Oct. 18, 1960 L. L. RAKES 2,956,357

DISPLAY

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Fig. 1.

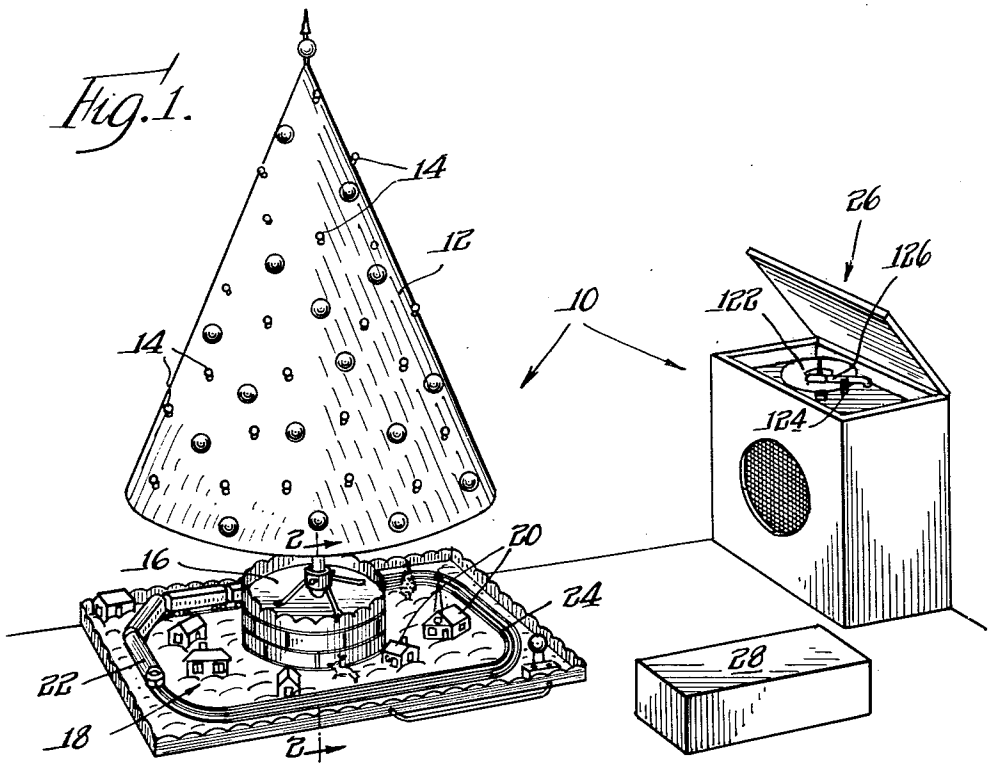



Fig. 2.

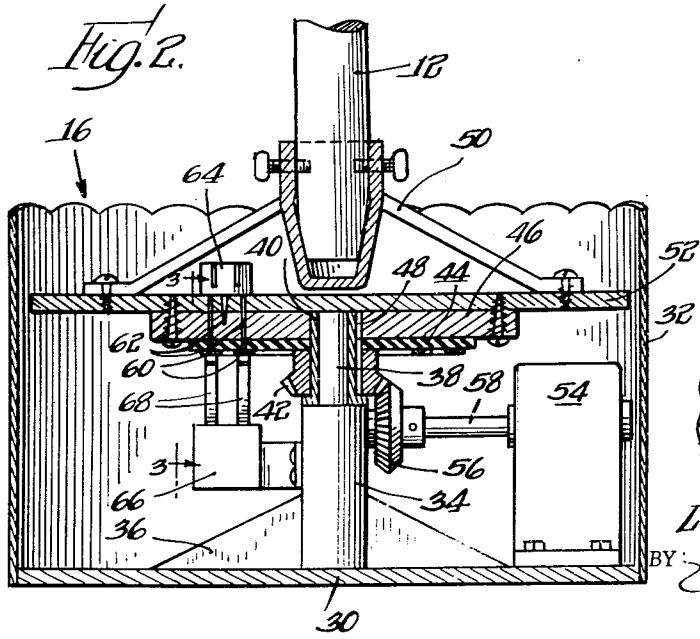
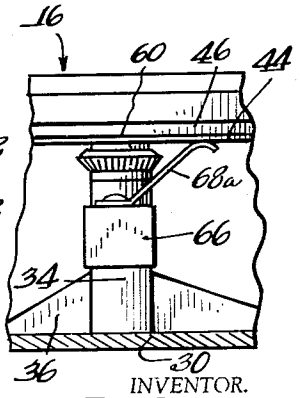



Fig. 3.




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Fig. 4.

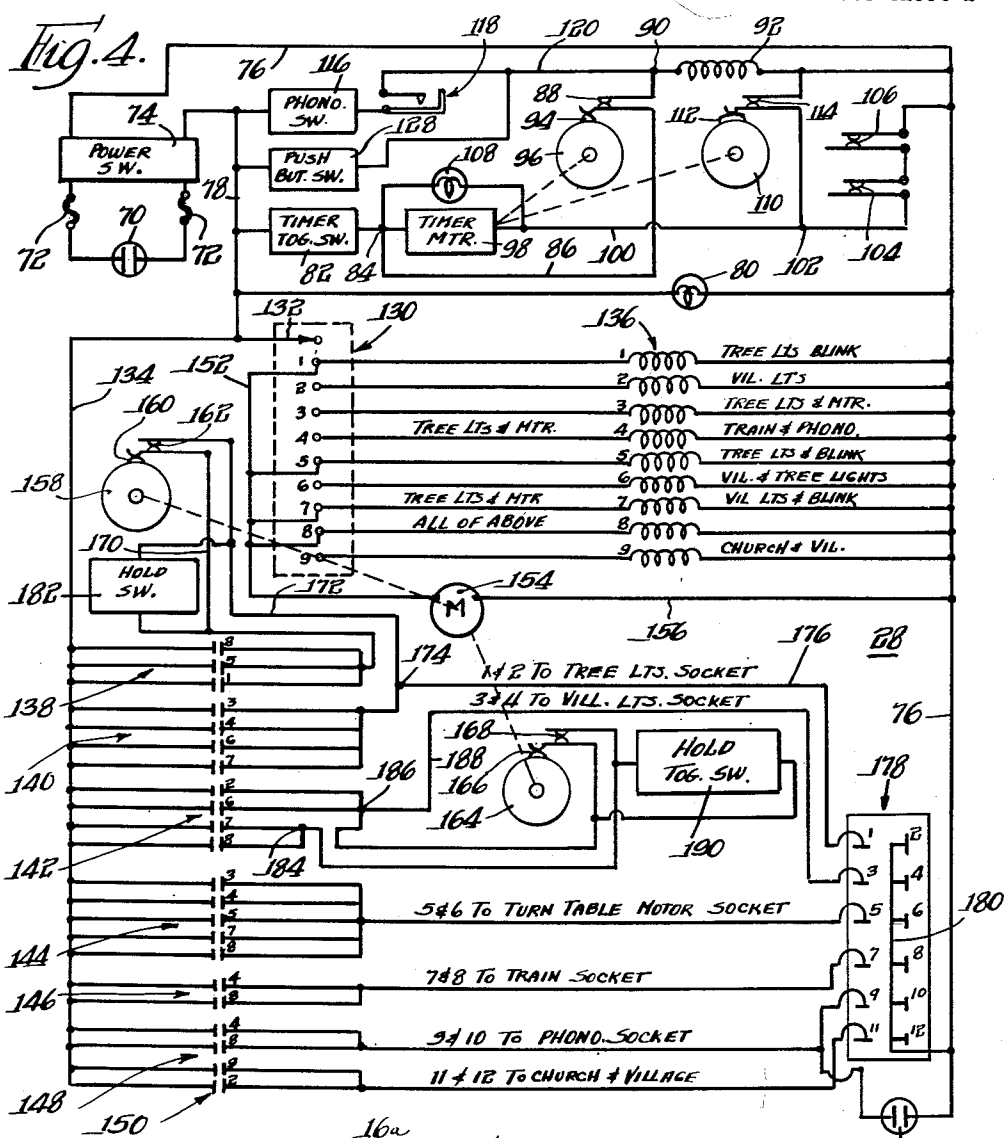



Fig. 5.

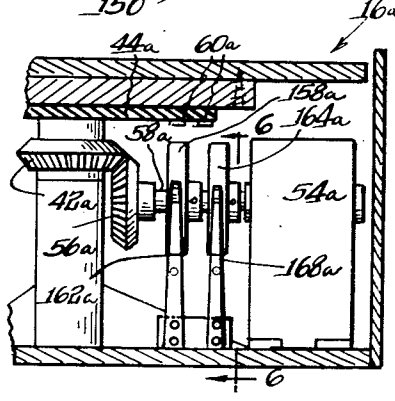
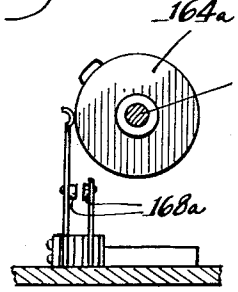


Fig. 6.



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United States Patent Office 2,956,357 Patented Oct. 18, 1960



2,956,357

# DISPLAY

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Filed Feb. 19, 1959, Ser. No. 794,332

12 Claims. (Cl. 40—28.3)

This invention is concerned generally with a display item, particularly one for the Christmas season.

Christmas displays are widely used in the home, in stores, and in many other places. A lighted Christmas tree is customarily included among such displays. Various additional items may also be included. Most such displays are quiescent, or else have moving parts which operate continuously. Christmas tree lights may be left on continuously, or may be blinked by means of a thermo timer or the like. Most Christmas displays are remarkably similar, and hence no one of them draws particular attention. The sameness of Christmas displays, coupled with the fact that Christmas displays are often left up for a period from several days to several weeks, tends to lead one to tire of seeing Christmas displays.

Accordingly, in my copending application Serial No. 568,587, filed February 29, 1956, now Patent Number 2,874,496, issued February 24, 1959, for "Display," I have set forth a Christmas display having a switching arrangement whereby various functions take place in accordance with a predetermined sequence, which sequence can be overcome by a manual switch. In accordance with the aforesaid application, a Christmas tree is provided on a rotating stand, and lights are placed on the Christmas tree. A village scene is placed beneath the Christmas tree, and an electric train is arranged to travel around the village scene. Furthermore, a phonograph is incorporated for providing music along with the display. Switching means is provided, as further set forth in the aforesaid application, for operating the various items singly or in combination.

Although the aforesaid display works very well indeed, certain minor deficiencies have been found, and are overcome by this present invention. For example, if a long playing record were on the phonograph, the timer motor in the aforesaid application would cause a step from one set of conditions to another set after a predetermined time during the playing of the phonograph, irrespective of whether the phonograph record had come to an end. Additionally, if a phonograph record of short duration were played, the concurrent operation of the timer would result in only a short amount of time left between the end of the phonograph record and the next switching operation as effected by the timer. Various steps in the time sequence thus would be non-uniform. The situation could be further confused by indiscriminate operation of the manual push button switch.

Accordingly, it is an object of this invention to provide a display having various operated parts controlled by a timer, and further having a phonograph in conjunction therewith, wherein playing of the phonograph results in disabling of the timer and places operations under time control of the phonograph.

More specifically, it is an object of this invention to provide a display in accordance with the preceding object wherein operation of the phonograph effects disconnection of the timer motor, but with means provided to cause the timer motor to continue in operation past its switching position.



It is further an object of this invention to provide means remote from the display for control thereof.

Other and further objects and advantages of the present invention will be apparent from the following description when taken in connection with the accompanying drawings wherein:

Fig. 1 is a perspective view of a Christmas display embodying the principles of this invention;

Fig. 2 is an axial sectional view through the base beneath the Christmas tree as taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a fragmentary side view as taken along the line 3—3 in Fig. 2 within the base;

Fig. 4 is an electrical wiring diagram of the invention;

Fig. 5 is a fragmentary axial view generally similar to Fig. 2 and showing a modification of the invention; and

Fig. 6 is a side view partially in section as taken along the line 6—6 in Fig. 5.

Referring now in greater particularity to the drawings, and first to Figs. 1–3, there will be seen a Christmas display indicated generally by the numeral 10 and including a Christmas tree 12 having a plurality of lights 14 thereon, and preferably having ornaments and other decorations. The Christmas tree is supported on a base 16, and a village scene 18 is provided beneath the base. The village scene includes various buildings 20 each of which is provided with an interior light. In addition, an electric train 22 runs through the village scene on a track 24. The invention also incorporates a phonograph 26, and a control box 28. The control box is connected by cables (not shown) to the phonograph, and to the tree and village scene, including the train.

The base 16, as shown in Figs. 2 and 3, includes a preferably circular floor 30 having an upstanding cylindrical wall 32 about the periphery thereof. The wall 32 may have a scalloped top, and a design on the surface thereof, such as bricks, for ornamental effect.

Within the base 16 there is centrally disposed an upstanding post 34 braced at the bottom 36 to the floor 30. The post is provided at its upper end with a reduced diameter section 38, and a sleeve bearing 40 is placed on this portion. A bevel gear 42 is journaled on the sleeve bearing 40, and an insulating disc 44 is positioned about the sleeve bearing. A plate 46 is suitably secured to the disc 44, and the gear, disc, and plate are non-rotatably secured together, as by a key 48. A Christmas tree stand 50 of any suitable construction is secured to the top of a plate or disc 52, and this is secured to the plate 46.

A motor 54 is mounted within the base 16, and has a bevel gear 56 on the output shaft 58 thereof meshing with the bevel gear 42. Accordingly, when the motor 54 is run, the Christmas tree 12 is rotated.

Slip rings 60 are suitably secured to the underside of the insulating disc 44. The slip rings are connected by wires 62 to a female socket or receptable 64 on the top of the plate or disc 52. A bracket 66 on the side of the post 34 insulatedly supports a pair of brushes 68 respectively bearing on the slip rings 60, and suitably connected to a source of electric current, as hereinafter set forth. Thus, when the tree 12 is rotated by the motor 54, power will be transmitted to the socket 64, and hence to the tree lights plugged into the socket, without danger of entangling any wires.

The control box 28 is illustrated schematically in Fig. 4, and reference should be had thereto at this time. Starting at the upper left hand corner of the figure, there is provided an electric connector 70 for connection to the usual flexible line cord. The connector 70 is connected through fuses 72 to a power switch 74. One side of the power switch 74 is connected to a bus 76, while the other side is connected to a bus 78.

A pilot light 80 is connected between the bus 78 and the bus 76 to indicate when the display is turned on. A timer toggle switch 82 is connected at one side to the bus 78, and at the other side to a junction 84. The timer toggle switch 82 normally is closed, and is opened manually when it is desired for any particular switching condition to remain indefinitely (except when a record is being played) as set. The junction 84 is connected by a wire 86 to a pair of contacts 88. The contacts are connected to a junction 90, and the junction 90 is connected through a stepping relay coil 92 to the bus 76. The contacts 88 normally are open, and are closed intermittently by a high spot 94 on a timer cam 96. The timer cam 96 is driven by a timer motor 98. The timer motor 98 is connected at one side to the junction 84, and at the other side to a wire 100 leading to a junction 102, and onto a pair of normally closed contacts 104 connected serially to another pair of normally closed contacts 106, the latter being connected to the bus 76. A second pilot light 108 is connected across the timer motor 98 and parallel therewith, to indicate when the timer motor is operating. Since the timer toggle switch 82 is normally closed, and the contacts 104 and 106 are normally closed, the timer motor 98 normally operates whenever the power switch 74 is closed. However, the timer motor can be manually stopped by opening the timer toggle switch 82. It also is stopped automatically at two different times during the sequence of the display when the contacts 104 or 106 are opened, as will be set forth hereinafter.

In connection with the opening of the contacts 104 and 106, these switches will normally open when the high spot 94 on the cam 96 closes the contacts 88. If the timer motor were to stop immediately at this point, the stepping relay coil 92 would remain energized. This could cause damage to the stepping relay coil, and could result in spurious operation of the relay. Accordingly, a timer override cam 110 is driven by the timer motor 98, and has a relatively long high spot 112 thereon. This high spot is arranged to close normally open contacts 114 connected between the junction 102 and the bus 76, thereby paralleling, the series combination of the contacts 104 and 106. Thus, when the contacts 104 or 106 open, the timer motor 98 will not be stopped immediately, but will continue to run until the high spot 112 of the cam 102 allows the contacts 114 to open.

A phonograph toggle switch 116 also is connected to the bus 78. This phonograph toggle switch normally is closed, and is connected on the other side to a phonograph phone jack 118, which is connected by a wire 120 to the junction 90. The phonograph 26 is of the type incorporating an automatic record changer 122 (Fig. 1), and means is provided carrying a low travel switch for actuation during the change cycle. For example, the switch could be mounted at 124 at the top of a post, in position to be struck by the pickup arm 126 upon movement thereof away from the turntable during the change cycle. The switch 124 preferably is of the make-and-break type which remains closed only momentarily. Alternatively, the switch could be mounted within the phonograph to be actuated by the trip mechanism of the record changer. The switch 124 is connected by a suitable wire or cable and phone plug (not shown) to the jack 118. Hence, whenever the switch 124 closes, the stepping relay coil 92 will be pulsed, the same as it is by the timer contacts 88. When the phono switch 116 is open, the record changer will play records indefinitely in accordance with the usual operation of record changers.

Further means is provided for pulsing the stepping relay coil 92, comprising a push button switch 128 (Fig. 4) connected at one side to the bus 78, and at the other side to the wire 120. Whenever the push button switch is manually closed, a circuit will be completed from the bus 78 to the bus 76 through the stepping relay coil 92 whereby to pulse the latter. Normally the switch 128 will not be pushed during the playing of a record. The changer reject switch can, however, be used to stop record playing and return to the timed sequence. The relay is provided with ten fixed contacts, preferably on a stepping disc 130 and numbered zero through nine, and with a movable contact 132 which is stepped sequentially from one to another of the contacts 0–9 by the stepping relay coil 92. The movable contact is electrically connected to the bus 78, and to a bus 134, the bus 134 being connected to the bus 78.

Each of the contacts 1–9 is connected to a respective one of a plurality of relays 136. The relay coils 136 are respectively connected to the bus 76, and are arranged to operate individual ones, or groups of contacts 138, 140, 142, 144, 146, 148 and 150. Thus, relay coil 1 is arranged to cause the tree lights to be on and to blink, and to this end, the relay coil 136–1 causes contact 1 of switch group 138 to close. As will be apparent, switch contacts 5 and 8 operated respectively by relay coils 5 and 8, are in parallel with contact 1. Contact 5 causes the tree lights to blink, and there is a similar contact 5 in contact group 144. There are additional contacts 8 in contact group 142, in contact group 144, in contact group 146, and in contact group 148. Thus, at one point or another in the switch groups 138–150, there is a contact 8 in parallel with each of contact numbers 1–7. Accordingly, closing of the various contacts 8 selectively concurrent operation of all of the elements controlled by relay coils 1–7.

Four contact numbers 1, 5, 7 and 8 of the stepping disc 130 are connected by a wire 152 to a blink cam motor 154, the opposite side of which is connected by a wire 156 to the bus 76. Thus, whenever the movable contact 132 is in engagement with any of the fixed contacts 1, 5, 7 or 8, the motor 154 will run. The motor 154 drives a cam 158 having a high spot 160 thereon for closing normally opened contacts 162 to cause the tree lights to blink or flicker. The motor 154 also drives a cam 164 having a high spot 166 thereon for closing normally open contacts 168 to cause the village lights to blink or flicker. One of the contacts 162 is connected by a wire 170 to the side of the contact group 138 opposite the bus 134, while the other side of the contact 162 is connected by a wire to a junction 174. The junction 174 is connected by a wire 176 to contact 1 of a multiple contact socket or connector 178. A corresponding connector has contact 1 thereof connected to the tree light socket 64 through the slip rings 60. The adjacent contact 2 of the connector 178 is connected by a common wire 180 to the bus 76. As will be observed, all of the even numbered contacts 2–12 are connected to this common wire 180. Hence, opening and closing of the contacts 162 causes the tree lights to blink. The duration of the high spot 160 can be varied, or more than one high spot may be provided, as desired, to cause the tree lights to blink in the desired time relation. A hold switch 182 is connected across the contacts 162 in parallel therewith. This switch is normally open, but can be closed manually so that the switch lights may remain on without blinking whenever any one of the contacts of the contact group 138 is closed.

The preceding example should make all of the relay coils and contacts clear as to operation, since all are plainly shown and labeled on the drawing. The only item that might be worthy of special mention is the cam 164 and associated contacts 168. The contacts 168 are connected from a junction 184 between contacts 7 and 8 of contact group 142 and a junction 186 between contacts 2 and 6 of contact group 142. The junction 186 is connected by a wire 188 to contact 3 of the connector 178, the corresponding contact of the complementary connector being connected to the village lights. Thus, whenever contacts 2 or 6 of contact group 142 are closed, the village lights will be on, but will not blink. On the other hand, when contacts 7 or 8 of this group are closed, the village lights will blink. A hold toggle

switch **190** is connected across the contacts **168** in parallel therewith, whereby to prevent blinking of the village lights. As will be apparent, the high spot **166** on the cam **164** could be of any desired arcuate extent, or more than one high spot could be provided, to cause the village lights to blink in the manner desired.

One further item worthy of mention is an extra outlet **192** connected below the multiple connector **178**, and connected on one side to contact 9 of the connector, and on the other side to the bus **76**. For example, the contact 9 could be arranged to control only the record changer of the phonograph **26**, while the phonograph could be plugged into the outlet **192**. Alternatively, the phonograph could be plugged into the wall in the usual outlet, whereby the amplifier would operate continuously, but the record changer mechanism would operate only when power was supplied to contact 9 of the multiple connector **178**.

*Operation*

Assuming that the movable contact **132** is on the zero or non-connected contact of the stepping disc **130**, and it is desired to operate the display, all that is necessary is to close the power switch **74**. This starts the timer motor in operation, assuming that the timer switch **82** is closed, and causes the cam **96** momentarily to close the contacts **88**, thus to pulse the stepping relay coil **92**. This moves the movable contact **132** to fixed contact 1 of the stepping disc **130**, and energizing relay coil 1 of the group of relays **136**, whereby to close contact 1 of the contact group **138**, and thus to cause the tree lights to blink on and off. After a predetermined time the cam **96** again closes the contacts **88**, and the movable contact **132** is stepped along to fixed contact 2, thereby closing the corresponding relay contacts 2. Operation continues under the control of the timer motor **98** until the fourth fixed contact of the stepping disc **130** is reach. This contact causes energization of relay coil 4 of the relay coils **136**, and effects opening of the contacts **106**, thereby tending to deenergize the timer motor, and closes contacts 4 of the contact groups **140**, **144**, **146** and **148**, thereby starting the phonograph and train in operation. With the switch **106** open, the timer motor stops as soon as the cam **110** allows the contacts **114** to open. The phonograph then continues to run until the record is finished, and the record changer closes the switch **124**, whereby again to pulse the stepping relay coil **92**, and to step the movable contact **132** onto the next contact of the stepping disc **130**. A similar timed step by the phonograph occurs when the movable contact **132** reaches contact 8, this causing opening of the contacts **104** along with closing of the contact 8 in the relay contact groups. As will be apparent, the timer motor resumes operation as soon as the pulse from the phonograph switch starts the movable contact stepping toward the next fixed contact.

As noted heretofore, switch **182** will not hold record player selections unless switch **116** is open. If switch **116** were eliminated and a wire connected directly from junction **84** to one side of phone jack **118**, the timer toggle or hold switch **82** would hold all selections. However, if phono hold switch **116** were eliminated, there would be trouble if the manual push button **128** were pushed with the switch **82** open. The phono selection would not shut off automatically at the end of a record. With the provision of switch **116**, as disclosed, and with the switch in closed position, the stepping switch is pulsed to its next position when the end of the record is reached. Of course, when the switch **116** is open, the changer continues to operate.

*Modification*

A modification of the invention is illustrated in Figs. 5 and 6. The parts shown in Figs. 5 and 6 are similar to those heretofore shown and described, and are identified by similar numerals with the addition of the suffix *a*. Needless repetition of description thereby is avoided. The essential difference is that the cams **158***a* and **164***a* have been moved from the control box **28** to a position within the base **16***a*. The blink cam motor **154** is eliminated, and the cams **158***a* and **164***a* are placed on the motor shaft **54***a*. The corresponding contacts **162***a* and **168***a* obviously are disposed within the base **16***a* for operation by the respective cams.

It is to be understood that the structure as heretofore shown and described is illustrative only. Various changes will no doubt occur to those skilled in the art, and will be understood as forming a part of the invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A display including a plurality of items alternately quiescent or activated to appeal to at least one of the perceptory senses, a plurality of switch means for rendering said items quiescent or activated, timer means for operating said plurality of switch means in predetermined order, one of said items having an independent time cycle, means tending to render said timer means inoperative when said one item is activated, means continuing said timer means in operation for a predetermined time after said last named means tends to render said timer means inoperative, and means for rendering said timer means operative upon completion of the independent time cycle of said one item.

2. A display as set forth in claim 1 wherein the plurality of switch means comprises a stepping switch, a plurality of relays selectively energized through said stepping switch, wherein the means tending to render the timer means inoperative includes one of said relay switches, and a plurality of relay switches, and further including a relay coil energized through said time switch means or by switch means associated with said one item having the independent time cycle.

3. A display as set forth in claim 1 wherein the timer includes an electric motor and wherein the continuing means comprises a switch in series with the timer motor and controlled by a cam driven by the timer.

4. A display including a plurality of items alternately quiescent or activated to appeal to at least one of the perceptory senses, a plurality of switch means for rendering said items quiescent or activated, said switch means including a stepping switch, a plurality of relays selectively energized through said stepping switch, a plurality of relay switches, and a relay coil for operating said stepping switch, timer means for energizing said relay coil from time to time for operating said plurality of switch means in predetermined order, one of said items having an independent time cycle, means for rendering said timer means inoperative when said one item is activated including contacts included among said relay switches and opened upon activation of said one item, said contacts being in series with said timer means, additional contacts in parallel with said contacts, cam means operated by said timer means and holding the additional contacts closed for a limited time after opening of the first mentioned contacts whereby said timer means stops a predetermined time after opening of the first mentioned contacts, and means for subsequently rendering said timer means operative upon completion of the independent time cycle of said one item.

5. A display including a plurality of items alternately quiescent or activated to appeal to at least one of the perceptory senses, a plurality of switch means for rendering said items quiescent or activated and including a stepping switch, a plurality of relays selectively energized in sequence through said stepping switch, a plurality of relay switches operated by said relays, and a relay coil for stepping said stepping switch from one position to another, timer means for periodically operating said relay coil to effect operation of said switch means in predetermined

order, one of said items having an independent time cycle, switch contact means in series with and controlling the operation of said timer, said series contact means being included among said relay switches and opened upon activation of said one item to render said timer means inoperative, means for retaining said timer means in operation a predetermined time after the opening of said contact means, and means for rendering said timer means operative upon completion of the independent time cycle of said one item.

6. A display including a plurality of items alternately quiescent or activated to appeal to at least one of the perceptory senses, a plurality of switch means for rendering said items quiescent or activated, timer means for operating said plurality of switch means in predetermined order, one of said items comprising a phonograph having an independent time cycle, means on said phonograph for operating said switch means independently of said timer, means for rendering said timer means inoperative when said phonograph is operated, said last named means comprising a switch in series with said timer, and means operatively connecting said switch means and said switch for opening said switch when said switch means renders said phonograph operative, and means controlled by the phonograph for subsequently closing said switch to render said timer means operative upon completion of the cycle of said phonograph.

7. A display as set forth in claim 6 and including manually operable means in parallel with said timer means and said phonograph for manually operating said switch means.

8. A display as set forth in claim 7 and further including manually operable means for removing the timer means from operation.

9. A Christmas display comprising a plurality of items including a Christmas tree mounted on a rotatable stand, lights on said Christmas tree, a phonograph having an independent time cycle, and a scene adjacent said Christmas tree and having lights thereon, said items being alternatively quiescent or activated to appeal to at least one of the perceptory senses, a plurality of switch means operable individually and in groups for similarly rendering said items quiescent or activated, time switch means for operating said plurality of switch means individually and in groups in predetermined order, manually operable switch means connected in parallel with said time switch means for operating said plurality of switch means irrespective of the operation of said time switch means, means for rendering said time switch means inoperative when said phonograph is energized and including a switch in series with said timer and operatively connected to one of said switch means, and means operatively connected to said phonograph for subsequently closing said switch



to render said timer means operative upon completion of the independent time cycle of said phonograph.

10. A display comprising a plurality of items alternatively quiescent or activated to appeal to at least one of the perceptory senses, one of said items having an independent time cycle, a plurality of switch means connected to said items for changing the condition of quiescence or activation thereof, means including timer means for operating said plurality of switch means in accordance with a predetermined pattern, means rendering said timer means inoperative when said independent time cycle means is activated and including a switch in series with said timer and means operatively connecting said switch to the switch means connected to the independent time cycle item, and means operated by said independent time cycle means for subsequently closing said switch to render said timer means operative upon completion of the independent time cycle of said one item.

11. A display comprising a plurality of items alternately quiescent or activated to apply to at least one of the perceptory senses, time switch means comprising a stepping contact operated by pulses and a plurality of switches operatively connected to said items for changing the condition of quiescence or activation thereof, first timer means connected to said stepping switch means for providing pulses thereto, a switch in series with said first timer means, second timer means, means operatively connecting said second timer means to the switch in series with the first timer means for opening said switch as said second timer means is started in operation, means operatively connecting said second timer means to at least one of the fixed switch contacts of the stepping switch means for operation of said second timer means, and means for subsequently closing the switch in series with the first timer means and operatively connected to the second timer means for so closing said switch upon operation of said second timer means.

12. A display as set forth in claim 11 and further including override control means operatively connected with the switch means in series with the first timer means for reclosing said series switch independently of the second timer means.

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# CERTIFICATION OF CORRECTION

Patent No. 2,956,357 October 18, 1960

Lee L. Rakes

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 45, for "cam 102" read -- cam 110 --; column 5, line 29, for "energizing" read -- energizes --; line 38, for "reach" read -- reached --; line 57, for "switch 182" read -- switch 82 --; column 6, line 35, strike out "and a plurality of relay switches," and insert the same after "switch," and before "wherein" in line 33, same column.

Signed and sealed this 2nd day of May 1961.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents