producing at least a selected predetermined color within the visible light spectrum as this visual color response, the color being dependent on the flashing frequency, a different color being produced at a different flashing frequency. Such an apparatus also preferably includes means, such as a tape recorder in conjunction with a headset, for substantially simultaneously producing an audio response in the observer correlated with the visual response, the flashing frequency of the strobe being controlled independently of the audio signal although preferably correlated therewith in accordance with the mood of the music if such music is the recorded audio signal. Preferably, the headset comprises a pair of conventional earphones and the strobe which is mechanically connected to the earphones, such as via a variable length arm, the strobe being located at a predetermined distance from the eyelids of the observer, the distance being a value sufficient to provide at least an intensity of 750,000 CP for the light signal at the eyelids. The flashing frequency of the strobe may preferably be controlled either by means of a recorded control signal on a track of a multitrack tape recorder, such as one providing the audio signal via a different track or may be controlled manually by means of a variable frequency squarewave generator.

BRIEF DESCRIPTION OF DRAWING

FIG. **1** is a diagrammatic illustration, partially in block, of the preferred system of the present invention; and

FIG. **2** is a diagrammatic illustration, partially in block, of the headset portion of the system of FIG. **1.**

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail and particularly to FIGS. **1** and **2** thereof, the preferred apparatus for producing a visual color response in an observer is shown. The apparatus of the present invention preferably includes a headset, generally referred to by the reference numeral **10,** and a means for providing an audio signal, preferably music, to the headset **10,** such means being illustratively shown by a conventional tape recorder **12.** The headset **10** preferably includes a conventional pair of earphones **14** and **16** which are electrically connected, preferably via a conventional plug in jack **18** to the output of tape recorder **12** in conventional fashion which will not be described in greater detail hereinafter. The earphones **14** and **16** are preferably mechanically connected together via a conventional coupling member **20** which fits over the head of the wearer or observer, shown illustratively by reference numeral **22** in FIGS. **1** and **2.** Preferably, as shown in FIGS. **1** and **2,** the headset **10** also includes a conventional stroboscopic lamp **24,** such as a clinical model PS33 strobe manufactured by Grass Medical Instruments of Quincy, Massachusetts, which strobe **24** preferably has a variable flashing frequency or rate to be described in greater detail hereinafter. The strobe **24** is preferably mechanically connected to the coupling member **20** of earphones **14** and **16** by a link arm member **26** which is preferably variable in length, such as by a conventional telescoping arrangement having a conventional screw adjust member **28** for locking the link arm **26** at the desired length "L".

As will be described in greater detail hereinafter, this length "L" is preferably measured from the eyelids **30** (FIG. **2**) of the observer **22** to the point of emission of the light signal from the storbe **24,** this distance "L" determining the intensity of the light signal emitted from the strobe **24** at the eyelids of the observer. Preferably, this distance "L" is of a value sufficient to provide at least an intensity of 750,000 candlepower for the emitted light signal at the eyelids of the observer in accordance with the preferred embodiment of the present invention. It is of course understood that this intensity is determined both by the initial intensity of the strobe **24** and the distance "L", the distance "L" being preferably varied as the intensity of the strobe **24** is changed, such as by utilizing a different strobe having a different intensity, so as to preferably provide at least an intensity of 750,000 candlepower to the light signal at the eyelids of the observer as previously mentioned. By way of example, if the Grass Medical Instruments model PS33 strobe is utilized, such a strobe has a preferred flash intensity of 750,000 candlepower, a flash

duration of approximately ten microseconds, a synchronizable light signal output and a variable flashing frequency, the distance L is preferably within the range of 3 to 12 inches for the normal observer in order to produce the intensity of the value described above.

The flashing frequency of the strobe **24,** as was previously mentioned, is preferably variable and the strobe **24** preferably has a predetermined controllable flashing frequency which is controllable preferably by conventional variable frequency squarewave generator **32** whose output is preferably connected through a conventional amplifier **34,** a switch **36,** to be described in greater detail hereinafter, and plug **18** to the strobe **24** or, if desired, the flashing frequency of the strobe **24** may be controlled by means of a control signal recorded on a track of tape recorder **12** if tape recorder **12** is a conventional multitrack tape recorder, the audio signal being recorded on a separate track from the control signal. As shown in FIG. **1,** switch **36** determines whether the flashing frequency of the strobe **24** is controlled by variable frequency squarewave generator **32,** as is the case in the illustrated position of switch **36,** or by the control signal track of tape recorder **12** as illustrated by the dotted lines in FIG. **1.**

As was previously mentioned, the control means, either generator **32** or the control signal track of tape recorder **12,** preferably controls the flashing frequency of the stroboscopic light signal from strobe **24** to provide a light signal having a predetermined flashing frequency substantially within the range of at least 1 to 16 cycles per second for producing at least a selected predetermined color within the visible light spectrum as a visual color response in an observer, the color being dependent on the flashing frequency, a different color being produced at a different flashing frequency. Most preferably, the stroboscopic source **24** provides a color in the red-orange spectrum as the visual color response when the flashing frequency is substantially within the range of 1 to 10 cycles per second, a color in the orange-green spectrum as the visual color response when the flashing frequency is substantially within the range of 8 to 12 cycles per second, and a color in the green-blue spectrum as the visual color response when the flashing frequency is substantially within the range of 12 to 16 cycles per second. Preferably, these flashing frequencies and the resultant colors are determined for the individual observer in accordance with the mood of the music when the headset **10** is used in conjunction with recorded music, the mood being a subjective combination of pitch, frequency and amplitude, and the selected colors being correlated by the observer to the subjective mood of the music, the colors produced in accordance with the flashing frequency of the strobe **24** activating the retina of the eye of the observer directly.

Preferably, the observer **22** "looks" at the strobe **24** which is located along the optical axis preferably, from the eyelids of the observer with closed eyes which are preferably not shut tight but merely closed so that the observer cannot see through the eyes, the light from the strobe **24** impinging on the closed eyelids and activating the retina directly.

In utilizing the apparatus of the present invention, the observer places the headset **10** on the head and looks at the strobe **24.** He then closes his eyes and turns on the multitrack tape recorder **12,** if that is being utilized, and listens to the music through the earphones **14–16** while the strobe **24** flashes in accordance with predetermined rates determined by the control signal recorded on the control signal track of the tape recorder **12,** the flashing light impinging upon the closed eyelids so as to produce the visual color response which has been predetermined in accordance with the preselected flashing frequency, the various colors having preferably been preselected in accordance with the mood of the recorded music. It should be noted, that preferably, the flashing frequency of the strobe **24** determines the predominant color within the visible light spectrum which is observed, this color being dependent on flashing frequency.

It is to be understood that the above described embodiment of the invention is merely illustrative of the principles thereof and that numerous modifications and embodiments of the invention may be derived within the spirit and scope thereof, such as by utilizing a different conventional means for providing an audio signal, such as a record player, and a different means for controlling the flashing frequency of the strobe such as via a punch tape in conjunction with a variable frequency generator. It should be noted that when the preferred range of flashing frequency for the strobe is extended to at least 1 to 60 cycles per second, predictable effects within the visible color spectrum are still produced, such as the occurrence of black patterns on a white background within the range of 17 to 60 cycles per second.

What is claimed is:

1. An apparatus for producing a visual color response in an observer comprising stroboscopic means for providing a flashing stroboscopic light signal having a predetermined controllable flashing frequency to said observer for producing said visual response, and means for controlling said flashing frequency of said stroboscopic light signal to provide a light signal having a predetermined flashing frequency substantially within the range of at least 1 to 16 cycles per second for producing at least a selected predetermined color within the visible light spectrum as said visual color response, said color being dependent on said flashing frequency, a different color being produced at a different flashing frequency.

2. An apparatus in accordance with claim **1** further comprising means for substantially simultaneously producing an audio response in said observer correlated with said visual response, said audio response producing means comprising means for providing an audio signal to said observer for producing said audio response as a result thereof, said controlling means controlling said flashing frequency independently of said audio signal.

3. An apparatus in accordance with claim **2** wherein said audio signal providing means comprises earphones and said stroboscopic means includes means for mechanically connecting said stroboscopic light signal providing means to said earphones at a predetermined distance from the eyelids of said observer, said distance being a value sufficient to provide at least an intensity of 750,000 CP for said light signal at said eyelids, said earphones and said stroboscopic means forming a mechanically unitary structure.

4. An apparatus in accordance with claim **3** wherein said connection means includes means for varying said distance whereby said intensity may be varied.

5. Apparatus in accordance with claim 2 wherein said audio signal providing means comprises a storage media and playback means for reproducing the contents of said storage media, said storage media having an audio information track thereon having said audio signal recorded, and playback means providing said audio signal from said audio information track.

6. An apparatus in accordance with claim 5 wherein said storage media further includes a control information track having a control signal recorded thereon which corresponds to said predetermined flashing frequency, said playback means providing said control signal from said control information track, said flashing frequency control means being operatively connected to said playback means for receiving said control signal and comprising means responsive to said control signal for flashing said stroboscopic light means at said predetermined frequency.

7. An apparatus in accordance with claim 1 wherein said controlling means includes means for varying said predetermined frequency to a different predetermined frequency whereby said selected color is varied to a different selected color.

8. An apparatus in accordance with claim 1 wherein said stroboscopic means provides a color in the red-orange spectrum as said visual response when said flashing frequency is substantially within the range of 1 to 10 cycles per second, a color in the orange-green spectrum as said visual response when said flashing frequency is substantially within the range of 8 to 12 cycles per second, and a color in the green-blue spectrum as said visual response when said flashing frequency is substantially within the range of 12 to 16 cycles per second.

9. An apparatus in accordance with claim 1 wherein said stroboscopic means is of a type having a flash intensity of substantially 750,000 candlepower at the point of light signal emission, a substantially 10 microsecond flash duration, a synchronizable light signal output and a variable flashing frequency.

10. An apparatus in accordance with claim 9 wherein said point of light signal emission is at a distance having a value substantially within the range of 3 to 12 inches along an optical axis from the eyelids of said observer.

11. A method for producing a visual color response in an observer comprising the steps of illuminating the closed eyelids of said observer with a flashing stroboscopic light signal having a predetermined controllable flashing frequency and controlling said flashing frequency so as to provide a light signal having a predetermined flashing frequency substantially within the range of 1 to 16 cycles per second for producing at least a selected predetermined color within the visible light spectrum as said visual color response, said color being dependent on said flashing frequency, a different color being produced at a different flashing frequency.

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