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Johnson

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[54] **COMBINED CLOCK AND AUDIO BROADCAST RECEIVER WITH AUTOMATIC CHIMES**

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[52] **U.S. Cl.**..... **325/396**, 179/100.1 C, 179/100.2 S

[51] **Int. Cl.** **H04b 1/16**

[58] **Field of Search** ... 325/396; 179/100.1, 100.2 S, 179/100.1 C, 6 TA

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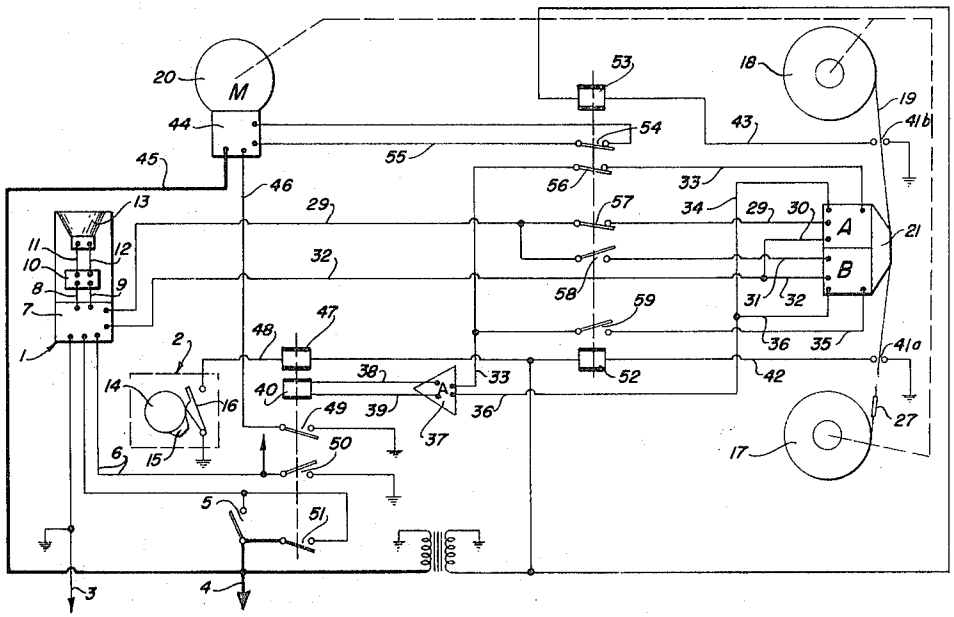
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[57] **ABSTRACT**

A clock utilized in conjunction with a broadcast receiver is coordinated with a control so that a prerecorded audible time chime signal is automatically played directly through the loudspeaker of the receiver. The clock and control cause the chime signal to be played through the speaker, whether the receiver switch is in on or off position. When the receiver is on and broadcast material is being directed through the speaker, the control substitutes the chime signal for the broadcast material. The control system is connected between the clock and the audio stage of the receiver and is adapted to by-pass the receiver's on-off switch to provide power to the receiver in the event the switch is in off position. The control is actuated by a switch which is responsive to the position of a clock shaft and, in the embodiment shown, includes a pair of tape reels which are driven in forward and reverse direction in response to control signals on the tape. The tape is four track and includes a pair of control signal channels and a pair of audio chime channels, one of each channel being provided for each direction of tape movement. The tape direction is reversed at either end in response to control signals, to thereby provide a continuously operating automatic system. The chime changes with the change in time to provide the correct time of day.

9 Claims, 2 Drawing Figures



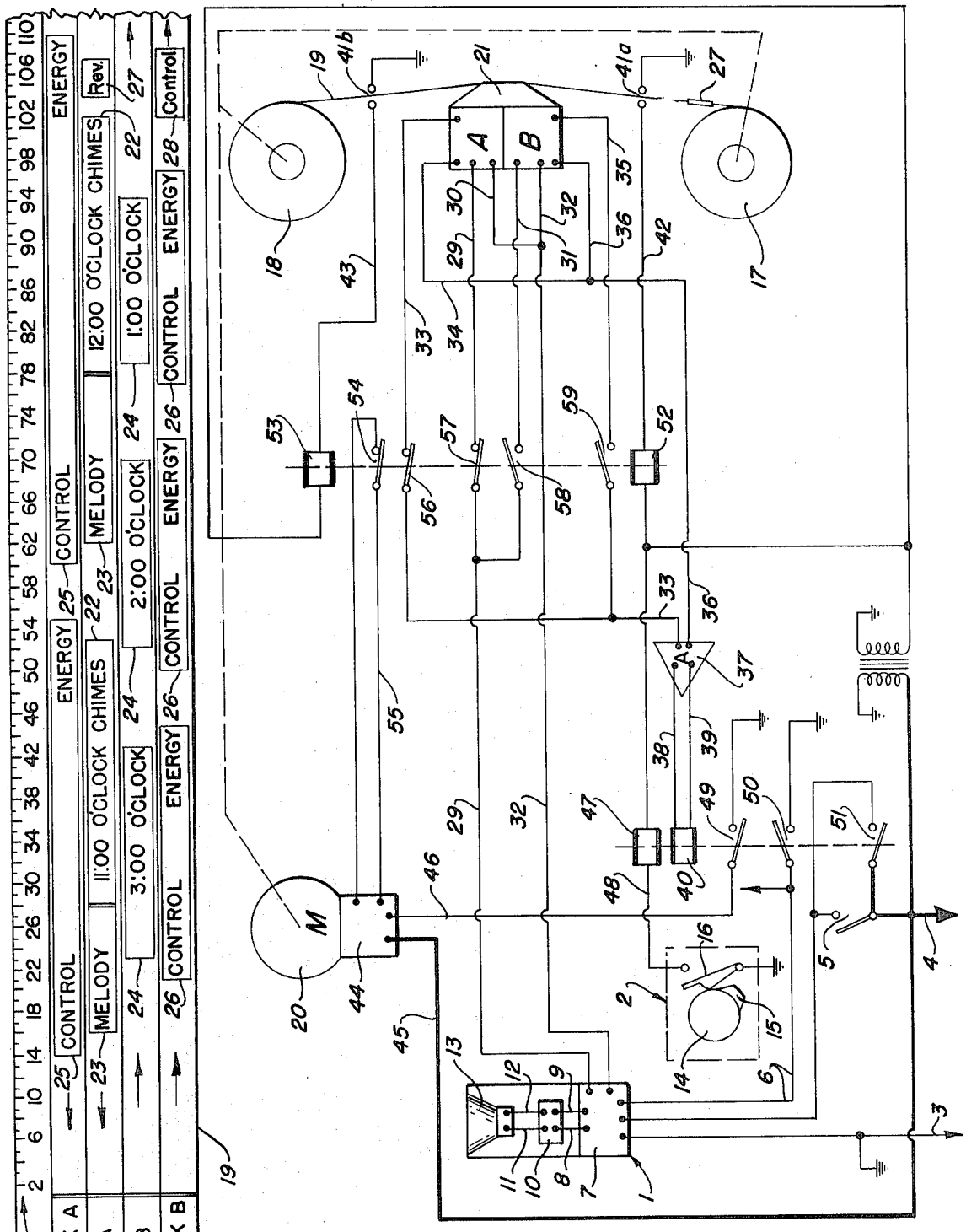


FIG. 2

FIG. 1

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COMBINED CLOCK AND AUDIO BROADCAST RECEIVER WITH AUTOMATIC CHIMES

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a combined clock and audio broadcast receiver with automatic chimes, and more particularly to a clock radio or TV with clock which is provided with chimes to signal the passing of time.

Clock radios are a popular modern convenience, and TV sets with clocks have recently been introduced. Heretofore, the clocks have been utilized to visually tell time and often to control the on-off functions of the set, or possibly of some external appliance. To the knowledge of the inventor, none of these receivers have utilized the clock to provide an audible chime to indicate a time interval, such as an hour, half-hour or quarter-hour.

The present invention is directed to a unique concept wherein a clock utilized in conjunction with a broadcast receiver is coordinated with a control so that a pre-recorded audible time chime signal is automatically played directly through the loudspeaker of the receiver. Further in accordance with the invention, the clock and control cause the chime signal to be played through the speaker, whether the receiver switch is in on or off position. When the receiver is on and broadcast material is being directed through the speaker, the control substitutes the chime signal for the broadcast material.

More particularly, the control system is connected between the clock and the audio stage of the receiver and is adapted to by-pass the receiver's on-off switch to provide power to the receiver in the event the switch is in off position. The control is actuated by a switch which is responsive to the position of a clock shaft and, in the embodiment shown, includes a pair of tape reels which are driven in forward and reverse direction in response to control signals on the tape. The tape is four track and includes a pair of control signal channels and a pair of audio chime channels, one of each channel being provided for each direction of tape movement. The tape direction is reversed at either end in response to control signals, to thereby provide a continuously operating automatic system. The chime changes with the change in time to provide the correct time of day.

DESCRIPTION OF THE DRAWING

The accompanying drawing illustrates the best mode presently contemplated by the inventor for carrying out the invention.

In the drawing:

FIG. 1 is a schematic circuit diagram of a device constructed in accordance with the invention; and

FIG. 2 is a schematic showing of a portion of the pre-recorded tape, and including a reference scale.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1 of the drawing, the concept of the invention is contemplated for use with a broadcast receiver, such as a radio 1 having associated therewith, either integrally or even separate therefrom, a clock 2.

Radio 1 may be battery operated, but is shown as connected to an outside electrical source through

power lines 3, 4. In either event, power to the radio is controlled by a manually operable on-off switch 5 disposed in power line 4. Radio 1 also includes an antenna line 6 which provides the input to a broadcasting receiving stage 7, which in turn, feeds through lines 8, 9 to an audio amplifier stage 10. Stage 10 connects through aduio lines 11, 12 to loudspeaker 13.

Clock 2 may be of any suitable type and includes a plurality of shafts which rotate at different speeds. The invention contemplates that the chimes are to be played at hourly, half-hour or quarter-hour intervals. A continuously rotatable clock shaft 14 is used to initiate operation of the system, and includes a single control cam 15 thereon. Cam 15 closes a normally open switch 16, as will be described. When a single cam 15 is used, shaft 14 must be chosen so that it makes one complete rotation in the time interval desired. If several cams are used, shaft 14 must rotate in the desired interval between cams. In the present embodiment, it will be assumed that shaft 14 rotates completely once per hour.

The control system of the invention includes means to supply an audible chime signal to speaker 13. For this purpose, a pair of tape supply reels 17, 18 are provided with a magnetic recording tape 19 of finite length extending therebetween. The reel-tape assembly may be of the popular cassette or cartridge type if desired. Reels 17, 18 are driven in both directions in any suitable well-known manner, as by a reversible motor 20. As tape 19 travels between reels, it passes a pick-up head 21 of any suitable well-known type.

Head 21 is 4-track in nature to correspond with the four tracks on tape 19. Referring to FIG. 2, tape 19 is pre-recorded and the tracks comprise two forward tracks identified as chime track A and control track A, and two reverse tracks identified as chime track B and control track B.

Chime track A is provided with audio chime portions 22 which are longitudinally spaced apart and pre-recorded with progressively increasing time interval chimes, together with Westminister type melody portions 23 if desired. Thus, that portion of the track A shown includes 11 o'clock and 12 o'clock chimes, although the track in its entirety would likely include from 1 o'clock to 12 o'clock. Chime track B is adapted for reverse travel and also includes similar spaced audio chime portions 24, those shown being for 1–3 o'clock.

Control tracks A and B are provided with longitudinally spaced control signal portions 25, 26 which are coextensive with and overlappingly extend beyond their respective audio chime portions 22 and 24.

A reversing signal portion 27, of metal foil or the like, is provided adjacent the tape end and is shown in FIG. 2 as on chime track A only. A further reversing control signal portion 28 is provided on control track B for purposes to be described. Portion 28 is coextensive with portion 27 and extends beyond it. Since it is contemplated that the tape operate over long periods of time without attention, similar reversing portions would also be disposed at the other tape end.

Tape chime and control tracks A and B provide the input to tape head 21. The outputs of the head comprise four pair of leads: leads 29, 30 corresponding to chime track A; leads 31, 32 corresponding to chime track B; leads 33, 34 corresponding to control track A; and leads 35, 36 corresponding to control track B.

As shown, lead **31** joins lead **29** and lead **30** joins lead **32**, with leads **29** and **32** providing the audio signal connection to receiver receiving stage **7**. Similarly, lead **34** joins lead **36**, with leads **33** and **35** providing the input connection to a signal amplifier **37**. The output leads **38, 39** of amplifier **37** are connected to a holding solenoid **40**, for purposes to be described.

Tape reverse control switches **41***a*, **41***b* are positioned in the tape path adjacent respective reels **17, 18** and are connected in lines **42, 43** respectively.

Motor **20** is connected through a suitable motor reversing relay unit **44** to leads **45, 46.**

A system initiating solenoid **47** is disposed in lead **48**, which forms a branch of line **42**, the latter also containing switch **16.** Solenoids **40** and **47** are in line and are designed to actuate, as will be described: (a) motor energizing switch **49** in line **46**, (b) antenna grounding switch **50** in line **6**, and (c) by-pass switch **51** in line **4.** Switches **49, 50** and **51** are normally open, as shown.

A pair of solenoids **52, 53** are disposed in respective lines **42** and **43** and are in line for control of: (a) motor reversing switch **54**, disposed in a lead **55** connected to relay **44**, (b) control track A switch **56** in line **33**, (c) chime track A switch **57** in line **29**, (d) chime track B switch **58** in line **31**, and (e) control track B switch **59** in line **35.** Switches **54** and **56-59** have no normal position.

OPERATION

For purposes of describing the operation of the device, it will be assumed that tape has been winding forwardly from reel **17** to reel **18**, and that the tape at head **21** is stopped at **10** on reference scale **60** in FIG. **2**, or just before the 11 o'clock chime. Solenoids **40** and **47** are not energized, so that switches 49–51 are open. Solenoids **52** and **53** and also de-energized, but the last energization of solenoid **53** closed switches **54, 56** and **57** and opened switches **58** and **59**, as shown.

The broadcast receiver switch **5** may be in either on or off position.

It is 11 o'clock. Clock shaft **14** turns to a known angular position so that cam **15** closes switch **16.** This energizes system initiating solenoid **47** to close switches 49–51. Switch **49** energizes motor **20** and the tape drive and switch **50** grounds out and disconnects the receiver input signal from antenna line **6** so that if a program is being played, it will stop. Also, switch **51** by-passes switch **5** to turn the receiver on if it is off.

Tape **19** feeds across head **21** towards reel **18.** Control track A control signal portion **25**, starting at about **14** on scale **60**, starts to move across head **21**, transmitting the signal through switch **56** to amplifier **37** and hence to energize solenoid **40.** Shortly after this, the continued turning of cam **15** permits switch **16** to open, which de-energizes solenoid **47**, and solenoid **40** now substitutes for solenoid **48** and alone maintains switches 49–51 closed.

Shortly after single signal portion **25** starts across head **21**, a single audio track A portion **22, 23** begins passing the head. See **16** on scale **60.** The chime is transmitted through switch **57** to receiver **7** and is broadcast through speaker **13.**

At the termination of the audio chime, control signal portion **25** continues for a few seconds. See **55** on scale **60.** When portion **25** terminates, solenoid **40** is de-energized and the system returns to the original inactive condition.

The 12 o'clock chime would operate in the same manner as described above. However, at the end of this chime, the respective control signal portion **25** extends well beyond audio portion **22** so that the tape keeps moving until reversing signal portion **27** contacts and closes switch **40.** This energizes solenoid **52** to open switches **54, 56** and **57** and close switches **58** and **59.** Switch **54** thereby acts through relay **44** to reverse the drive direction of motor **20.** Switches **56** and **57** thereby disconnect audio and control tracks A from receiver **7** and amplifier **37**, respectively. Closing of switches **58** and **59** now connect audio and control track B to receiver **7** and amplifier **37**, respectively.

Control portion **28** on track B takes over immediately to feed tape **19** toward reel **17** long enough to move signal portion **27** from switch **41***a* back onto the reel, thus opening the switch. The system will again become inactive until 1 o'clock.

When cam **15** closes switch **16**, similar events will occur as described above in relation to 11 o'clock, except that the control signal from control track B will be fed through now closed switch **59** to amplifier **37**, and the audio chime from audio track B will be fed through now closed switch **58** to receiving stage **7.** Thereafter, at every selected time interval, the chime action sequence will operate. When reel **18** is almost exhausted, a reversing signal portion on the tape, similar to portion **27** and not shown, will close switch **41***b* and reverse the system's condition and operation.

While the clock and electrical control system is contemplated as being integral with the broadcast received with its housing and frame, they could be separately housed without departing from the spirit of the invention. Also, if a reversing system isn't desired, certain broad concepts of the invention could still be utilized with a so-called endless tape system. Furthermore, if desired, a manual switch (not shown) could be placed in lead **48** to de-activate the chime system altogether.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention:

1. A device for signalling the passing of time comprising, in combination:

a. a broadcast receiver having a signal input means connected to a signal processing circuit for driving a speaker,

b. a clock operatively associated with said receiver,

c. means including a record means having a plurality of chime signals carried therein and being responsive to said clock for playing one of said prerecorded audible time chime signals through said signal processing circuit and broadcast receiver speaker automatically at desired time intervals, each of said chime signals being related to different times and changing commensurate with the change in time to provide an audio indication of the correct time of day, and

d. switch means for actuating of said receiver and including selection means to operate the receiver to process the broadcast signals and having automatic clock responsive means to activate said signal processing circuit independently of said selection means and to simultaneously operate said record means for a preselected time and thereby provide

for playing of said pre-recorded chime signals through said speaker.

2. The device of claim 1:

a. which includes an on-off switch for said receiver,

b. and wherein said signal playing means includes means to automatically by-pass said switch so that said chime signal is played through said broadcast receiver speaker whether said switch is in on or off position.

3. The device of claim 1:

a. wherein said receiver includes means to receive transmitted broadcasts and play them through said receiver speaker,

b. and wherein said signal playing means includes means operable to automatically substitute said chime signal for said transmitted broadcast at said receiver speaker.

4. The device of claim 1:

a. wherein said receiver includes means to receive transmitted broadcasts and play them through said speaker,

b. which includes an on-off switch for actuating said last-named means,

c. wherein said signal playing means is operable through said speaker whether said switch is in on or off position,

d. and wherein said signal playing means is operable to substitute said chime signal for said transmitted broadcast when said switch is in on position.

5. A device for signalling the passing of time comprising, in combination:

a. a broadcast receiver having a broadcast signal receiving input and a speaker,

b. a clock having a continuously rotatable shaft,

c. a tape mechanism including:

1. tape supply means,

2. a magnetic tape,

3. a tape head over which said tape extends,

4. and a motor for driving, said tape supply means to feed said tape across said head,

d. said tape having time chimes pre-recorded along the length thereof in a plurality of longitudinally spaced sections corresponding to progressively increasing times, said sections providing an input to said head,

e. said head having an audio output operably connected to said receiver,

f. means responsive to the angular position of said clock shaft to:

1. disconnect a broadcast signal at said receiver input,

2. and initiate operation of said motor to feed a single time chime section of said tape across said head so that the chime signal is fed to the head output and to said receiver and speaker,

g. and means to stop said motor and reconnect said receiver input to a broadcast signal when said single time chime section has passed said head.

6. In the device of claim 5:

a. an on-off switch for said broadcast receiver,

b. and means responsive to the angular position of said clock shaft to by-pass said switch so that said chime signal will be played through said speaker whether said switch is in on or off position.

7. In the device of claim 5:

a. a plurality of longitudinally spaced prerecorded control signal portions on said tape, with said portions being generally co-extensive with said time chime sections,

b. said portions comprising a second input to said head,

c. said shaft position responsive means including an initiating control,

d. a holding control,

e. a second head output,

f. and means responsive to said second head output, as a control signal portion passes said head, to actuate said holding control to substitute the latter control for said initiating control as said shaft continues to rotate.

8. The device of claim 7 in which said holding control activating means serves as the motor stopping and receiver input reconnecting means by de-activating said holding control when a said control signal portion passes beyond said head.

9. The device of claim 7:

a. wherein said tape and head are of the 4-track type and which includes a secondary plurality of longitudinally spaced time chime sections on a third track as well as a second plurality of longitudinally spaced pre-recorded control signal portions on a fourth track,

b. one of each said sections and portions being recorded for reverse play,

c. wherein said motor is reversible,

d. and means for reversing said motor when said tape has reached a predetermined point for subsequent playing of said second chime sections and control by said second control signal portions.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,795,866 Dated March 5, 1974

Inventor(s) Albert C. Johnson

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

Page 1, Inventor's address, delete "616 Lake View Ave." and substitute therefor ---616 East Lake View Ave.---

Col. 3, line 36, delete "and" , second occurrence, should read -- are --.

Col. 5, line 39, delete the comma (,) after "driving"

Col. 6, line 38, delete "secondary" and substitute therefor ---second---

Claim 4 has been printed in its original unamended form rather than as amended in Amendment dated October 27, 1972, and should read as follows:

---4. The device of claim 1:
(a) wherein said broadcast receiver includes means to receive transmitted broadcasts and play them through said receiver speaker,
(b) which includes an on-off switch for actuating said last-named means,
(c) wherein said signal playing means includes means to automatically by-pass said switch so that said chime signal is received through said broadcast receiver speaker whether said switch is in on or off position,
(d) and wherein said signal playing means includes means operable to automatically substitute said chime signal for said transmitted broadcast at said receiver speaker when said switch is in on position.

Signed and sealed this 1st day of October 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.