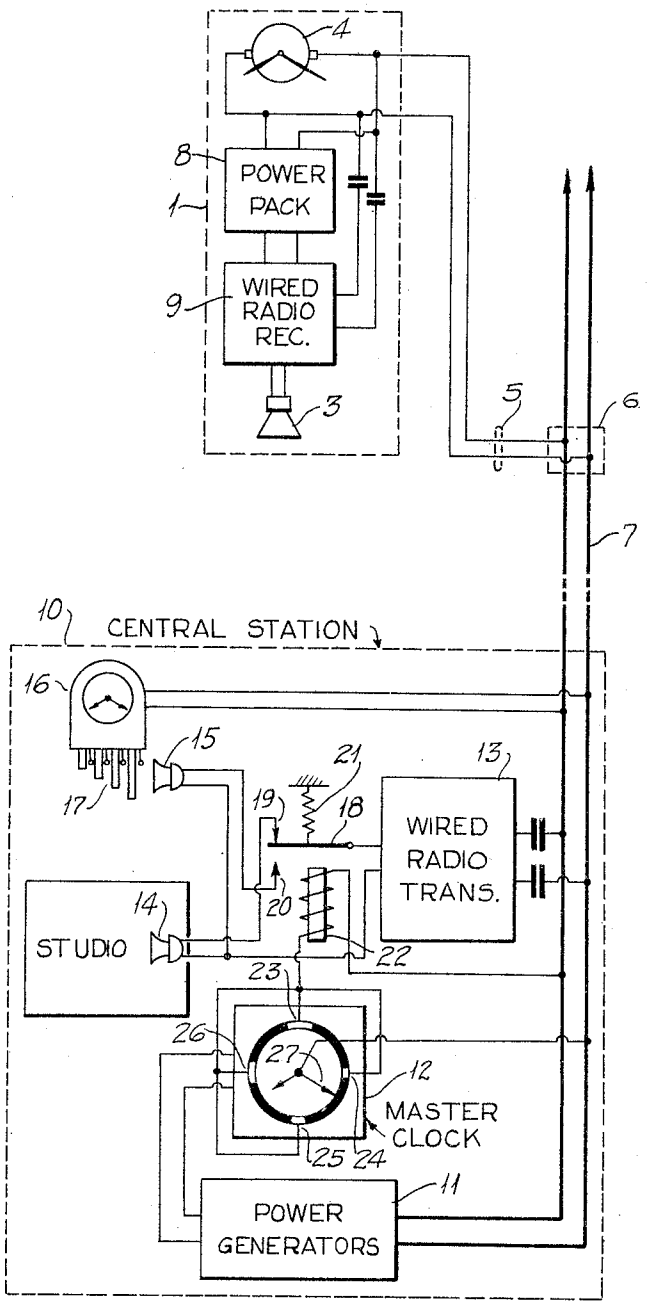
April 25, 1933. A. M. TROGNER 1,905,193

COMBINED CLOCK AND RADIO SYSTEM

Filed May 28, 1931 2 Sheets-Sheet 1

FIG. 1



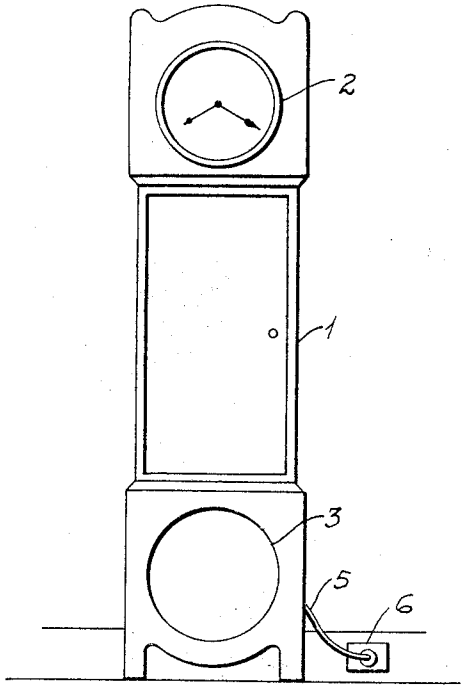
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Fig. 2



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UNITED STATES PATENT OFFICE

ARTHUR M. TROGNER, OF MAPLEWOOD, NEW JERSEY, ASSIGNOR TO WIRED RADIO, INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

COMBINED CLOCK AND RADIO SYSTEM

Application filed May 28, 1931. Serial No. 540,632.

My invention pertains in general to electrical clocks and time-keeping apparatus and specifically relates to an electrical time-keeping system for cooperation with a wired radio broadcast system.

One of the objects of my invention consists in providing a combined clock and radio system in which an electrical clock and a radio receiver operate under control of a central station to furnish time service.

Another object consists in providing a combined clock and radio system in which an electrical clock is provided with radio receiving apparatus for audibly reproducing time signals transmitted from a central station.

Another object comprises providing a time service system in which means are provided at a central station for simultaneously transmitting commercial power at a constant frequency and carrier frequency energy for operating a subscriber's electrical time keeping apparatus.

A further object consists in providing a combined clock and radio system in which master time keeping apparatus automatically transmits time signals to a radio receiving organization equipped with an electrically driven clock synchronized with the master time keeping apparatus.

I accomplish the above desirable objects in a combined clock and radio system in which a radio receiver is incorporated with an electrically driven clock for cooperation therewith under control of electrical energy transmitted from a central station.

In the drawings which accompany and form a part of this specification and in which like reference numerals designate corresponding parts throughout:

Fig. 1 is a schematic representation of one embodiment of the combined clock and radio system of my invention; and

Fig. 2 is an elevation of the construction of the combined clock and radio unit employed with my system.

My invention contemplates providing a combined electrically driven clock and radio receiving device which will provide radio program entertainment and time service to a subscriber. A feature of my invention resides in the use of the radio receiving apparatus to reproduce audible sounds such as chimes at regular predetermined intervals with respect to the time indications of the electrically driven clock.

According to my invention, I provide a construction of clock along the style known as the "grandfather" clock having radio receiving apparatus therein for reception of entertainment programs and for reproducing chimes at different parts of the hour as transmitted from a central station. Fig. 2 of the drawings illustrates this type of construction. The housing 1 includes the clock 2 which is of the electrically driven type having a small synchronous motor adapted to keep in step with commercial alternating current of constant frequency. The housing 1 also includes a loud speaker 3 which may be concealed behind grille work or other ornamentation. Radio receiving apparatus is mounted behind the front panel of the housing 1. A cable 5 is provided from the housing 1 to a service outlet 6 for supplying operating energy to the clock and associated radio organization.

Referring to Fig. 1, the synchronous motor 4, which drives the hands of the clock 2, is connected through the cable 5 and service outlet 6 to commercial power lines 7. A power pack 8 is also connected to the cable 5 for producing suitable voltages for the operation of a wired radio receiver 9. The power pack 8 is of a conventional type used in radio receiving organizations and includes a suitable transformer and rectifier. The wired radio receiver 9 is capacitively coupled to the cable 5 and comprises a selective filter system responsive to carrier frequency energy and works into a thermionic detector and amplifier system. The output of the wired radio receiver 9 is directed to a translating device such as loud speaker 3.

The power lines 7 connect to a central station 10 which includes centrally located commercial power generation apparatus, time controlling apparatus, and wired radio transmitting means. The power lines 7 connect to power generators 11. The power

generators 11 produce alternating current which is controlled as to frequency, in a well known manner, by a master clock 12 whereby the commercial alternating current can be used for time-keeping purposes. According to my invention, a wired radio transmitter 13 is capacitively coupled to the power lines 7 for impressing carrier frequency energy thereon. The transmitter 13 includes a suitable oscillator, amplifier, and filter arrangement for producing carrier energy at desired frequencies. A studio microphone 14 is provided and serves as means for producing program modulation of the carrier frequency output of the wired radio transmitter 13. Another microphone 15 is provided proximate to an electrically driven clock 16 operated from the power lines 7 in synchronism with the master clock 12. The clock 16 is provided with electrically driven mechanical means for producing chimes at certain parts of the hour, preferably at each quarter hour. Such chimes are a usual feature of the so-called "grandfather" clock and includes a plurality of vibratable members 17 for producing different tones under control of clappers operated by the clock mechanism. Chime movements of this type, when of good quality, are necessarily expensive. It is a feature of my invention that all of the advantages of a clock having such a chime movement are given to a subscriber.

The contact armature 18 is pivotally mounted for making contacting engagement with either of two terminals 19 or 20. The terminal 19 is connected to the microphone 14, and the terminal 20 is connected to the microphone 15. A tension spring 21 is provided for holding the contacting armature 18 normally in engagement with the terminal 19. Connections are provided from the armature 18 to the input of the wired radio transmitter and also from the wired radio transmitter to the microphones 14 and 15 as shown. An electromagnet 22 is provided for actuating the armature 18.

The minute hand 27 of the master clock 12 is adapted to engage with contacts 23, 24, 25, and 26 which are positioned at fifteen minute intervals about the path of travel of the minute hand. Connections are provided from the electromagnet 22 to the contacts 23, 24, 25, and 26 and to the power lines 7 whereby the electromagnet 22 is energized at every quarter hour. Energization of the electromagnet 22 moves the contacting armature 18 into engagement with the terminals 20 so that the microphone 15 controls the modulation of the carrier frequency energy impressed upon the power lines 7 by wired radio transmitter 13. It will, of course, be understood that other arrangements under control of the master clock 12 can be employed for energizing the electromagnet 22 at predetermined times. For example, a contact sector could be rotated under control of the clock mechanism for engagement with contact brushes.

In the operation of my combined clock and radio system, the power generators 11 develop commercial alternating current stabilized as to frequency by the master clock 12. Programs originating in the studio are picked up by the microphone 14 and transmitted at carrier frequencies over the power lines 7. The wired radio receiver 9 in the clock housing 1 receives these programs for audible reproduction by the loud speaker 3. When the minute hand 27 of the master clock 12 moves to a position indicating a quarter hour, a circuit is established to the electromagnet 22 whereby the contacting armature 18 disconnects the microphone 14 and connects the microphone 15 to the wired radio transmitter 13. The chime clock 16, being in synchronism with the master clock 12, now produces suitable chime effects through the agency of the vibratable members 17 controlled by the clock mechanism. These chime effects are transmitted over the power lines 7 and are reproduced by the loud speaker 3 in the clock housing 1 at the precise time when the hands of the clock 2, driven by the motor 4, are in the position indicating the quarter hour. To all appearances the chimes are produced by usual mechanism under control of the clock, whereas, in reality, the chimes are actually produced at the central station by the clock 16. At the expiration of the chime effects produced by the clock 16, the master clock 12 will disconnect the circuit to the electromagnet 22 whereby the spring 21 will return the contact armature 18 into engagement with the terminal 19. The program originating in the studio will then be resumed and picked up by the microphone 14 for transmission over the power lines to be received by the receiver 9.

In the practice of my invention it is intended that the clock unit such as depicted in Fig. 2 will be provided in a multiplicity of consumers' dwellings for operation under control of the apparatus provided at the central station. Each subscriber will, therefore, enjoy the advantages of a combined clock and radio service of a unitary structure having the semblance of a "grandfather" clock. According to my invention, the subscriber is provided with precise time, and chime effects as well as radio program service.

Although I have shown a preferred embodiment of my system it will, of course, be understood that changes can be made therein without departing from the intended scope of my invention. I do not, therefore, desire to limit myself to the foregoing ex-

cept insofar as may be pointed out in the appended claims.

What I claim as new and original and desire to secure by Letters Patent of the United States is:

1. A combined clock and radio system comprising, means for producing commercial alternating current, wire lines for conveying said alternating current, a regulator for controlling the frequency of said alternating current, a source of programs and a microphone associated therewith, a source of horological sound effects and a microphone associated therewith, a radio transmitting organization for transmitting carrier frequency energy over said wire lines, means under control of said regulator for selectively connecting said microphones to said transmitter at predetermined times, an electrically driven clock connected to said wire lines at a point removed from said source of horological sound effects, and means responsive to carrier frequency energy connected to said wire lines for reproducing said programs and said horological sound effects in the vicinity of said electrically driven clock.

2. A combined clock and radio system comprising, means for producing an alternating current, transmission means for conveying said current, a regulator for controlling the frequency of said current, a source of programs and a microphone associated therewith, a source of horological sound effects and a microphone associated therewith, a radio transmitting organization for transmitting carrier frequency energy over said transmission means, means under control of said regulator for selectively connecting said microphones to said radio transmitting organization at predetermined times, an electrically driven clock operatively associated with said transmission means at a point removed from said sources of programs and horological sound effects and means responsive to carrier frequency energy operatively associated with said transmission means for reproducing said programs and said horological sound effects in the vicinity of said electrically driven clock.

3. A combined clock and radio system comprising, means for producing an alternating current, transmission means for conveying said current, a regulator for controlling the frequency of said current, a source of programs, a source of horological sound effects, a radio transmitting organization for transmitting carrier frequency energy over said transmission means, means under control of said regulator for selectively associating said source of programs and said source of horological sound effects with said radio transmitting organization at predetermined times, an electrically driven clock operatively associated with said transmission means at a point removed from said sources of programs and horological sound effects and means responsive to carrier frequency energy operatively associated with said transmission means for reproducing said programs and said horological sound effects in the vicinity of said electrically driven clock.

4. A combined clock and radio system comprising, means for producing an alternating current, wire lines for conveying said alternating current, a regulator for controlling the frequency of said alternating current, a source of programs, a source of horological sound effects, a radio transmitting organization for transmitting carrier frequency energy over said wire lines, means under control of said regulator for selectively associating said source of programs and said source of horological sound effects with said transmitter at predetermined times, an electrically driven clock connected with said wire lines at a point removed from said source of horological sound effects and means responsive to carrier frequency energy connected to said wire lines for reproducing said programs and said horological sound effects in the vicinity of said electrically driven clock.

ARTHUR M. TROGER.