June 1, 1965 M. E. MILLER 3,186,158

ZONE TIME DISPLAY CLOCK

Filed June 13, 1963 2 Sheets-Sheet 1

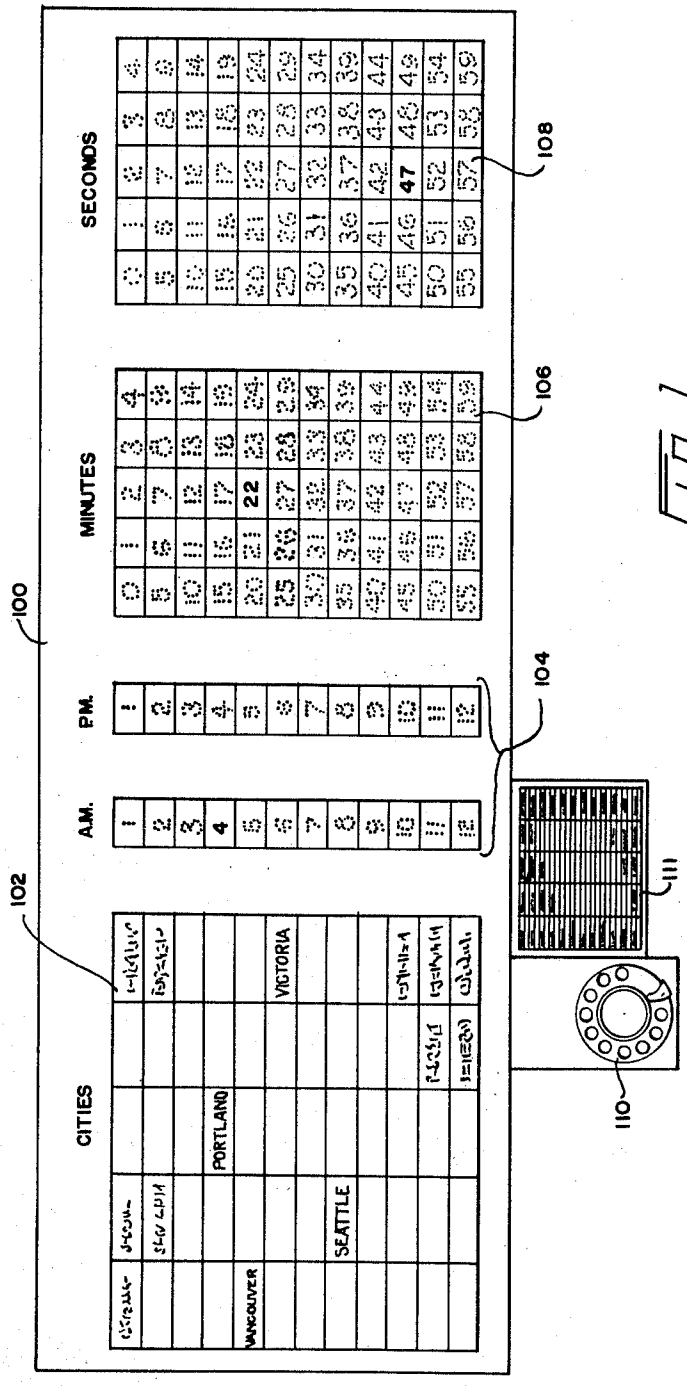


FIG. 1

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ZONE TIME DISPLAY CLOCK

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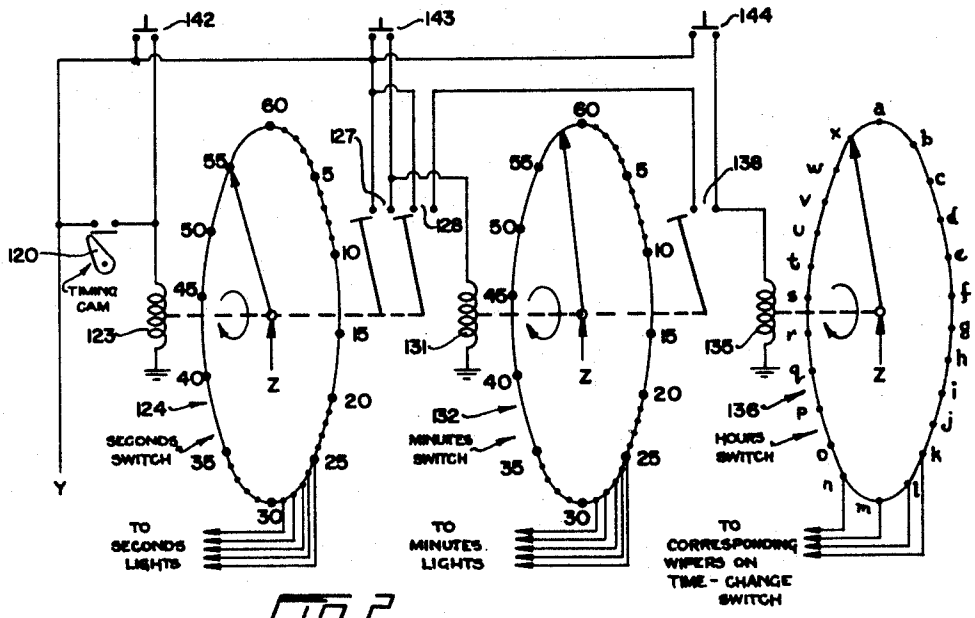


FIG. 2.

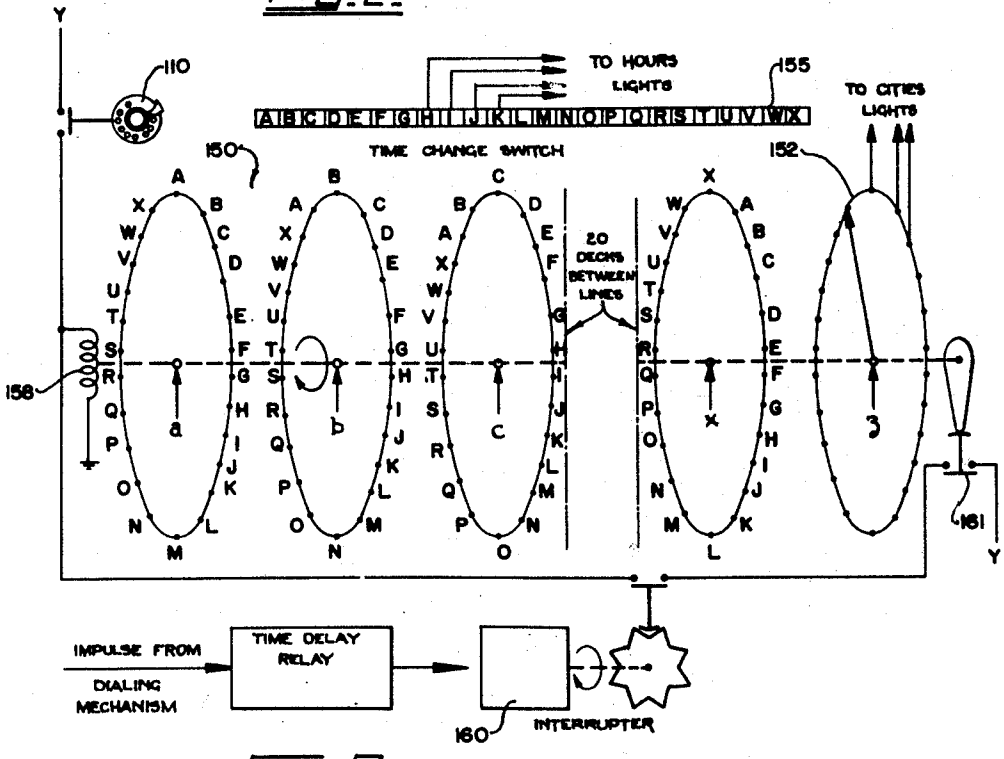


FIG. 3.

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ZONE TIME DISPLAY CLOCK

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10 Claims. (Cl. 58—42.5)

This invention relates to a clock for selectively displaying the time in designated localities in a plurality of time zones.

An object of the present invention is the provision of an electric clock which normally displays the time of the locality in which the clock is located, and which may be operated to display the time of a selected locality in another time zone.

Another object is the provision of a precision time piece that allows the public to participate in determining and indicating the time in various parts of the world.

A further object is the provision of an electric time clock which may be operated instantly to indicate the time in different cities or localities throughout the world without the necessity of knowing the time zone differences or making any mental calculations.

This apparatus includes a readout board having four indicating sections, one section including the names of a plurality of cities or localities situated in different time zones throughout the world, a second section indicating a.m. hours 1 to 12 and p.m. hours 1 to 12, the third section indicating individually 60 minutes, and a fourth section indicating individually 60 seconds. Actually, the seconds section may be omitted if desired. Suitable means is provided in association with this board for indicating a selected city or cities, the a.m. and p.m. hours, minutes and seconds. The most convenient way of doing this is to illuminate the names of the cities selected, and to illuminate the times in hours, minutes and seconds. This board normally indicates the local time and the name of the community in which the board is located, along with the names of any other cities listed on the board which are located in the same time zone. Means is provided for selectively indicating on the board the time in any of a plurality of different time zones. This may be accomplished by means of a dial switch adapted to create pulses in the circuit in which a switch is located. If a person is interested in knowing the time in a city located in another time zone, he scans a list of the cities appearing on the board to ascertain the number of that city. He then dials that number, and the hour indicated by the board is instantly changed to the hour of the time zone in which the selected city is located. After a predetermined time, the time indicated by the board is returned to that of the home city in which this apparatus is located.

An example of this invention is illustrated in the accompanying drawings, in which,

FIGURE 1 diagrammatically illustrates a readout board and a dial switch for this apparatus,

FIGURE 2 is an electrical diagram illustrating apparatus for indicating the local time, and

FIGURE 3 diagrammatically illustrates apparatus by means of which the local time is selectively transposed to times in different time zones.

Referring to FIGURE 1 of the drawings, **100** is a readout board having a "cities" section **102** containing the names of a plurality of cities located in different time zones, an "hours" section **104** adapted to indicate hours 1 to 12 in both the a.m. or p.m., a "minutes" section **106** adapted to indicate 1 to 60 minutes, and a "seconds" section **108** adapted to indicate 1 to 60 seconds. The simplest way to indicate the time in a given city of this readout board is to illuminate the name of the city and to illuminate the hour, minute and second of the time in

said city. Section **102** may include the names of several cities in each or some of the time zones, in which case the names of all the cities in each time zone are illuminated simultaneously. As stated above, this apparatus normally indicates the time of the locality in which it is situated. Thus the name of the home city and all other cities in the same time zone which are included in board section **102** are normally illuminated, as is the changing time of the home city.

In this example, a dial switch **110** is used to change the time indicated by board **100** to that of a desired city in another time zone. A list **111** is provided, usually near the dial, said list including a number opposite the name of each city. All the listed cities in each time zone have the same number. When a person is interested in knowing the time in a certain city, he ascertains the number of that city from list **111**, and then dials that number, and the indicated time on board **100** is instantly changed to that of the selected city, and the name of the latter city is illuminated. Actually, the only change in the indication is in the hours of section **104** and in the name of the city or cities in section **102** which is or are illuminated.

FIGURE 2 illustrates apparatus for indicating the "home" time. A timing cam **120** supplies one-a-second timing pulses to the stepping relay **123** of a single deck, 60-point "seconds" switch **124** which lights up the "seconds" lights of board section **108** from a 110 volt supply Z which is fed to the wiper of switch **124**. On the shaft of the "seconds" switch are two sets of normally-open contacts **127** and **128** which close at the 60-second position of the "seconds" switch. Contacts **127** are used to energize the stepping relay **131** of a 60-point "minutes" switch **132**, and the other contacts **128** are used to energize the stepping relay **135** of a 24-point "hours" switch **136**, said relay **135** being in series with a set of normally-open contacts **138** on the shaft of the "minutes" switch. Contacts **138** of the "minutes" switch stay on for a considerable number of seconds in the vicinity of the 60-minute mark, and so the hours stepping relay is precisely actuated by the contacts on the "seconds" switch.

Manually-operated buttons **142**, **143** and **144** are provided for stepping switches **124**, **132** and **136**, respectively, so that each of said switches may be manually pulsed to the correct "home" time indication. The stepping relays **123**, **131** and **135** are supplied with **48** volts direct current, the source of which is indicated by the letter Y.

Each point or contact of "seconds" switch **124** is connected to a light in the "seconds" section **108** of readout board **100**. Thus, lights indicating numbers 1 to 60 are successively lighted to indicate the seconds of the "home" time indicated by the board. Similarly, the 60 points or contacts of switch **132** are connected to lights in the board "minutes" section **106**, and the 24 points or contacts of the "hours" switch **136** are connected to lights in the "hours" section **104** of the board.

FIGURE 3 illustrates apparatus by means of which the indication of the "home" time on the readout board is changed to indicate the time of a selected city. The 24 contacts of the "hours" switch **136** are connected to 24 wipers of a 24 point, 25 deck rotary stepping switch generally designated by the numeral **150**. The wiper of the 25th deck **152** of switch **150** is supplied with 110 v. A.C. and it feeds the lights in the "cities" section **102** of board **100**.

The points of the other 24 decks are interconnected between the corresponding indicated capital letters and then brought out to a terminal board **155**. The interconnection is so made that each successive deck represents a time advance of one hour, and this is accomplished by the rotational displacement of corresponding connections by one contact interval from deck to deck.

The stepping relay 158 which rotates deck assembly 150 is energized to indicate the desired time zone by pulses from dialing switch 110, and it is returned to its "zero" or "home" time setting by pulses from a time-delayed continuously-running interrupter 160 which is switched off by a cam switch 161 on the end of the shaft of assembly 150.

Actuation of the dialing mechanism 110 is made to perform two functions. The fist is to provide the proper number of pulses to advance the "hours" indication to that of the selected time zone, and to illuminate the names of the cities in section 102 in that time zone; and the second function is to actuate a time-delayed relay which, after a predetermined interval of time, for example, 12 seconds closes a contact to start the continuously-running interrupter 160 which provides pulses to actuate the stepping relay 158 of rotary switch 150. This interrupter is connected so that it will run and advance the wipers of rotary switch 150 until they arrive back at the "zero" or "home" time position, where the supply circuit of the stepping relay of the interrupter is broken by the opening of switch 161 which is closed for all other positions of the rotary switch.

Terminal board 155 serves as a step in the connection from the 25 deck assembly 150 to the "hours" lights of board section 102.

What I claim as my invention is:

1. A clock for selectively displaying the time in designated localities in a plurality of time zones, comprising minute electrical means for stepping off the time in minutes and indicating the minute time, hour electrical means associated with said minute means for stepping off the time in hours and closing electrical circuits at at least some of the hours in a 24 hour cycle, said electrical circuits being adapted to be connected to an electrical power source, a multiple deck, 24-point rotary stepping switch having a wiper for each deck, each wiper being connected in one of said circuits of said hour electrical means, the points of each deck of the stepping switch representing 1 to 24 hours and each deck representing a different time zone, means interconnecting the points of the multiple decks so that each successive deck represents a time advance of one hour by the rotational displacement of corresponding connectors by a one contact interval from deck to deck, means connecting corresponding points of the multiple decks to hour indicating means, one set of corresponding points representing the "home" time and the other sets of corresponding points representing the times of different time zones, and a selector switch for operating the rotary stepping switch to advance the wipers thereof selected numbers of points to cause the hour indicating means to indicate hours of selected time zones.

2. A zone time display clock as claimed in claim 1 including an extra deck of a plurality of points in said rotary stepping switch and having a wiper adapted to be connected to an electrical power source, each point of said extra deck being connected to a light corresponding to a locality in the time zone, the hour of which is being indicated by the hour indicating means.

3. A zone time display clock as claimed in claim 1 including means for returning the wipers of the stepping switch to the "home" time indicating position a predetermined interval after the selector switch has been operated.

4. A zone time display clock as claimed in claim 3 in which the means for returning the wipers to the "home" time indicating position comprises a time-delay relay set into operation by the selector switch, a continuously-running interrupter set into operation by said time-delay relay after a predetermined time interval and adapted to return the wipers to the "home" time indicating position, and a switch operated by the wipers when the "home" time position is reached to switch off said interrupter.

5. A zone time display clock as claimed in claim 1 including second electrical means associated with said minute means for stepping off the time in seconds and indicating the second time.

6. A clock for selectively displaying the time in designated localities in a plurality of time zones, comprising a readout board, a "minute" section in the board adapted to indicate 60 minutes, an "hour" section in the board adapted to indicate 24 hours, minute electrical means for stepping off the time in minutes and electrically connected to the "minutes" section to indicate the minute time, hour electrical means associated with said minute means for stepping off the time in hours and closing electrical circuits at at least some of the hours in a 24 hour cycle, said electrical circuits being adapted to be connected to an electrical power source, a multiple deck, 24-point rotary stepping switch having a wiper for each deck, each wiper being connected in one of said circuits of said hour electrical means, the points of each deck of the stepping switch representing 1 to 24 hours and each deck representing a different time zone, means interconnecting the points of the multiple decks so that each successive deck represents a time advance of one hour by the rotational displacement of corresponding connectors by a one contact interval from deck to deck, means connecting corresponding points of the multiple decks to said "hour" section to indicate the hour time, one set of corresponding points representing the "home" time and the other sets of corresponding points representing the times of different time zones, and a selector switch for operating the rotary stepping switch to advance the wipers thereof selected numbers of points to cause the "hour" section to indicate hours of selected time zones.

7. A zone time display clock as claimed in claim 6 including a "localities" section in the readout board adapted to indicate a plurality of localities situated in a plurality of time zones and including the home locality in which the clock is to be placed, and an extra deck of a plurality of points in said rotary stepping switch and having a wiper adapted to be connected to an electrical power source, each point of said extra deck being connected to a locality indicating means, the hour of which is being indicated by the "hour" section.

8. A zone time display clock as claimed in claim 7 including means for returning the wipers of the stepping switch to the "home" time indicating position a predetermined interval after the selector switch has been operated.

9. A zone time display clock as claimed in claim 8 in which the means for returning the wipers to the "home" indicating position comprises a time-delay relay set into operation by the selector switch, a continuously-running interrupter set into operation by said time-delay relay after a predetermined time interval and adapted to return the wipers to the "home" time indicating position, and a switch operated by the wipers when the "home" time position is reached to switch off said interrupter.

10. A zone time display clock as claimed in claim 6 including a "second" section in the readout board adapted to indicate 60 seconds, and second electrical means associated with said minute means for stepping off the time in seconds and electrically connected to the "seconds" section to indicate the second time.

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