United States Patent

[11] 3,576,185

[72] Inventors Hansrichard Schulz
Villingen Schwarzwald;
Oskar Meseck, Singen Hohentwich,
Germany

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[73] Assignee Saba Schwarzwalder Apparate-Bau-Anstalf
August Schiver Sohne GmbH
Villingen Schwarzwald, Germany

[54] **SLEEP-INDUCING METHOD AND ARRANGEMENT USING MODULATED SOUND AND LIGHT**
19 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **128/1,** 307/293, 331/108, 331/137
[51] **Int. Cl.** **A61n 1/34**
[50] **Field of Search** .... 128/1, 1.03 (Digest), 2; 331/108, 108.4, 137; 332/31, 66, 50; 307/293

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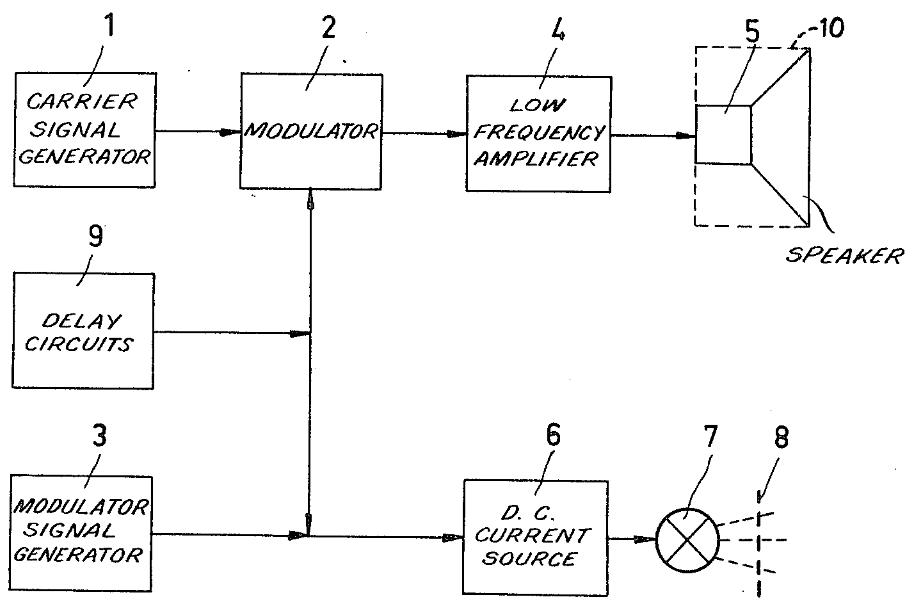
Primary Examiner—William E. Kamm
Attorney—Michael S. Striker

ABSTRACT: A tone or a blue light are modulated slowly between a perceivable maximum and a perceivable minimum with a perceivable period. Both the light and the tone are switched in after a time delay past the energization of the carrier and modulating signal generators used in the generation of the modulated light and tone, so that no transient effects are visible to the patient. The switch-out process is similarly effected in gradual stages to reduce transient effects.



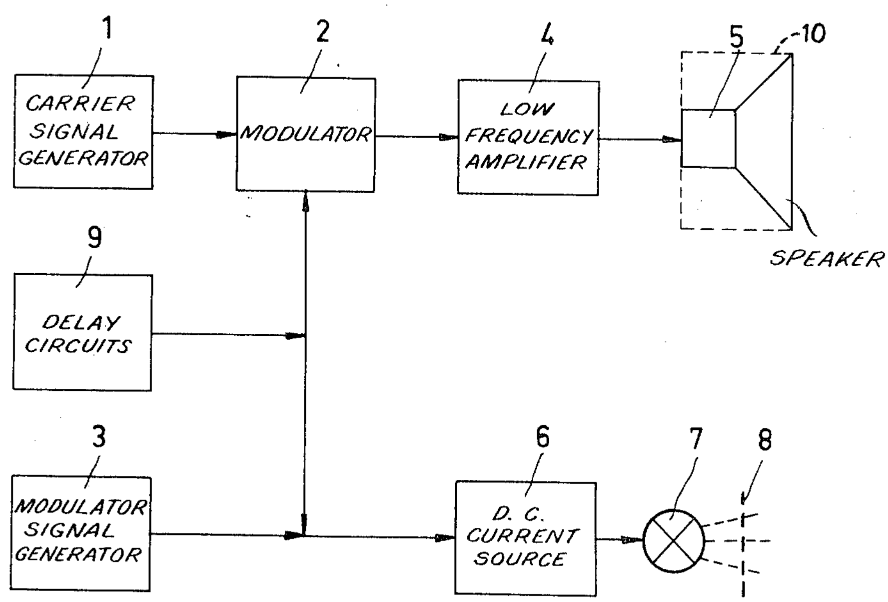


Fig. 1

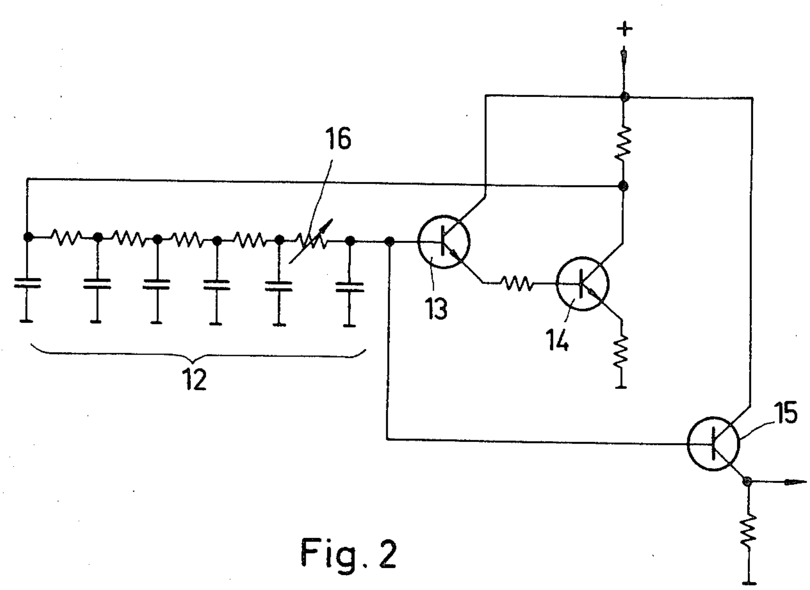


Fig. 2

Inventors:
HANSRICHARD SCHULZ
OSKAR MESECK

By Michael S. Striker
Attorney

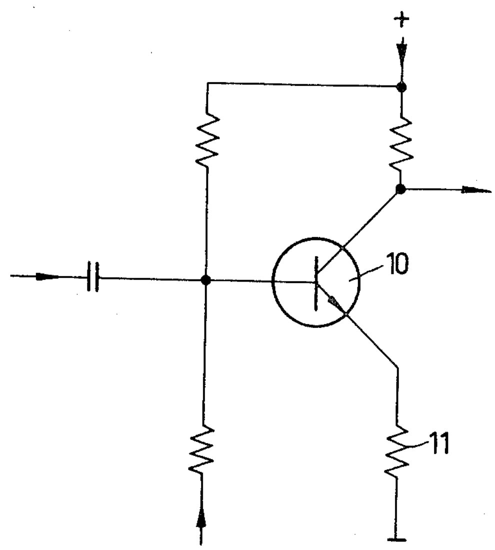


Fig. 3

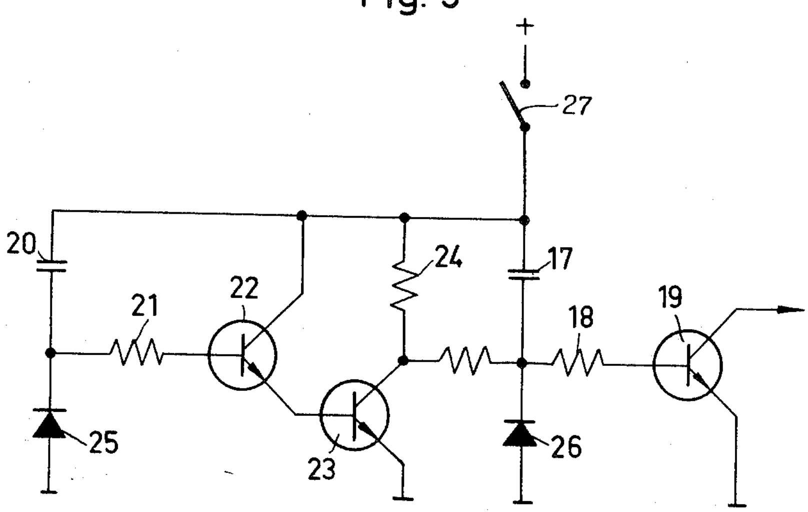


Fig. 4

Inventors:
HANSRICHARD SCHULZ
OSKAR MESECK

By: Michael S. Striker
Attorney

base of said delay transistor in such a manner that the base current of said delay transistor causes said capacitor to become charged, blocking said delay transistor when sufficient charge has accumulated after said predetermined time period.

9. A system as set forth in claim 8, wherein said electrical means comprise a first switch-out transistor; a switch-out resistance-capacitance circuit connected between the collector and base of said switch-out resistor and adapted to determine the switch-out time of said sleep-inducing arrangement; a second switch-out transistor having a base connected to the emitter of said first switch-out transistor, an emitter connected to ground, and a collector connected to the base of said delay transistor.

10. A system as set forth in claim 7, wherein said carrier signal generating means and said modulating signal-generating means each comprise transistor amplifier means having an input and an output; a plurality of RC stages connected between said output and said input; and an emitter-follower circuit having an input connected to the input of said transistor amplifier means, and an output furnishing said carrier signal or said modulation signal.

11. A system as set forth in claim 10, wherein said transistor amplifier means comprise an input transistor and an output transistor and means for overdriving said output transistor.

12. A system as set forth in claim 7, wherein said modulator means generates an amplitude modulated signal whose degree of modulation is adjustable between 0 and 90 percent.

13. A system as set forth in claim 7 also comprising a low-frequency amplifier for amplifying said amplitude-modulated signal.

14. A system as set forth in claim 13, wherein said low-frequency amplifier has a distortion factor of less than 0.5 percent at a 15 watt output.

15. A system as set forth in claim 7, wherein said speaker means comprise a speaker in an acoustically absorbtive conventional speaker cabinet.

16. A system as set forth in claim 7 also comprising a source of direct current; means for applying said modulation signal to said direct current source, thus generating a modulated direct current; and a light source energized by said modulated direct current, thus generating an intensity-modulated light.

17. A system as set forth in claim 16 also comprising filter means arranged in front of said light, said filtering means permitting passage of one color only.

18. A system as set forth in claim 17, wherein said color is blue.

19. A system as set forth in claim 7, wherein said modulator comprises a transistor having an emitter, collector and base; feedback means, independent of frequency, providing feedback from the collector circuit to the base circuit; and an emitter resistor, R, having a value substantially equal to 1/Sa, where Sa is the slope of the curve of collector current plotted against base voltage at the operating point of said transistor.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,576,185 Dated April 27, 1971

Inventor(s) Hansrichard Schulz et al.

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

On the cover sheet [72] "Singen Hohentwich" should read -- Singen Hohentwiel --; [73] "Saba Schwarzwalder Apparate-Bau Anstalf August Schiver Sohne GmbH" should read -- Saba Schwarzwalder Apparate-Bau-Anstalt August Schwer Sohne GmbH --.

Signed and sealed this 30th day of November 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Pate