April 21, 1970 N. C. MILATZ 3,507,110

AUDIO CLOCK

Filed July 3, 1967 2 Sheets-Sheet 1

FIG. 1

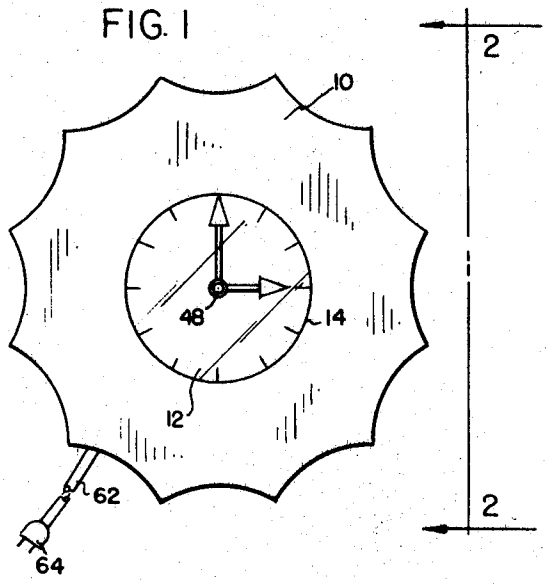
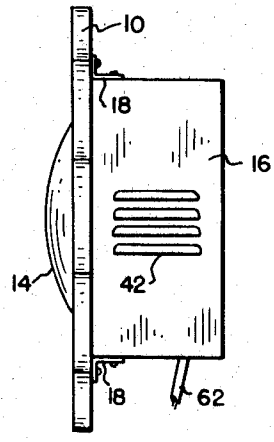


FIG. 2



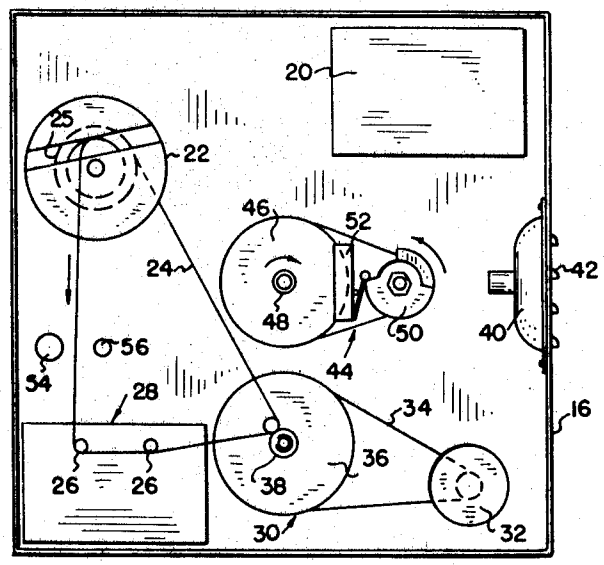


FIG. 3

INVENTOR

NORMAN C. MILATZ

BY Adolph G. Martin

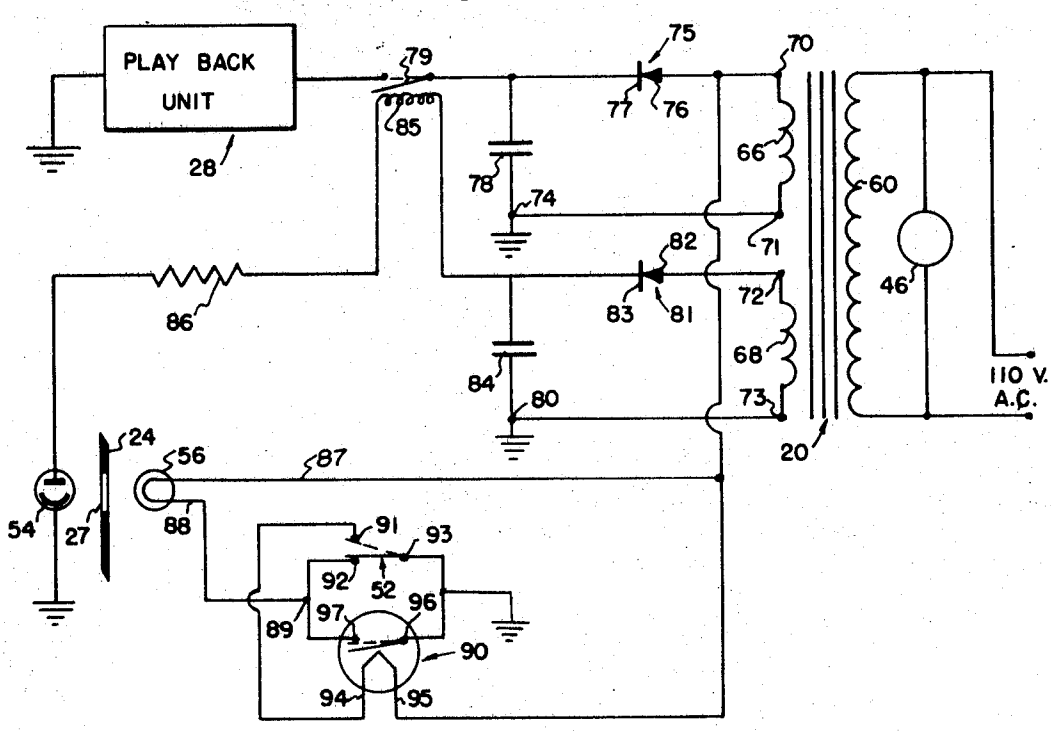
ATTORNEY

April 21, 1970 N. C. MILATZ 3,507,110

AUDIO CLOCK

Filed July 3, 1967 2 Sheets-Sheet 2

FIG. 4



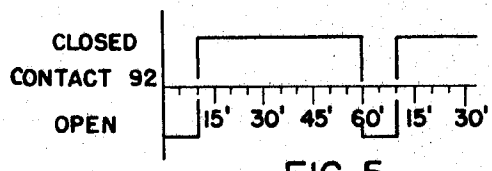


FIG. 5

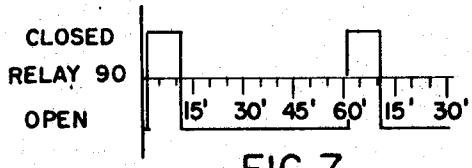


FIG. 7

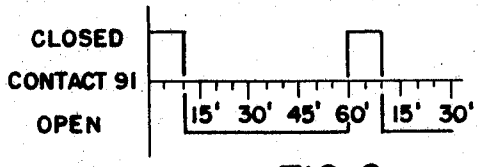


FIG. 6

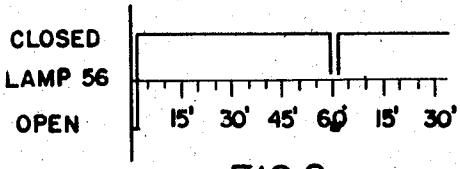


FIG. 8

INVENTOR
NORMAN C. MILATZ
BY Adolph G. Martin
ATTORNEY

United States Patent Office 3,507,110
Patented Apr. 21, 1970

3,507,110

AUDIO CLOCK

Norman C. Milatz, 2382 Casper, Detroit, Mich. 48209

Filed July 3, 1967, Ser. No. 650,753
Int. Cl. G04c 21/14
U.S. Cl. 58—14 2 Claims

ABSTRACT OF THE DISCLOSURE

An audio clock having a timer that actuates a self-contained tape playback unit so as to announce the time, and deliver preselected messages at spaced intervals.

BACKGROUND OF THE INVENTION

This invention relates to time measuring devices generally, and more particularly to an audio clock which is well adapted for use in hospitals and homes for the sightless where the patients or inmates are unable to view the clock face. It also provides a convenient means for teaching children to read time, and conveying interesting and instructive messages at spaced intervals. Alarms clocks, cuckoo clocks, chime clocks and others all contain a means for creating an audible alarm or time signal, but none are equipped to announce the time and convey messages at spaced intervals.

SUMMARY OF THE INVENTION

This invention consists of an audio clock having a face for visually displaying the time, and associated means for periodically actuating a self-contained tape playback unit to announce the time at spaced time intervals. The tape in the playback unit is a continuous loop, having thereon a series of time announcements and preselected messages separated by transparent control sections which are utilized to synchronize the tape with the time indicated on the clock face.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is an elevation view showing the relative size of the clock face and frame of the applicant's audio clock.

FIGURE 2 is an elevation view, taken substantially on plane 2—2 in FIGURE 1, showing the case and the speaker louvers on the side.

FIGURE 3 is an enlarged elevation view of the clock case, detached from the frame, showing location of the various electrical and electromechanical components thereon mounted.

FIGURE 4 is a schematic diagram shownng the electrical circuitry of the applicant's audio clock.

FIGURE 5 is a diagram showing the timing provided by the cam operated switch **52** in conjunction with contact **92**.

FIGURE 6 is a diagram showing the timing provided by the cam operated electrical switch **52** in conjunction with contact **91**.

FIGURE 7 is a diagram showing the timing provided by the time delay relay **90**.

FIGURE 8 is a diagram showing the timing provided for the incandescent lamp **56** operatively associated with the photoelectric cell **54**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Physical structure

Referring to the drawing in the application, nnumeral **10** designates an ornamental frame having centrally disposed therein a clock face **12** enclosed with a convex transparent cover **14**. A case **16**, attached to the frame

10 by angle brackets **18**, has mounted therein the various electrical and electromechanical components comprising the applicant's invention. A magnetic core transformer **20**, located in one corner of the case **16**, provides low voltage power for operating the applicant's clock.

A circular container **22**, mounted in the case **16**, has therein a continuous audio tape **24** stored on a rotatable reel **25**. The audio tape **24** is looped around a pair of spaced guide pins **26** provided by a playback unit **28**. A drive unit **30** for the audio tape **24** comprises a motor **32** connected by a belt **34** to a pulley **36** which rotates a resilient friction roller **38**. A speaker **40**, for the tape playback unit **28**, is mounted on one side of the case **16** which is provided with spaced louvers **42** for emitting sound.

A timing unit **44**, mounted centrally in the case **16**, has a motor **46** driving a clock shaft **48**, and an adjustable cam **50**. A single pole double throw switch **52**, operated by the adjustable cam **50**, is connected into the control circuit in a manner to be hereinafter described in detail. A photoelectric cell **54** is mounted in the case **16** for operation by a small incandescent lamp **56** placed on the opposite side of the audio tape **24**.

Electrical circuitry

The transformer **20** has a primary winding **60**, which is connected to a source of alternating current electrical potential by means of an extension cord **62** and a plug **64**. A pair of secondary coils **66** and **68** on the transformer **20** have terminals **70**, **71** and **72**, **73** respectively. Terminal **71** on the secondary transformer coil **66** is connected to a grounded terminal **74**. The other terminal **70** of the secondary coil **66** connects directly to a silicon diode **75** having an anode **76** and a cathode **77**.

The cathode **77** is connected to grounded terminal **74** through a filter capacitor **78**. The cathode **77** also connects to a standard tape playback unit **28**, through a normally open relay contact **79**. Terminal **73** of the transformer coil **68** connects directly to a grounded terminal **80**. The other terminal **72** of the transformer coil **78** is connected to silicon diode **81** having an anode **82** and a cathode **83**. The cathode **83** is connected to a grounded terminal **80** through a filter capacitor **84**. The cathode **83** is also connected to one terminal of a relay coil **85** which controls the normally open relay contact **79**.

The other terminal of the relay coil **85** connects to one lead of the photoelectric cell **54** through a current limiting resistor **86**. The other lead of the photoelectric cell **54** is connected directly to ground. The incandescent lamp **56**, serving as a light source for the photoelectric cell **54**, has one lead **86** connected directly to terminal **70** of the secondary transformer coil **66**. The other lead **88** of the incandescent lamp **56** connects to a common terminal **89** which provides a circuit to ground either through the double pole switch **52** or a time delay relay **90**.

The double pole switch **52**, operated by the adjustable cam **50**, has two contacts **91** and **92**, and a grounded common terminal **93**. Contact **92** is connected directly to common terminal **89**, and contact **91** connects to one lead **94** of the heating element in the time delay relay **90**. The other lead **95** of the heating element is connected directly to terminal **70** of the secondary transformer coil **66**. The time delay relay **90** has two contacts **96** and **97** which connect respectively to ground and common terminal **89**.

The preceding discussion completes a description of the structure and circuitry comprising the applicant's invention as herein disclosed; however, to provide a more thorough understanding and appreciation of the subject matter presented, a brief discussion will be directed to the manner in which the applicant's audio clock operates in performing its intended function.

Modus operandi

In practice, time announcements and messages are recorded on the continuous audio tape **24** by the manufacturer and placed in the playback unit **28**. For the purposes of this discussion, it will be assumed that the time announcements and messages are to be played at hourly intervals. However, regardless of the time interval selected, and the messages recorded, the operation is substantially the same; therefore, a discussion of operation will be limited to a selected time interval of one hour.

Accordingly, a timing unit **44** is installed by the manufacturer which will rotate the adjustable cam **50** a full 360 degrees every hour. The adjustable cam **50** is then adjusted to shift the switch **52** once every 60 minutes from the full line position on the contact **92** to the broken line position on contact **91**, as shown in FIGURE 4. The adjustable cam **50** permits the switch **52** to remain in this position for approximately 10 minutes, as shown by the timing diagram of FIGURES 5 and 6, at the end of which 10-minute interval, it is returned to the full line position on the contact **92**.

In preparing the tape **24** for use in applicant's audio clock, a clear section **27**, capable of transmitting light, is provided between each recorded announcement for use in maintaining synchronization between the visual time on the clock face **12** and the time announcements on the audio tape **24**. When it is desired to place the clock in operation, the plug **64** is inserted into an electrical outlet, not shown, thereby providing a source of alternating current potential for energizing the transformer **20**.

Electrical power is thus delivered to the motor **46**, which produces rotation of the clock shaft **48** and the adjustable cam **50** in the arrow directions indicated in FIGURE 3. With the opening on the adjustable cam **50**, as shown in FIGURE 3, the switch **52** closes immediately on contact **91** thereby energizing the heating element of time delay relay **90**, and simultaneously opening the electrical circuit of the incandescent lamp **56**.

This interrupts light reaching the photoelectric cell **54** through the clear sections **27** in the audio tape **24** for approximately 2 seconds, as shown by the timing diagram of FIGURE 8. Such interruption increases the internal resistance of the photoelectric cell **54** in the circuit of the relay coil **85** sufficiently to allow the normally open relay contact **79** to close. This immediately directs power to the playback unit **28** thereby energizing its amplifier and drive unit **30** for the audio tape **24**.

This moves the clear section **27** of the audio tape past the photoelectric cell **54**, and causes the messages recorded thereon to be played through the speaker **40** of the playback unit **28**. In approximately 2 seconds, as indicated by the timing diagram of FIGURE 7, the time delay relay **90** closes on contact **97**, again completing the circuit of the incandescent lamp **56**. In this way, the playback unit **28** is interrupted when the next clear section **27** on the audio tape reaches a position between the photoelectric cell **54** and the incandescent lamp **56** insuring the playing of only one message.

The time delay relay **90** remains in the closed position for approximately 10 minutes until the switch **52** is again shifted by the rotating cam **50** to the full line position on contact **92**. This immediately opens the circuit to the heating element in the time delay relay **90**, which permits the relay contact to open in approximately 2 seconds, as shown by the timing diagram of FIGURE 7. Such delay in the opening of the time delay contact provides ample time for the switch **52** to close on contact **92** so as to avoid an interruption in the circuit of the incandescent lamp **56**.

Synchronization between the visual time and the time announcements on the audio tape **24** is provided when the clock is assembled. This is done by coordinating the audio tape **24** with the time shown on the clock face **12**, and placing the adjustable cam **50** in a corresponding position. As both the adjustable cam **50** and the clock shaft **48** are driven by a common motor **46**, mis-synchronization is thus prevented whenever the clock is withdrawn from service temporarily, or stopped as a result of a power failure.

In practice, the frequency of time announcements and recorded messages is selected to meet the requirements peculiar to the use for which the clock is intended. The messages may be both informative and humorous, and may be rendered more interesting by using a voice which is well known and readily recognizable. It is possible to modify the applicant's clock for use as either a table or floor model, and provide an open face so as to further adapt it for use by the sightless.

Based upon the foregoing discussion, the applicant is of the opinion that his invention has fulfilled a long-felt need in the field of timing devices generally, and that he has made a valuable contribution to the related art. However, while the invention was described with reference to the details of a single embodiment, it will be appreciated by those familiar with the art that the principles involved are susceptible of numerous other modifications.

Therefore, I claim as new and desire to secure by Letters Patent:

1. An audio clock comprising a timer having a driven cam, a switch operated by the driven cam, a playback unit having a continuous audio tape with messages recorded thereon, a first electrical circuit including a relay switch for operating the playback unit, electrical means controlling the relay switch in the first electrical circuit, a second electrical circuit including the cam operated switch connected in parallel with a time delay relay switch for controlling the electrical means, and a source of power for the timer, electrical circuits and playback unit; said cam operated switch being adapted to close at a preselected time interval thereby energizing the second electrical circuit which allows the relay switch to close and energize the first electrical circuit so as to activate the playback unit, and simultaneously therewith energize the time delay relay which is adapted to de-energize the first electrical circuit after a preselected time interval to insure the playing of only a single recorded message on the audio tape.

2. The audio clock of claim **1** in which the electrical means controlling the relay switch in the first electrical circuit comprises a light transmitting section on the continuous audio tape between each recorded message, a source of light on one side of the audio tape and a light sensing device on the other side of the audio tape operated by light received from the light source through the light transmitting sections of the audio tape.

References Cited

UNITED STATES PATENTS

2,971,716	2/1961	Sampson	250—219
3,376,700	4/1968	Davis et al.	58—14

RICHARD B. WILKINSON, Primary Examiner

L. R. FRANKLIN, Assistant Examiner