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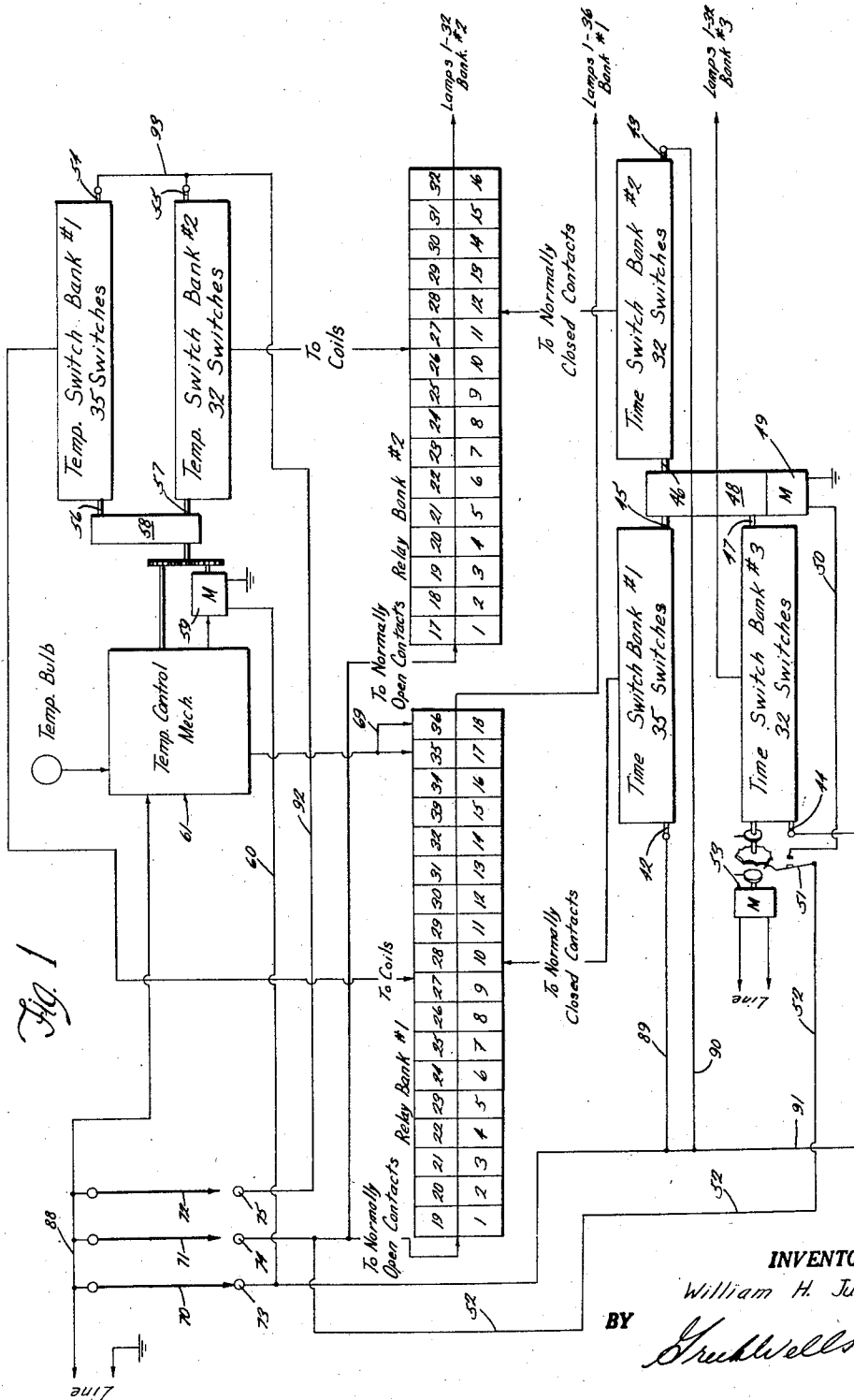
W. H. JUSTUS

2,907,995

DISPLAY SIGNS

Filed Jan. 17, 1957

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Fig. 2

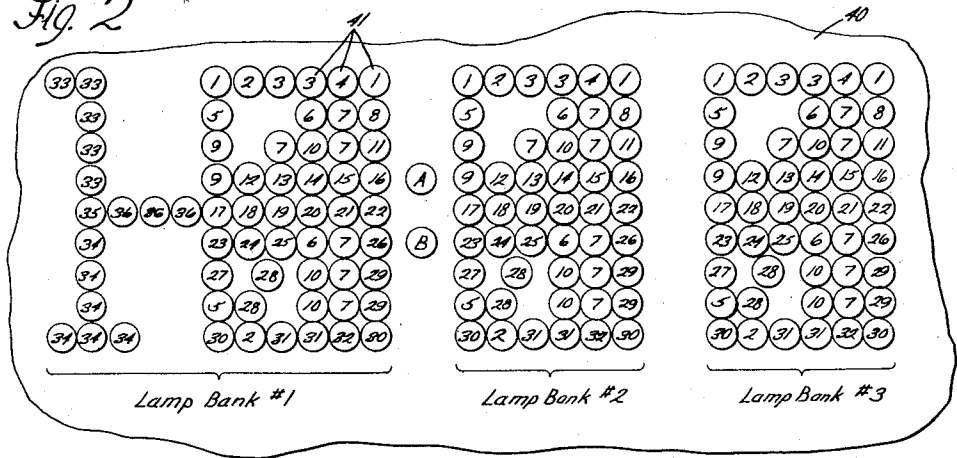
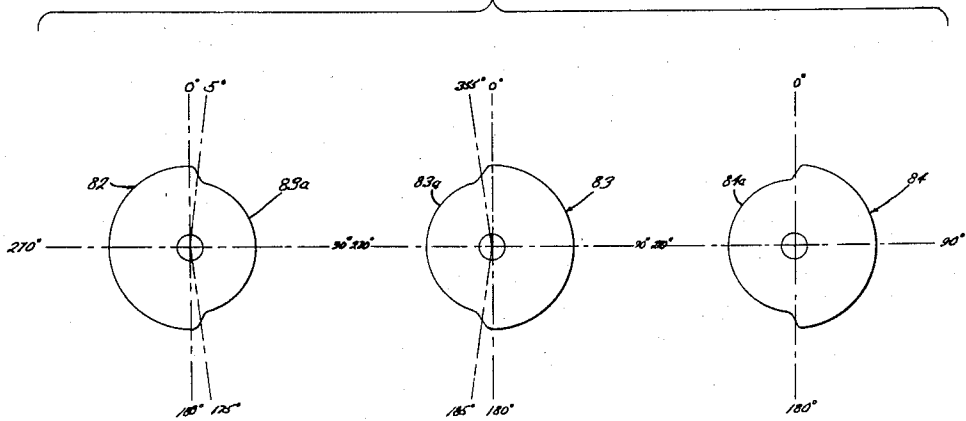


Fig. 6



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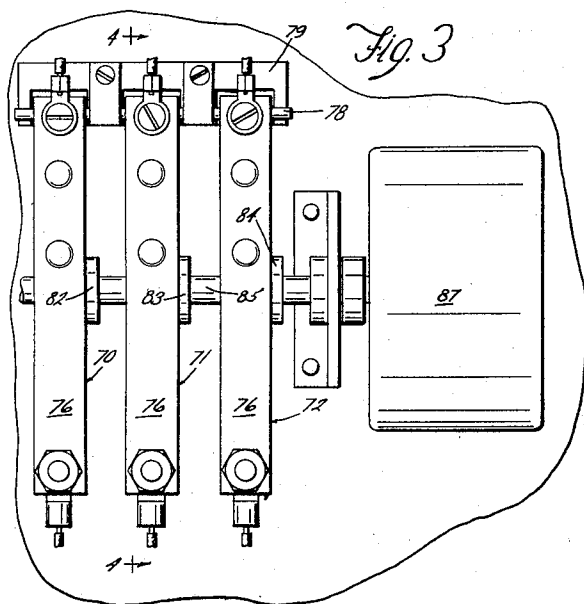
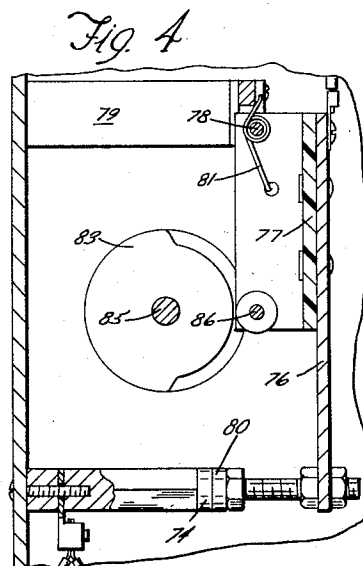
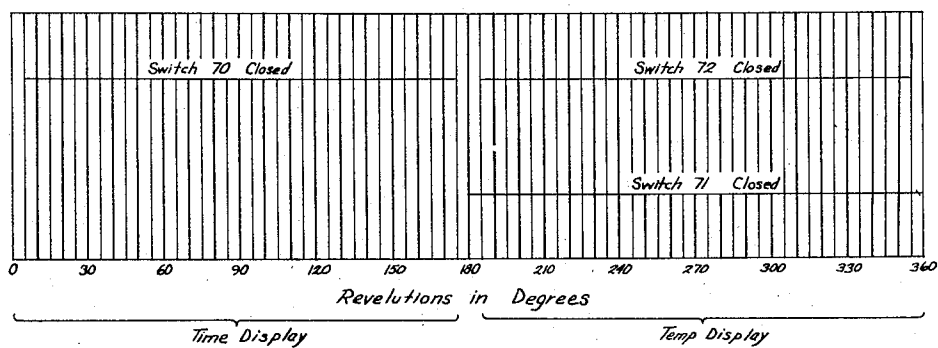


*Fig. 7*



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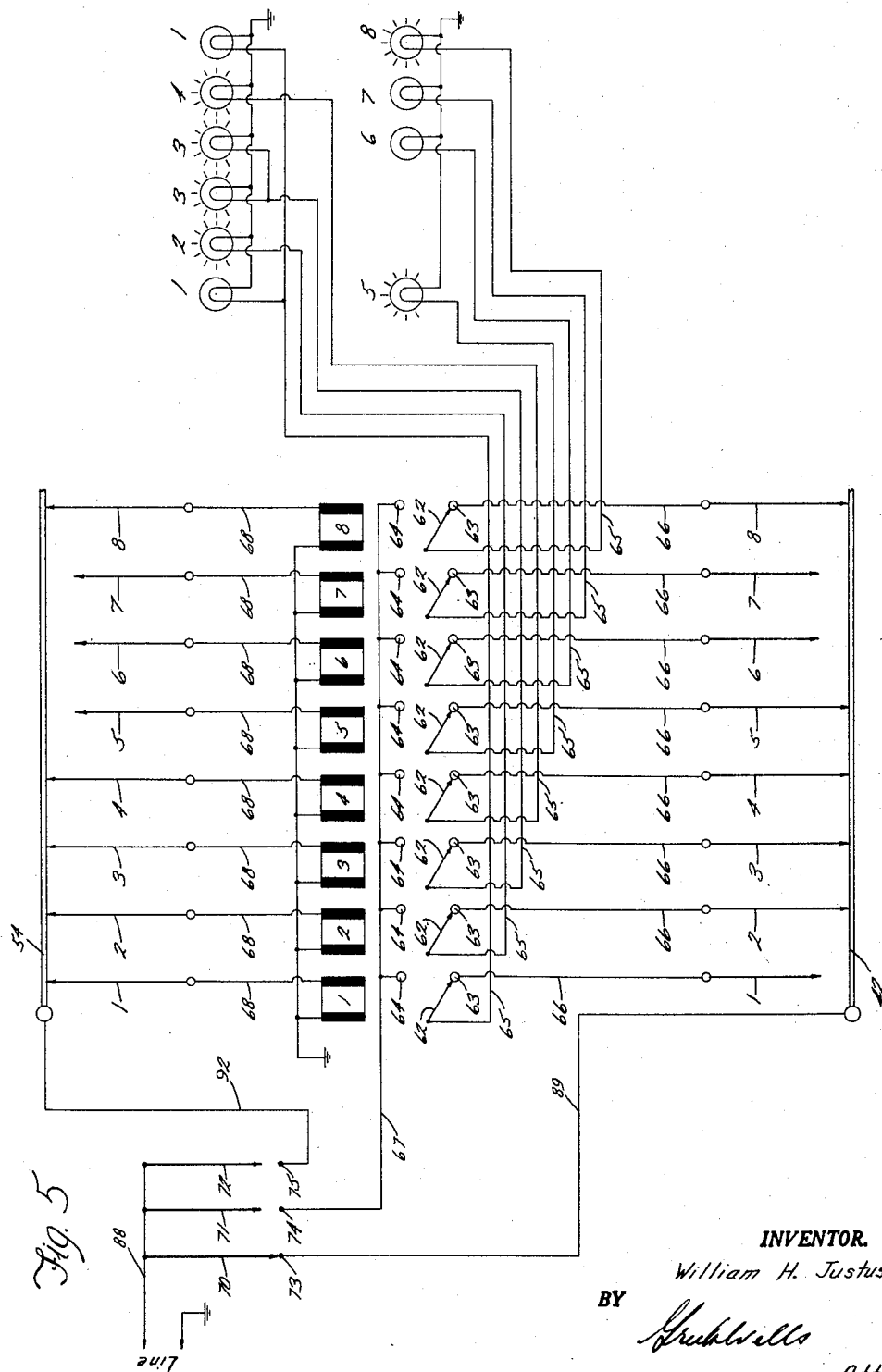
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DISPLAY SIGNS

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2,907,995

## DISPLAY SIGNS

William H. Justus, Spokane, Wash., assignor to American Sign & Indicator Corporation, Spokane, Wash.

Application January 17, 1957, Serial No. 634,714

5 Claims. (Cl. 340—336)

The present invention relates to improvements in display signs, and more particularly to improvements in display signs wherein combinations of lighted and darkened lamps are utilized to display correct time and present temperature on a common display panel.

In my prior co-pending application, Ser. No. 555,362, filed December 27, 1955, for Display Signs, I have disclosed a display sign including a display panel having a plurality of lamps thereon utilized for alternate time and temperature displays. The lamps are connected in a plurality of separate circuits so as to be energizable in various combinations. Two individual indicating mechanisms are disclosed, one which operates according to time, and one which operates according to temperature. Each of the indicating mechanisms has a plurality of switch banks as part thereof, there being a multiplicity of cam operated switches in each bank. The switch banks are manipulated by their mechanisms in such a manner that combinations of opened and closed switches representative of the information to be displayed are maintained in the switch banks. The display sign also includes a plurality of transfer relays, there being one relay for each lamp circuit in the display panel that is used to display both time and temperature. The transfer relays have double throw switches therein electrically connected to the lamp circuits. The switches are spring pressed into normally closed position against contact points electrically connected to the cam switches of the time indicating mechanism. When any relay is deenergized, the lamp circuit controlled thereby is electrically connected to the time indicating mechanism, whereby to display time when the cam switches thereof are energized. The relays themselves are electrically connected to the cam switches of the temperature indicating mechanism, whereby to be energized when the cam switches of the temperature indicating mechanism are energized. The relays, when energized, are operable to disconnect their double throw switches from the normally closed contacts, and close them against normally open contacts which are electrically connected to a power source.

The alternating time and temperature display is effected by alternately energizing the time and temperature cam switches. When the time switches are energized, the lamps connected to closed switches are lighted thereby. When the temperature switches are energized, the transfer relays connected to closed temperature switches operate to close their double throw switches against the normally open contacts to light appropriate lamps.

The principal purpose of the present invention is to provide, in such a display sign, means for alternately supplying current to the time and temperature switches in such a manner that a delay period is provided between the de-energization of one group of switches, and the energization of the other group of switches, whereby to prevent arcing at the contacts of the transfer relays.

A further purpose of the invention is to provide, in such

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a mechanism, a breaker switch for the current line connecting to the normally open contact points of the transfer relay switches, which is operable in timed relation to the alternate current supplying means for the time and temperature switches to open the current line leading to said normally open contacts in advance of the operation of each relay whereby to further prevent arcing at the normally open contact points.

The nature and advantages of my invention will appear more clearly from the following description and the accompanying drawings wherein a preferred form of the invention is shown. It should be understood, however, that the drawings and description are illustrative only, and are not intended to limit the invention except insofar as it is limited by the claims.

In the drawings:

Figure 1 is a diagrammatic view illustrating an alternate time and temperature displaying mechanism embodying my invention;

Figure 2 is a diagrammatic view illustrating the display panel upon which the displays are made;

Figure 3 is a fragmentary view of my improved means for alternately supplying current to the time and temperature switches.

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a diagrammatic view illustrating the operation of the invention with respect to a representative group of lamps;

Figure 6 is a diagrammatic view showing the shape of the actuating cams for the current supplying means; and

Figure 7 is a graph illustrating the sequence of operation of the current supplying means.

Referring now to the drawings, and to Figures 1 and 2 in particular, my invention is shown as embodied in a display sign mechanism of the type disclosed in my co-pending application identified earlier herein. As disclosed in that application, the function of the mechanism is to display alternately the correct time and temperature on a common display panel. Such a display panel is shown in Figure 2, and identified by the numeral 40. The display panel 40 contains a plurality of lamps 41 thereon, arranged in three banks, indicated in Figure 2 as lamp banks 1, 2 and 3. Lamp bank 1 is used to display numbers from 1 to 12 to represent the hours of the day, and to display numbers from —9 to 11 to represent ten degree units of temperature from —90 degrees F. to 119 degrees F. To this end, the lamps 41 of bank 1 are connected in 36 separate circuits which may be selectively energized to produce the desired number. The several lamps of bank 1 are numbered according to the circuits with which they are connected. Lamp bank 2 is used to display numbers ranging from 0 to 5 to represent ten minute intervals of time and to display numbers from 0 to 9 to represent degree units of temperature. To this end the lamps 41 thereof are connected in 32 separate circuits which may be selectively energized to display any of these numbers. The lamps of this bank are numbered in Figure 2 according to the circuit with which they are connected. Lamp bank 3 is used to display numbers from 0 to 9 to indicate minutes of time; however, since a complete temperature display may be made on banks 1 and 2, this bank is not used for the temperature display. The several lamps of bank 3 are connected in 32 separate circuits in the same manner as the lamps of bank 2.

It should be understood that while the lamps in the three banks bear corresponding numbers, each bank is operated separately and no lamps from one bank are connected to the lamps of another bank.

In addition to the lamp banks just described, the panel 40 is provided with two lamps A and B which are positioned between lamp banks 1 and 2. These lamps are

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connected together in a common circuit and lighted during the time display to form a colon between the hour and minutes.

The lamp circuits of the display panel 40 are energizable by either of two mechanisms, each of which is shown generally in Figure 1. These are a time indicating mechanism and a temperature indicating mechanism. The time indicating mechanism includes three banks of cam operated switches, identified in Figure 1 as time switch banks 1, 2 and 3. Time switch bank 1 has 35 cam switches which are operable to control lamp circuits 1 to 35 of lamp bank 1. By proper manipulation of these switches, the lamps of bank 1 may be lighted to display any number from 1 to 12. Time switch bank 2 has 32 cam operated switches operable to control the 32 lamp circuits of lamp bank 2 whereby to light selected lamps to display numbers from 1 to 5 on lamp bank 2. Time switch bank 3 has 32 cam operated switches operable to control the 32 lamp circuits of lamp bank 3 to display numbers from 0 to 9 thereon. The several switches of each switch bank are arranged in side by side order and each switch bank has a bus bar against which all of the switches of that bank are spring closed. The bus bars are indicated at 42, 43 and 44. Each switch bank also has a cam shaft which extends beneath each of the switches of that bank. The cam shaft for time switch bank 1 is indicated at 45; the cam shaft for time switch bank 2 is indicated at 46; and the cam shaft for time switch bank 3 is indicated at 47. Each of these cam shafts has thereon a plurality of individual switch manipulating cams (not shown) which engage the several switches of each bank. The cams on shaft 45 are shaped to open and close the switches of switch bank 1 to set up successive combinations of switches proper for displaying numbers from 1 to 12 during a revolution of the shaft 45. In like manner the cams on shaft 46 are shaped to set up successive switch combinations on switch bank 2 to display numbers from 0 to 5 during one revolution of shaft 46. The cams on shaft 47 are capable of setting up successive switch combinations on bank 3 to display numbers from 0 to 9 during a single revolution. The shafts 45, 46 and 47 are each connected to a suitable driving means 48 whereby the shaft 45 is rotated, in twelve successive steps, one revolution each twelve hours; and the shaft 46 is rotated, in six successive steps, one revolution each hour; and the shaft 47 is rotated, in ten successive steps, one revolution every ten minutes. The driving means 48 is driven by an electrically operated control device or motor 49 which is energized through a lead 50 connected to a switch 51. The switch 51 is connected by a lead 52 to a power source to be described later herein and is manipulated by a mechanism commonly known in the trade as a "jump clock" and indicated generally in Figure 1 by the numeral 53. The mechanism 53 is old and well known, and it is believed unnecessary to describe it in detail here. Such a mechanism is fully shown and described in my above identified co-pending application. The switch 51 is manipulated in such a manner that the motor 49 is energized once each minute for a sufficient time to drive the drive means 48 that amount required to alter the switch combinations on the time switch banks to show a minute advance in time.

The temperature indicating mechanism includes two banks of cam operated switches generally indicated in Figure 1 as temperature switch banks 1 and 2. Temperature switch bank 1 has 35 cam operated switches which are operable to control the corresponding lamp circuits of lamp bank 1 to display desired numbers representative of ten degree units of temperature. Temperature switch bank 2 has 32 cam operated switches operable to control the corresponding lamp circuits in lamp bank 2 to display numbers representative of one degree units of temperature. The switches of temperature switch banks 1 and 2 are identical to those of the time switch banks, and close against bus bars 54 and 55. The

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switches of temperature switch banks 1 and 2 are manipulated by cams (not shown) fixed on cam shafts 56 and 57. The cams on shaft 56 for temperature switch bank 1 are so shaped as to set up successive switch combinations representative of numbers from 1 to 11 during one revolution. The cams on shaft 57 are so shaped as to set up successive switch combinations from 0 to 9 during one revolution. As shown in Figure 1, the shafts 56 and 57 are connected to a driving means 58. The driving means 58 couples these shafts 56 and 57 in such a manner that the shaft 56 is rotated one-twelfth of one revolution for each full revolution of the shaft 57. With this construction, rotation of the shaft 57 sets up successive combinations of switches on the temperature switch banks 1 and 2 in such a manner as to cause the display to count in either positive or negative sequence, depending upon the direction of rotation of the shaft 57.

The shaft 57 is driven by an electrically operated control device or motor 59 which is controlled according to temperature. The motor 59 is a shaded pole induction motor having three separate windings, a main winding, and two directional windings. The main winding of the motor 59 is connected by a lead 60 to a power source to be described later herein. The directional windings of the motor 59 are connected to a temperature control mechanism generally indicated at 61. This mechanism 61 operates to generate motor driving impulses in response to temperature variation. It is not believed necessary to describe in detail the construction and operation of the mechanism 61 here. Any device capable of driving the motor 59 in proportion to temperature change, whereby to cause the motor to maintain combinations of open and closed switches on the temperature switch banks 1 and 2 which are proper for controlling the lamp circuits of lamp banks 1 and 2 to display numbers representing correct present temperature is sufficient. The mechanism must operate to drive the motor 59 in a direction to "count" in positive sequence for temperature increase above zero and must operate to drive the motor 59 in a direction to rotate the shafts 56 and 57 in a direction to "count" in negative sequence for temperature decline above zero. The mechanism 61 must include means to reverse the direction of operation of the motor 59 for temperature below zero whereby to rotate the shafts 56 and 57 in a direction to "count" in positive for temperature decline below zero, so that proper displays of such temperatures may be made. It must also include switch means for energizing lamps 35 and 36 of lamp bank 1 when the temperature falls below zero, so as to display a minus sign in front of the temperature display. Temperature control mechanisms suitable for this purpose are disclosed in my above identified co-pending application, and in the co-pending application of Edward M. Caferro and William H. Justus, Serial No. 627,261, filed December 10, 1956, for Display Signs.

With the construction thus far described, the several switches of the time switch banks 1, 2 and 3 and the several switches of the temperature switch banks 1 and 2 are always maintained in combinations of open and closed switches representative of the information to be displayed by each. The mechanism which connects these switches to the lamp banks will now be described.

As hereinbefore described, lamp banks 1 and 2 are utilized to display both time and temperature. Lamp bank 3 is utilized to display time only and its circuits are connected directly to switch bank 3 of the time indicating mechanism, as shown in Figure 1. However, to alternately display time and temperature numbers on lamp banks 1 and 2, a plurality of transfer relays are utilized, as shown in Figures 1 and 5. There are two banks of relays indicated in Figure 1 as relay banks 1 and 2. Relay bank 1 contains 36 individual relays numbered 1 to 36, and bank 2 contains 32 relays numbered 1 to 32. The connections of the relays are best illustrated in Figure 5 wherein a portion of relay bank 1 is shown. Each relay of bank 1 and of bank 2 is connected

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in the same manner as every other, so it is believed that the illustration of Figure 5 is sufficient. Each of the relays 1-36 of bank 1 and 1-32 of bank 2, has a single pole, double throw switch 62 provided with two contacts, a normally closed contact 63 and a normally open contact 64. The switch 62 is spring pressed into engagement with the normally closed contact 63 and is operable upon energization of the relay to move into engagement with the contact 64. The switches 62 of relays 1-36 of bank 1 are connected by leads 65 to lamp circuits 1-36 of lamp bank 1. The switches 62 of relays 1-32 of relay bank 2 are similarly connected to the corresponding lamp circuits 1-32 of lamp bank 2. Normally closed contact 63 of each relay 1-35 in relay bank 1 is connected by a lead 66 to the corresponding time switch 1-35 of time switch bank 1. The normally closed contact 63 of relay 36 in bank 1 has no connecting lead for the reason that lamps 36 of bank 1 are not used in the time display. The normally closed contacts 63 of relays 1-32 of relay bank 2 are connected to the corresponding switches of time switch bank 2 in the same manner as the relays of bank 1.

The normally open contact 64 of each relay 1-36 in relay bank 1 and of each relay 1-32 in relay bank 2 is connected to a power lead 67 which, in turn, is connected to the power source described later herein. The coils of the relays of banks 1 and 2 are connected to temperature switch banks 1 and 2. As indicated in Figure 5, one side of the coil of each relay 1-36 of relay bank 1 is connected to a common ground. The other side of the coil is connected by a lead 68 to the corresponding switch 1-35 of temperature switch bank 1. The coil of relay 36 is connected by a lead 69 to the temperature control mechanism and controlled to light with the temperature display only for temperatures below zero. A similar connection is made with the coil of relay 35 of bank 1, for the same purpose. The coils of relays 1-32 of relay bank 2 are connected to the corresponding switches of temperature switch bank 2 in the same manner as the relays of bank 1.

With the relays so connected, the several lamp circuits of lamp banks 1 and 2 are normally connected through the relay switches 62 to the cam switches of time switch banks 1 and 2. Therefore when the bus bars 42, 43 and 44 of the time switch banks 1, 2 and 3, are energized or supplied with current, the current will travel through the closed cam switches and through the relay switches 62 to the corresponding lamp circuits to make the time display. When the bus bars 54 and 55 of the temperature switch banks 1 and 2 are energized, current will flow through the closed cam switches in these banks and through the coils of the corresponding relays. Energization of those relays will cause their switches 62 to be attracted into engagement with the normally open contacts 64. When the switches are in this position, current will flow from the line 67 through the switches 62 and through the corresponding lamp circuit to make the temperature display.

In order to provide for an intelligible display of time and temperature on the panel, means must be provided to supply current to the bus bars 42, 43, and 44 of the time switch banks and the bus bars 54 and 55 of the temperature switch banks 1 and 2 alternately so that the switches of one mechanism are de-energized during the period when the switches of the other mechanism are energized. It is the purpose of this invention to provide a mechanism which will supply current in this manner, and which will operate in such a manner that the switches 62 of the relays are manipulated only at periods when both of the contacts 63 and 64 thereof are de-energized whereby to prevent destructive arcing at the relay contact points.

The current supplying mechanism, best shown in Figures 1 and 3 comprises three cam operated main breaker switches 70, 71 and 72 which are adapted to close against contact points 73, 74 and 75 respectively. As illustrated in Figures 3 and 4 each of the switches 70, 71 and 72

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comprise bars 76 of conductive metal which are fixed to non-conductive brackets 77. The brackets 77 are pivoted to a shaft 78 which is carried by a mounting framework 79. The switch bars 76 carry contact points 80 which are adapted to engage the stationary contacts 73, 74 and 75. Springs 81 urge the brackets 77 and the bars 76 in a direction to close the contacts 80 against the stationary contacts 73, 74 and 75. The switches 70, 71 and 72 respectively, are manipulated by cams 82, 83 and 84 which are fixed to a common shaft 85. The cams 82, 83 and 84 are aligned beneath the brackets 77 of the switches 70, 71 and 72 and engaged by cam follower wheels 86 journaled in the brackets 77 as illustrated in Figure 4. With this construction, rotation of the shaft 85 causes the switches 70, 71 and 72 to be opened and closed by the cams 82, 83 and 84. The shaft 85 is driven by a motor 87 which is connected to the power source.

As best shown in Figures 1 and 5, the switches 70, 71 and 72 are connected by a lead 88 to the power source. The switch 70 is utilized to supply power to the switches of time switch banks 1, 2 and 3, and its stationary contact 73 is connected by leads 89, 90 and 91 to the bus bar 42, 43 and 44 of these switch banks. The switch 71 is utilized to supply power to the normally open contacts 64 of the transfer relays and the lead 67, which energizes these normally opened contacts 64, and is connected to the stationary contact 74. The switch 72 is utilized to supply current to the temperature switch banks 1 and 2, and its stationary contact 75 is connected by leads 92 and 93 to the bus bars 54 and 55 of these switch banks.

One revolution of the cam shaft 85 represents one complete display cycle, during which both the correct time and temperature are displayed. The cams 82, 83 and 84 are shaped so that during the first 180 degrees of revolution of the shaft 85, the time display supply switch 70 is closed and then opened, and during the last 180 degrees of revolution, the temperature display switches 71 and 72 are closed and then opened. The shaping of the cams 82, 83 and 84 to effect this result is shown in Figure 6. The dot-dash lines in this figure represent the positions of the cams with respect to their cam followers 86 at various positions during a revolution of the cam shaft 85. For example, the upwardly directed vertical lines marked 0 degree represent the positions of the cams at the beginning and end of each full revolution of the shaft 85. As shown in Figure 6, cam 82 has a reduced diameter portion 82a therein which extends from the 5 degree position to the 175 degree position. The cam 83 has a reduced diameter portion 83a thereon which extends from the 185 degree position to the 355 degree position. The cam 84 has a reduced diameter portion 84a which extends from the 180 degree position to the 360 degree position. The cams are of such a diameter that the switches they control are only closed during the period when the follower wheels 86 are riding upon the reduced diameter portions.

With the construction just described, the switches 70, 71 and 72 operate to cause the alternating displays in such a fashion that no relay switch 62 is opened or closed against either of its contacts 63 and 64 when that contact is energized. In this way, arcing and consequent burning of the relay contacts is prevented. Since such destructive arcing is the prime cause of switch failure, this construction greatly lengthens the useful life of each relay. All the arcing is confined to the easily replaceable points of the switches 70, 71 and 72.

The operation of the switches 70, 71 and 72 is best illustrated in Figures 5 and 7. As the shaft 85 rotates from the 0 degree position toward the 360 degree position, switch 70 is first closed at 5 degrees and allowed to remain closed for approximately 170 degrees thereafter. During this time current flows to the bus bars 42, 43 and 44, through the closed switches of the time switch banks, and thence through the relay switches 62 (which are in

normally closed position, the relays being de-energized) to the appropriate lamp circuits. When the shaft 85 reaches the 175 degree position, the switch 70 is opened, so that the time switches are de-energized and the time display cut off. During the revolution from 175 degrees to 180 degrees, both the time and temperature switches are de-energized. At 180 degrees the switch 72 is closed, energizing the bus bars 54 and 55 of the temperature switch banks, allowing current to flow through the closed switches thereof to energize the corresponding relays of relay banks 1 and 2. At the time these relays are energized and their switches attracted to the normally open position against the contacts 64, both the other main supply switches 70 and 71 are open, so neither contact 63 or 64 of any relay is energized. The relay switches 62 draw no arcs during this movement. At 185 degrees, after all the appropriate relays have been energized, the switch 71 is closed, allowing current to flow through line 67 to contacts 64 and thence through the switches 62 of the energized relays and to the appropriate lamp circuits. The switch 71 is allowed to remain closed for approximately 170 degrees and then opened when the shaft 85 reaches the 355 degree position to cut off the display and de-energize the contacts 64 of the transfer relays. At 360 degrees, the switch 72 is opened to de-energize the temperature switches whereby to permit the switches 62 of the previously energized relays to move back to normally closed position. At the time this movement occurs, both contacts 63 and 64 of each relay are de-energized, so no arcing occurs.

It has also been found desirable to de-energize the drive means 48 for the time switch banks and the drive means 58 for the temperature switch banks during the periods when the switches of these banks are in control of the lamp banks. If this is done, any change in the open and closed switch combinations of each of the time and temperature switch banks will only occur during periods when the switches of these banks are deenergized, and arcing at the contacts of these switches will also be prevented, thus increasing their lives many times over. I accomplish this purpose very easily by connecting the power lead 52 of the drive motor 49 of the time mechanism to the stationary contact 74 of main supply switch 71. With this construction, the motor 49 can only drive the means 48 during periods of temperature display when the time switch banks are de-energized. It should be noted that the jump clock 53 is connected directly to the power source and is thus unaffected by the de-energization of line 52 and continues to keep proper time. The power supply lead 60 of the motor 59 is connected to the stationary contact 73 of switch 70 so that this motor can only drive to change the open and closed switch combinations of the temperature switch banks during periods of time display when the temperature switch banks are de-energized. Since the temperature control mechanism is connected directly to the power source, as shown by line 61a, the operation of this mechanism is likewise unaffected.

It should be apparent from the foregoing description that the switches 70, 71 and 72 and their associated mechanism provide for proper alternating time and temperature displays in such a manner that destructive arcing at the contacts of the several relays and at the contacts of the several cam switches of the time and temperature switch banks is entirely prevented.

It is believed that the nature and advantages of my invention appear clearly from the foregoing description.

Having thus described my invention, I claim:

1. A display sign comprising a display panel having a plurality of lamps thereon, said lamps being connected in a plurality of separate circuits, a first information indicating mechanism including a first group of switches operable to select lamp circuits to be energized to display first information, a second information indicating mechanism including a second group of switches oper-

able to select lamp circuits to be energized to display second information, a plurality of relays each including a relay coil and a relay switch having a normally open contact and a normally closed contact, each of said relay switches being connected to a lamp circuit, each of the normally closed contacts of said relay switches being connected to a switch of said first group of switches whereby to electrically connect the lamp circuits to said first group of switches when the relays are deenergized, a power supply line connected to the normally open contacts of said relay switches, the relay coils being connected to said second group of switches whereby to energize certain of the relays when the closed switches of said second group are energized and move the relay switches of said energized relays to normally open position and electrically connect the corresponding lamp circuits to the power supply line, a power source, a first switch means operable to connect the power source with said first group of switches, second switch means operable to connect the power source with the second group of switches, third switch means operable to connect the power source with said power supply line, and switch actuating means operable to open and close said first and second switch means alternately, said actuating means including means operable to close and open said third switch means while the second switch means is closed.

2. A display sign comprising a display panel having a plurality of lamps thereon, said lamps being connected in a plurality of separate circuits, a first information indicating mechanism including a first group of switches operable to select lamp circuits to be energized to display first information, a second information indicating mechanism including a second group of switches operable to select lamp circuits to be energized to display second information, a plurality of relays each including a relay coil and a relay switch having a normally open contact and a normally closed contact, each of said relay switches being connected to a lamp circuit, each of the normally closed contacts of said relay switches being connected to a switch of said first group of switches whereby to electrically connect the lamp circuits to said first group of switches when the relays are deenergized, a power supply line connected to the normally open contacts of said relay switches, the relay coils being connected to said second group of switches whereby to energize certain of the relays when the closed switches of said second group are energized and move the relay switches of said energized relays to normally open position and electrically connect the corresponding lamp circuits to the power supply line, a power source, a first switch means operable to connect the power source with said first group of switches, second switch means operable to connect the power source with the second group of switches, third switch means operable to connect the power source with said power supply line, first and second actuators operable to alternately open and close said first and second switch means, said actuators including means preventing closing of either of said first and second switch means for a period of time after the other of said first and second switch means is opened, and a third actuator operable to close and open the third switch means while the second switch means is closed.

3. A display sign comprising a display panel having a plurality of lamps thereon, said lamps being connected in a plurality of separate circuits and operable by energization of appropriate circuits to spell out information on the panel, a first information indicating mechanism having a first group of switches, said first mechanism including means operable to manipulate said switches to maintain combinations of opened and closed switches representative of the information to be displayed, a second information indicating mechanism having a second group of switches, said second information indicating mechanism including means operable to manipulate said last named switches to maintain combinations of opened and

closed switches representative of the information to be displayed thereby, a power source, first switch means operable to connect the power source to the first group of switches whereby to cause the closed switches of said first group to conduct electricity, a second switch means operable to connect the power source with the second group of switches whereby to cause the closed switches of said second group to conduct electricity, third switch means operable to connect and disconnect with the power source, a plurality of separate controlling means controlling said separate lamp circuits, each of said last named means normally connecting its lamp circuit to one of the switches of the first group whereby to permit said switch to control the energization of said circuit, each of said separate control means being controlled by one of the switches of the second group whereby to disconnect its lamp circuit from the switch of the first group and connect said lamp circuit to said third switch means when the switch of the second group is conducting electricity, and switch actuating means operable to open and close the first and second switch means alternately, said actuating means including means operable to close and open said third means to connect and disconnect it from the power source while the second switch means is closed.

4. A display sign comprising a display panel having a plurality of lamps thereon, said lamps being connected in a plurality of separate circuits and operable to energization of appropriate circuits to spell out information on the panel, a first information indicating mechanism having a first group of switches, said first mechanism including means operable to manipulate said switches to maintain combinations of opened and closed switches representative of the information to be displayed, a second information indicating mechanism having a second group of switches, said second information indicating mechanism including means operable to manipulate said last named switches to maintain combinations of opened and closed switches representative of the information to be displayed thereby, a power source, first switch means operable to connect the power source to the first group of switches whereby to cause the closed switches of said first group to conduct electricity, second switch means operable to connect the power source with the second group of switches whereby to cause the closed switches of said second group to conduct electricity, third switch means operable to connect and disconnect with the power source, a plurality of separate controlling means controlling said separate lamp circuits, each of said last named means normally connecting its lamp circuit to one of the switches of the first group whereby to permit said switch to control the energization of said circuit, each of said separate control means being controlled by one of the switches of the second group whereby to disconnect its lamp circuit from the switch of the first group and connect said lamp circuit to said third switch means when

the switch of the second group is conducting electricity, first and second actuators operable to alternately open and close said first and second switch means, said actuators including means preventing closing of either of said first and second switch means for a period of time after the other of said first and second switch means is opened, and a third actuator operable to close and open the third switch means while the second switch means is closed.

5. In a display sign which includes a display panel having a plurality of lamps thereon connected in a plurality of separate circuits, a first information indicating mechanism including a first group of control switches operable to select lamp circuits to be energized to display first information and including a first electrically operated control device for causing selective manipulation of the switches of said first group, a second information indicating mechanism including a second group of control switches operable to select lamp circuits to be energized to display second information and including a second electrically operated control device for causing selective manipulation of the switches of said second group, a plurality of relays each including a relay coil and a relay switch having a normally open contact and a normally closed contact, each of said relay switches being connected to a lamp circuit, each of the normally closed contacts of said relay switches being connected to a switch of said first group of switches whereby to electrically connect the lamp circuits to said first group of switches when the relays are de-energized, a power supply line connected to the normally open contacts of said relay switches, the relay coils being connected to said second group of switches whereby to energize certain of the relays when the closed switches of said second group are energized and move the relay switches of said energized relays to normally open position and electrically connect the corresponding lamp circuits to the power supply line, a power source, first switch means operable to connect the power source with said first group of switches and operable to connect the second electrically operated control device to the power source, second switch means operable to connect the power source to the second group of switches and operable to connect the first electrically operated control device to the power source, third switch means operable to connect the power source with said power supply line, and switch actuating means operable to open and close said first and second switch means alternately, said actuating means including means operable to close and open said third switch means while the second switch means is closed.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |                 |               |
|-----------|-----------------|---------------|
| 2,290,261 | Welch           | July 21, 1942 |
| 2,447,037 | Sitzer          | Aug. 17, 1948 |
| 2,673,976 | Williams et al. | Dec. 19, 1952 |