United States Patent

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[54] **ELECTRONIC MEDICAL WARNING DEVICE**
7 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **340/279,** 128/1, 200/61.47, 340/221, 340/321
[51] **Int. Cl.** **G08b 21/00**
[50] **Field of Search** 340/279, 283, 221, 276, 321; 200/61.47; 128/2.1, 1

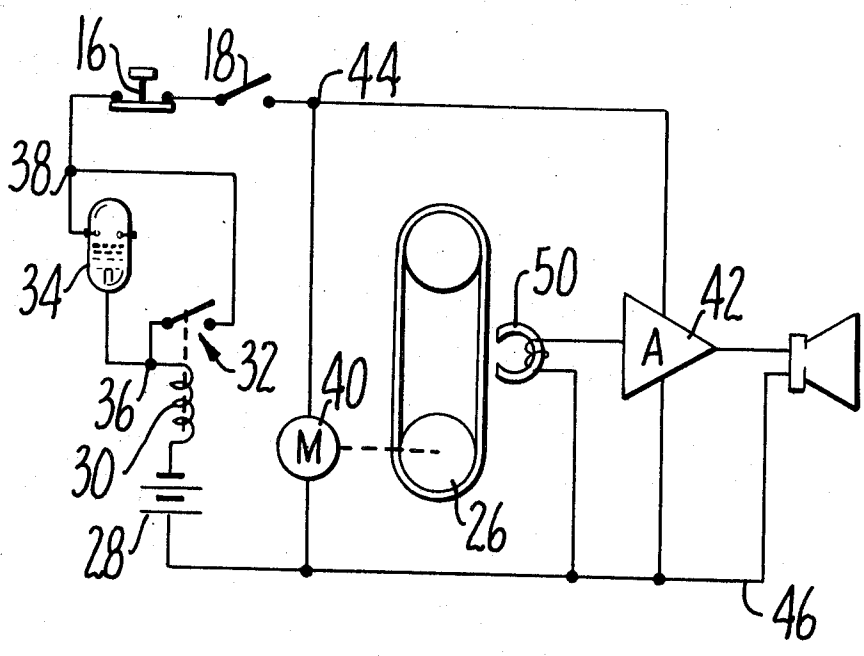
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Assistant Examiner—Scott F. Partridge
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ABSTRACT: An attitude-activated warning device for persons subject to incapacitating and prostrating medical attacks or seizures. The warning device contains a miniature tape recorder with an endless tape repeating an instructional message relating to the medical problem and emergency treatment of the patient carrying the device, a power source, an attitude switch for activating the recorder when vertically disoriented, a latching relay to maintain a power delivery to the recorder when the attitude switch is physically reoriented, and an override switch to manually deactivate the recorder.



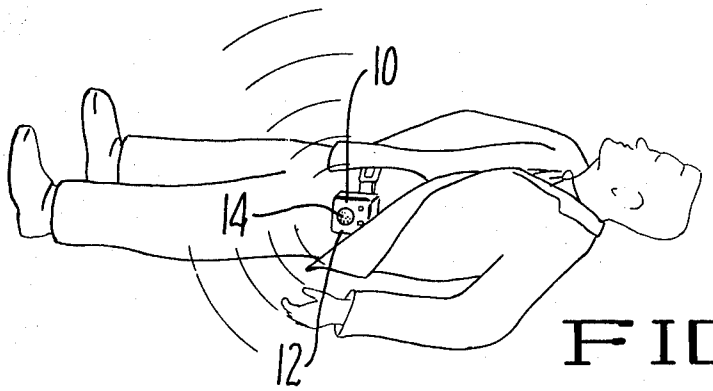


FIG. 1.

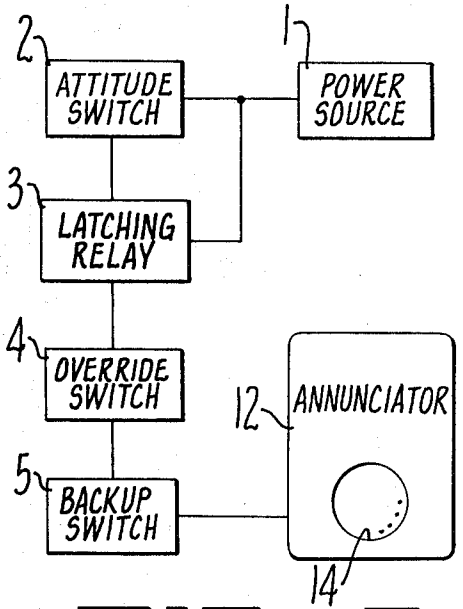


FIG. 3.

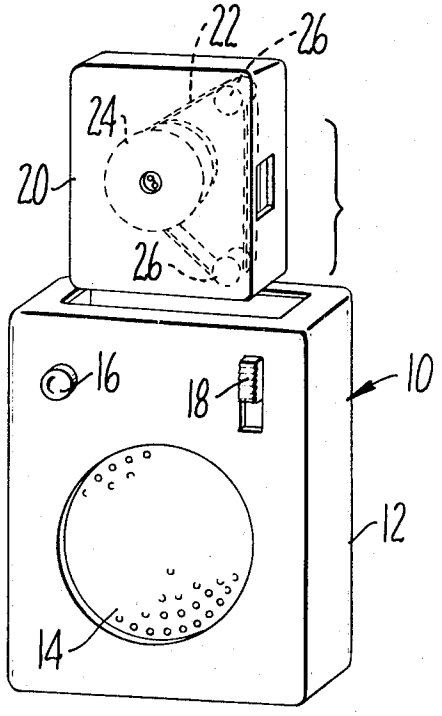


FIG. 2.

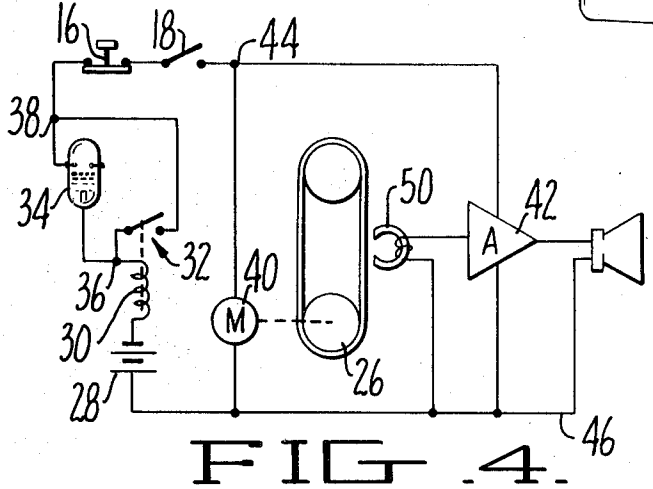


FIG. 4.

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ELECTRONIC MEDICAL WARNING DEVICE

BACKGROUND OF THE INVENTION

Certain medical conditions cause intermittent seizures, strokes or arresting shock which may, for a period, totally incapacitate a patient. Frequency, the attack occurs at an unexpected time and at a place where knowledgeable assistance is unavailable. Heretofore, visual aids, such as identification cards and bracelets, have provided information relating to a particular patient's condition and treatment. However, often these visual devices go unnoticed by bystanders, and the patient remains untreated. In other instances, the patient may inadvertently be physically abused prior to the arrival of professional help. Onlookers generally become panicky and confused when confronted with a patient suffering a disabled attack in public and are often afraid to touch the patient or look for visual identification or medical information.

In the particular case of an epileptic, professional help is usually not needed or desired since the patient is, in almost all instances, fully ambulatory after a seizure. Medical expenses are therefore often unnecessarily incurred by transporting such patient to a hospital.

Other conditions, for example cardiac arrest or heart stoppage, may require immediate treatment such as external cardiac massage prior to the arrival of professional aid. It would be important for the welfare of the patient that information concerning treatment be immediately conveyed to those around him.

SUMMARY OF THE INVENTION

The invented medical warning device broadcasts specific audible information for the care of a patient who is suffering from an unexpected attack. The warning device contains a prerecorded tape message directed to the specific condition of the patient carrying the device. The message may include explanatory information concerning the nature of the condition, the immediate treatment necessary, and the specific aid to be summoned.

The warning device comprises a miniature tape recorder and accompanying control circuitry which functions as an annunciator to broadcast the prerecorded message. Other broadcast means such as recording discs or wire may be employed. The message is preferably recorded on an endless magnetic tape which is continuously repeated when the recorder is activated.

The warning device is activated by a mercury attitude switch which electrically connects a battery power source to the miniature recorder when the warning device undergoes a substantial vertical disorientation upon a patient's collapse. To insure a continuous broadcast of the recorded message when the warning device is reoriented, for instance, when the patient is repositioned or the device is removed from the person of the patient, a latching relay is included in the electrical circuitry in parallel with the attitude switch to maintain the power supply to the recorder components.

The warning device may be deactivated by a manually operated override switch included in the electrical circuitry. In this manner, the recorder can be deliberately stopped when desired.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of the warning device and the manner in which it is carried.

FIG. 2 is an exploded view of the warning device and tape cartridge.

FIG. 3 is a block diagram of the principal elements of the warning device.

FIG. 4 is a circuit diagram of the warning device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Considering FIG. 1 in detail, a warning device 10 illustrated in its environmental use, here attached to the belt of a patient

suffering an incapacitating attack. Locating the warning device of the patient's belt allows the patient the greatest degree of freedom of movement. At that location the warning device maintains a relatively stable vertical equilibrium during ambulatory movement. In FIG. 1 the patient is shown in a supine position. Such position upsets the vertical equilibrium of the warning device causing it to activate. The activated warning device will continuously broadcast a prerecorded instructional message to bystanders. The message can, of course, contain any information relating to the condition and treatment of the particular patient suffering the attack. There exists a variety of medical conditions that are recurring in nature and that subject a patient to prostrating seizure at unexpected moments.

The warning device can be adapted to adequately provide information relating to epileptic seizures, hypoglycemia or insulin shock, cardiac arrest, failure in cardiac pacemaker, or any similar incapacitating condition. The recorded information should naturally be specifically tailored for the individual patient by the patient's physician.

Turning to FIG. 2, the warning device 10 is illustrated in perspective. The warning device comprises an outer case 14 containing a broadcast recorder, power source and accompanying circuitry. On the face of the outer case is a screened speaker orifice 14, a manually operated override switch 16, and a manually operated backup switch 18.

The outer case 12 is adapted to receive a tape cartridge 20 in which is provided a continuous tape 22 (shown in phantom in FIG. 2) tracked on a series of a drive spool 24 and two trailing spools 26 (also shown in phantom in FIG. 2).

The block diagram of FIG. 3 and the circuit diagram of FIG. 4 schematically illustrate the electrical relationship between the principal components controlling the operation of the warning device.

A power source, for instance a dry cell battery, represented by block 1 in FIG. 3, is electrically connected to an annunciator through a control circuit comprising an attitude switch represented by block 2, connected in parallel to a latching relay, represented by block 3, a series-connected override switch, represented by block 4, and a series-connected backup switch, represented by block 5.

The reciprocal relationship of the components for the preferred embodiment of the warning device of FIG. 2, is shown in greater detail in the circuit diagram of FIG. 4.

A DC power source 28 is electrically connected, through a drive coil 30 of a latching relay 32, to a mercury-filled attitude switch 34. The latching relay 32 is connected in parallel with the attitude switch 34 to common terminals 36 and 38. In series with the parallel-connected attitude switch and latching relay are the override switch 16 and the backup switch 18. When the warning device is in a potentially active state, i.e., when the warning device will activate upon a predetermined change in attitude, the override switch 16 and the backup switch 18 are in a normally closed position. The circuitry subsequent to the override switch and backup switch operates the annunciator and connects in parallel a drive motor 40, operating the tape cartridge 20, and a power amplifier 42. The drive motor and power amplifier are connected in common to terminal 44 and ground line 46. The power amplifier amplifies the input signal from a recording head 50 to drive the output speaker 52.

In the potentially active state the attitude switch and latching relay are in an open condition, breaking the power supply to the drive motor and power amplifier. When the warning device containing the control circuitry is displaced a predetermined degree from a vertical equilibrium, the mercury in the attitude switch completes the power circuit to the motor and amplifier. The current surge through the drive coil electromagnetically closes the latching relay to provide an alternate circuit for the power supply.

Thereafter, if the warning device and attitude switch are returned to vertical equilibrium, breaking the electrical circuit through the attitude switch, current will continue to pass to

the motor and amplifier by the alternate path through the latching relay. In this manner the warning device will continue to broadcast its instructional message regardless of any subsequent change in attitude during movement of the stricken patient or removal of the device from the patient's person.

To return the warning device to a potentially active state, the override switch is manually depressed momentarily, breaking the electrical connection between the power supply and the annunciator. The cessation of current through the coil causes the release of the latching relay, breaking the alternate relay circuit. As the override switch is spring-controlled to return to a closed position when released, the warning device will then return to its potentially active state.

The backup switch is included in the circuitry to enable the warning device to selectively be switched "on" to a potentially active state or "off" to an inactive state. When switched "off" the warning device may be stored or transported without any possibility of activating, regardless of the attitude of the device.

What is claimed is:

1. A warning device adapted to be attached to a person prone to incapacitating medical conditions or prostrating seizures comprising an annunciator which when activated repeatedly broadcasts a prerecorded message to inform bystanders of the nature of such person's condition or seizure and how he is to be treated prior to the arrival of medical aid, a power source for connecting an electrical power supply to said annunciator, control means to activate such annunciator when such person passes from an erect to a supine position and to maintain said annunciator in an activated state regardless of any nature of subsequent change of the positional attitude of such person or the warning device, and deactivating means to override the activating control means and return the warning device to a preactivated state.

2. The warning device of claim 1 wherein the annunciator comprises a miniature tape recorder having an endless magnetic tape.

3. The warning device of claim 1 wherein said control means comprises an attitude switch contained in said warning device which closes, completing an electrical circuit between the power supply and the annunciator, when said attitude switch is displaced a predetermined degree from a vertical equilibrium and a latching relay electrically connected in parallel with said attitude switch which closes, completing an alternate electrical circuit between the power supply and the annunciator, when said attitude switch closes, said latching relay remaining closed regardless of any subsequent opening of the attitude switch when returning to a vertical equilibrium.

4. The warning device of claim 1 further comprising a backup switch electrically connected between said annunciator and said power source, said backup switch having an "on" position for normal operational use of the warning device and an "off" position which totally deactivates the device regardless of the attitude of the warning device.

5. The warning device of claim 3 wherein said deactivating means comprises an override switch electrically connected between said annunciator and said power source, which, when temporarily opened, terminates the power supply through the control means to the annunciator to open the latching relay of the control means.

6. A method of safeguarding a person who may be prone to a prostrating seizure comprising attaching to such person an annunciator adapted when activated to inform bystanders of the nature of such person's seizure and how he is to be treated pending the arrival of medical aid, activating said annunciator when such person passes from an erect to a supine position, and maintaining said annunciator activated for a predetermined period of time regardless of any nature of change of the positional attitude of such person during said period of time.

7. A method of safeguarding a person subject to incapacitating medical attacks or prostrating seizures comprising attaching to such person a warning device adapted when activated to repeatedly broadcast a prerecorded instructional message relating to such person's condition to bystanders, activating said warning device when such person passes a predetermined degree from a vertical equilibrium, maintaining said warning device activated regardless of any nature of change of the positional attitude of such warning device, and deactivating such device by an affirmative act after the necessary information has been received.

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