Dec. 15, 1953 M. GLENN 2,662,368

TIME ZONE INDICATOR SYSTEM

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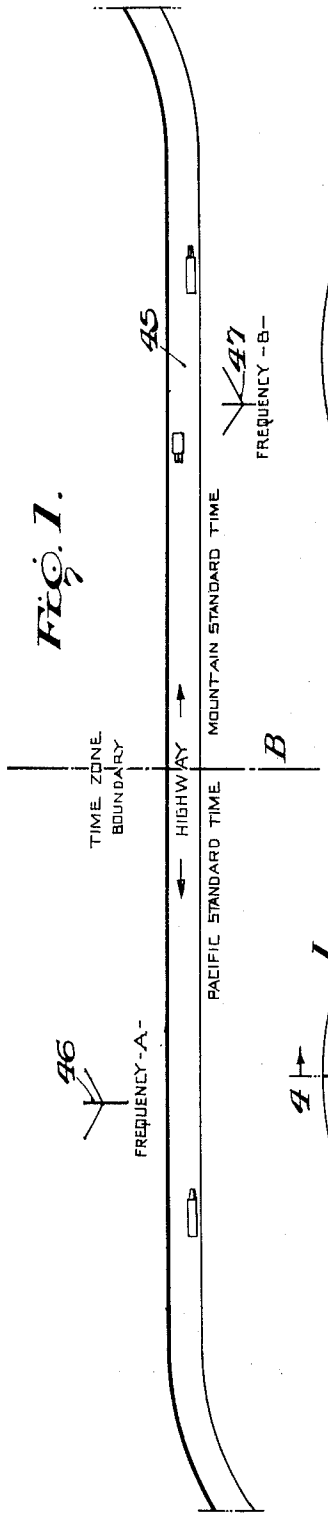

Fig. 1.

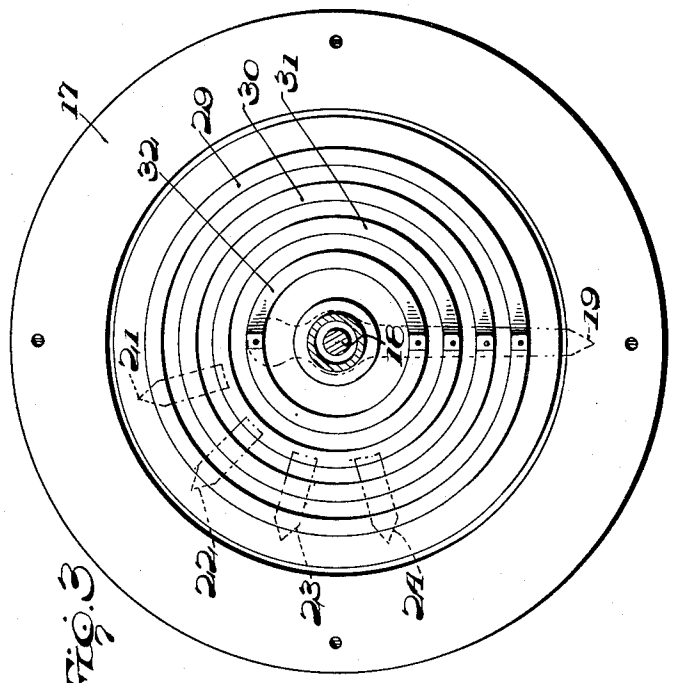

Fig. 3

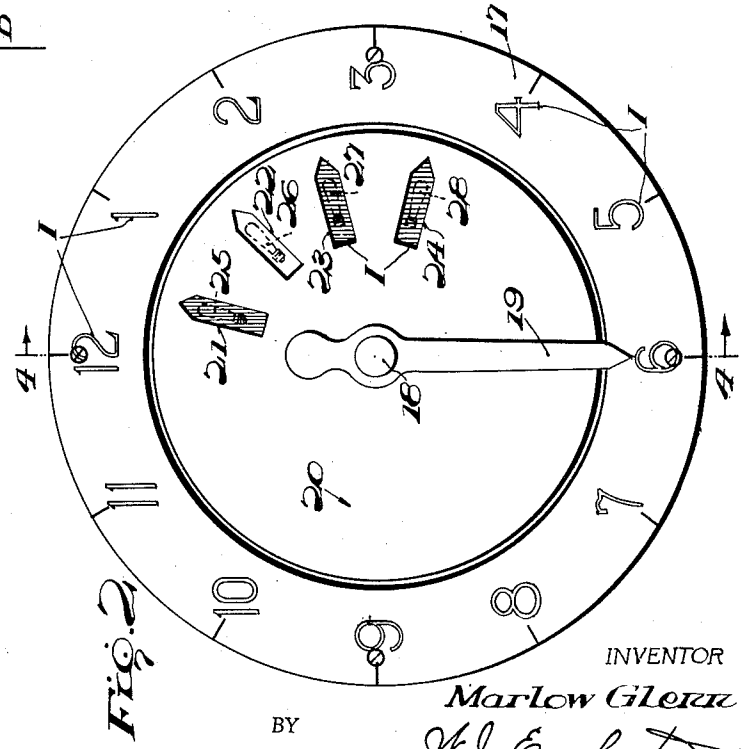

Fig. 2

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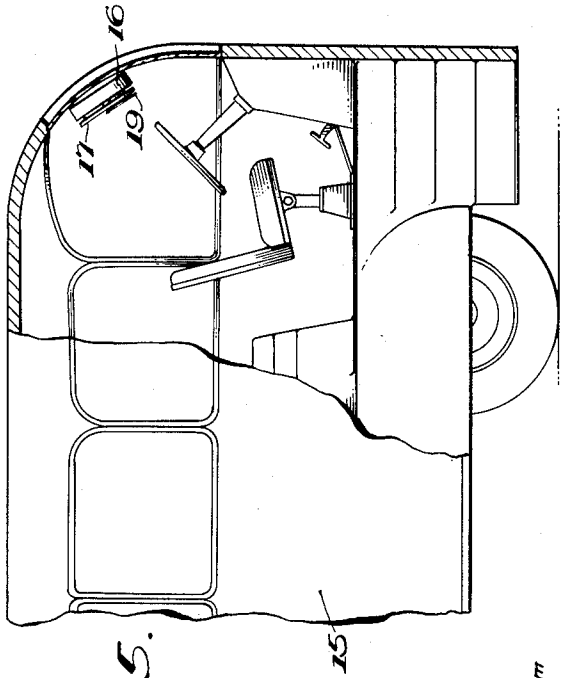

Fig. 5.

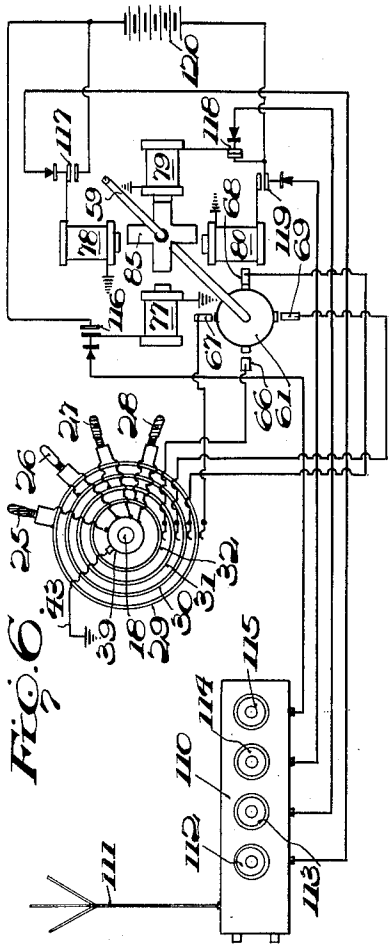

Fig. 6.

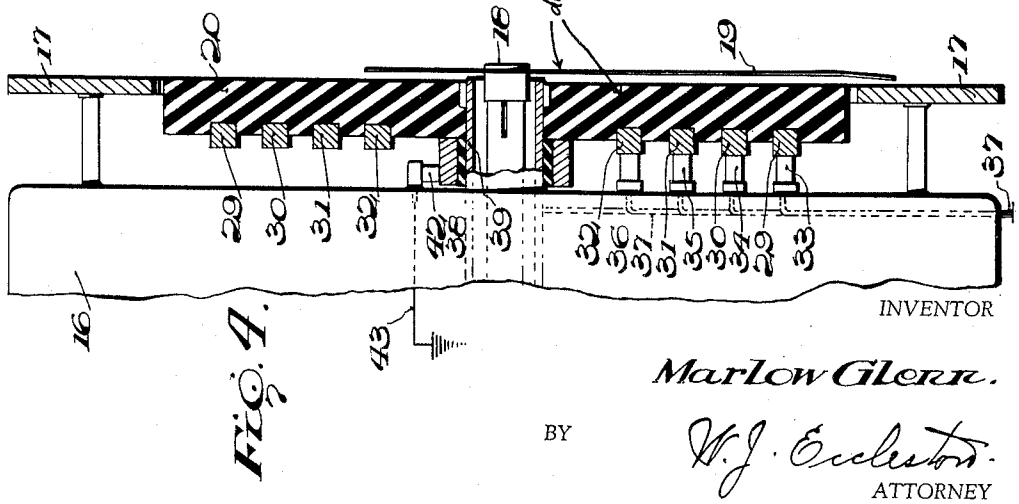

Fig. 4.

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Fig. 7.

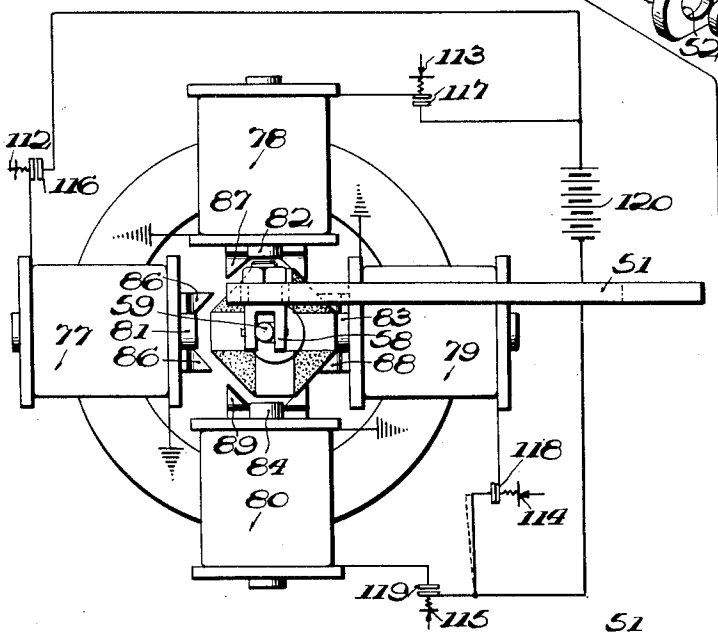
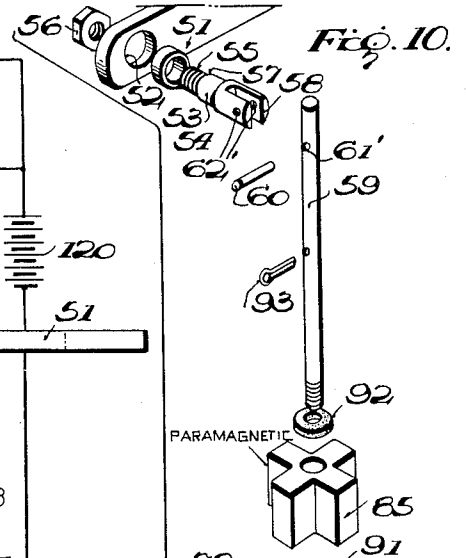


Fig. 10.



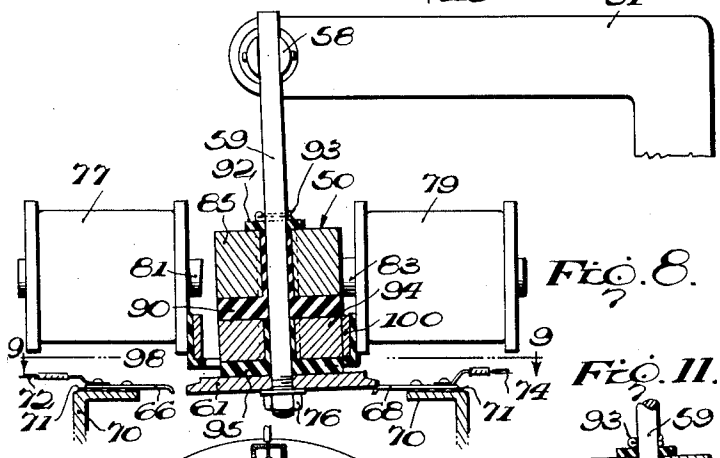


Fig. 8.

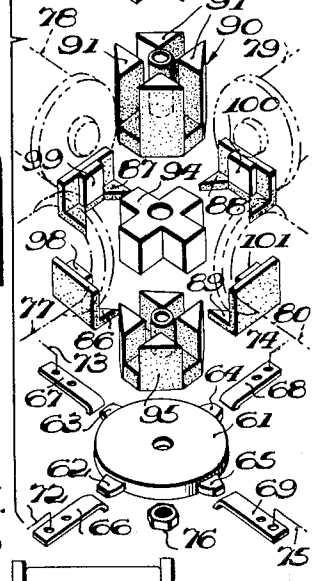


Fig. 11.

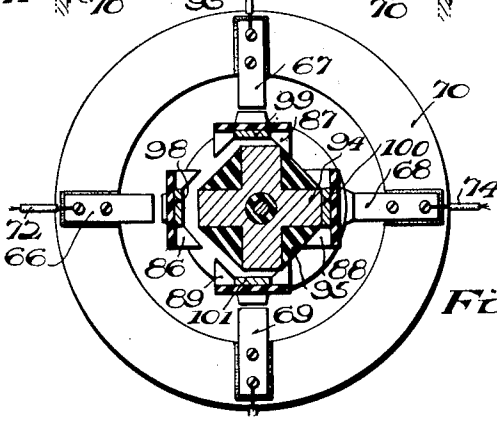
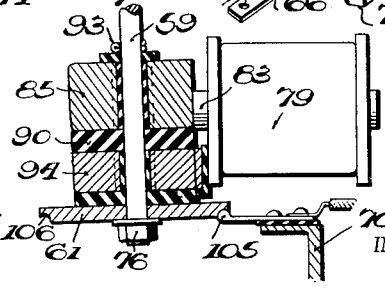


Fig. 9.



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Patented Dec. 15, 1953

2,662,368

UNITED STATES PATENT OFFICE

2,662,368

TIME ZONE INDICATOR SYSTEM

Marlow Glenn, San Francisco, Calif.

Application April 2, 1953, Serial No. 346,547

8 Claims. (Cl. 58—43)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

It is well known that in the United States, Canada, and other nations having large land areas, the country is divided by law into several time zones each observing a different standard time. Thus the United States is divided into four zones, viz., eastern standard time, central standard time, mountain standard time and Pacific standard time. The boundaries of these zones are very irregular, but usually it is a simple matter to determine from published maps the places or points where a road or railway leaves one time zone and enters another. While this is true, few travelers in public conveyances have access to or study time zone maps and many, to judge from their questions, do not even read or understand train schedules (which always indicate where the time changes). The confusion which constantly arises as to the time at the place where a traveler happens to be (a confusion which is vastly augmented during periods when "daylight saving" goes into effect) may be eliminated by employment of the system of the present invention in connection with trains, buses, and other public conveyances. If desired, the system may even be extended to private cars and trucks, as the time-indicating and signal-responsive equipment of the invention will not occupy much space or require much labor or skill in making an installation.

Objects are to provide a reliable, simple, automatic system of the character indicated. Other objects will be apparent from the above remarks and from the following description of a preferred embodiment of the invention shown in the accompanying drawings forming a part of this specification.

In said drawings, which illustrate the system and apparatus somewhat diagrammatically,

Fig. 1 is a sketch showing in plan a road traversing parts of two time zones, with means for broadcasting signals of different frequencies in the respective zones, a few vehicles being shown on the road;

Fig. 2 is an elevation of the dial of the time indicator;

Fig. 3 is a sectional elevation of the rear of the time indicator;

Fig. 4 is an enlarged cross section on line 4—4 of Fig. 2;

Fig. 5 is an elevation with parts broken away of the front end of a bus showing the receiving

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set installed above or adjacent to the windshield;

Fig. 6 is a wiring diagram of the receiving set;

Fig. 7 is a top plan view of a magnetic pendulum switch, and wiring connections;

Fig. 8 is a vertical section through the switch of Fig. 7;

Fig. 9 is a section on line 9—9 of Fig. 8;

Fig. 10 is an exploded view of the magnetic pendulum switch; and

Fig. 11 is a detail in elevation showing an alternative construction of the pendulum switch holding or latching means.

Referring particularly to the drawings and first to Fig. 5, the bus 15 (which represents any public conveyance or private car) is shown with a time-indicating mechanism 16 installed adjacent the forward end of the bus, said mechanism including an annular dial 17 (Figs. 2 and 4) which has hour indicia I marked thereon. A rotating arbor 18 carries minute hand 19, which extends over the annular dial. A rotating hour disk 20 is supported substantially flush with the annular dial 17 and is adapted to rotate in timed relation with the minute hand 19, that is, hour disk 20 rotates once in twelve hours. Any suitable mechanical, electrical or electro-mechanical time keeping mechanism (not shown) may be used to drive the minute hand and hour disk. Cut or otherwise formed in the rotating hour disk 20 are four hour indicia, preferably openings 21, 22, 23, 24 each having an outline simulating the outer end of a clock's hour hand, each opening being adapted to be illuminated from behind when a small electric lamp bulb 25, 26, 27, 28 respectively (or other source of light) is energized. Bulbs 25—28 are carried in recesses formed in the insulating hour disk 20. In Fig. 2 the shading of openings 21, 23 and 24 is intended to indicate the absence of illumination, while the unshaded opening 22 is intended to indicate illumination from bulb 26. Each hour indicium opening and its corresponding bulb are shielded by the body of hour disk 20 so that when any one opening is illuminated by the corresponding light bulb the other three openings are dark. In lieu of openings, transparent panes or lenses may be fixed in the openings in the hour disk. A light (not shown) or luminous materials may be employed to make the minute hand 19 also visible, preferably as far as the rear end of the bus, so that all passengers may read the indicated time.

To energize separately the several bulbs 25, 26, 27, 28 or other individual sources of light for the hour indicia, a set of four conductor rings 29, 30,

31, 32 (Figs. 3 and 4) are provided, these conductor rings constituting an armature, and preferably being set concentrically in the non-conducting hour disk 20. Brushes 33, 34, 35, 36 contact said conductor rings to conduct electricity through said rings to the bulbs 25, 26, 27, 28, respectively. See also Fig. 6. Wires 37 are individually connected to the brushes and lead to a control mechanism to be described, thence to a source of electricity, for example, the electrical lighting system of the bus. The negative contacts (not shown) of bulbs 25, 26, 27 and 28 are connected by wires with a conducting collar 38 which is tightly fitted on to a hollow shaft 39 which in turn is secured by any preferred means to the hour dial to drive the same. Hollow shaft 39 surrounds but has no contact with arbor 19 and both are driven by the clock mechanism previously mentioned. A brush 42 makes contact with collar 38 and a ground wire 43 connects brush 42 with the chassis of the bus or other conveyance.

At convenient points near a highway 45 (Fig. 1) are two antennae 46, 47 located on either side of the boundary B of two time zones and representing any low power broadcasting means for broadcasting waves of two different frequencies. The purpose of the broadcasting means 46, 47 is to actuate the parts of the system which effect a change in the circuits of lamp bulbs 25, 26, 27 and 28 so that the hour "hand" will be visually changed by one hour, appearing to jump forward if the vehicle has entered an eastward zone, and appearing to jump backward if a westward zone has been entered. The power of each broadcasting means 46, 47 is so weak that neither can affect the pulse-responsive mechanism provided on a vehicle employing my system after such vehicle has proceeded a short distance within the neighboring zone. It is intended that antennae broadcasting signals on the same frequency will be located throughout each time zone near its boundaries, but only adjacent principal highways and railroad tracks designated for passenger traffic, and that each of the four time zones of this country will have a different frequency assigned to it.

Referring to Figs. 7, 8, 9 and 10, I show therein a pendulum switch which is illustrative of several devices that may be used to control the circuits of bulbs 25, 26, 27 and 28 responsive to signals sent out as stated above. Each vehicle employing my system will carry one of these devices, which need not be located near the clock previously described but may be placed at any point where it is most readily protected from road shocks and weather damage. Each pendulum switch is preferably inclosed in a protective housing, not shown, and includes pendulum member 50 suspended at its upper end on the end of an inverted L-shaped bracket 51 which is fixed to any convenient support and stands in a vertical plane. Pendulum member 50 is permitted to swing in any vertical plane because of its suspension, which in effect is a universal joint. Bracket 51 is of insulating material and has a bore 52 at its extremity in which a sleeve 53 is fixed. Sleeve 53 provides a bearing for a shaft 54 having screw threads 55 on one end and a nut 56 by which the shaft is held on the bracket. An annular shoulder 57 on shaft 54 bears against the adjacent end of a sleeve 53 when nut 56 is tightened. A clevis 58 on shaft 54 receives loosely the upper end of a rod 59 and a pivot pin 60 is passed through aligned bores 61', 62' respectively in rod 59 and in the arms of the clevis. Rod 59 may swing freely on pivot 60 in a vertical plane which passes through shaft 54, and said rod may also swing freely about the axis of shaft 54 because said shaft turns freely in sleeve 53.

Secured to the lower end of rod 59 is a contact plate 61 which is preferably circular and has points or projections 62, 63, 64, 65 extending outwardly from the periphery thereof. Spring contacts 66, 67, 68, 69 are secured on a fixed ring 70 with insulation 71 between each spring contact and the fixed ring. Wires 72, 73, 74, 75 connect the spring contacts with the time indicator as will be described. Contact plate 61 is held on rod 59 by a nut 76 screwed upon the lower end of said rod. The spring contacts and the contact plate are so constructed, proportioned and arranged that when the pendulum formed by rod 59 and the parts secured thereto is plumb, projections 62—65 are not in contact with any one of the spring contacts. A small swing of said pendulum in any one of four directions, as determined by an energized electromagnet, will, however, bring one of the projections 62—65 into contact with a spring contact, thus closing a circuit which will energize one of the lamp bulbs 25, 26, 27 or 28.

To cause the pendulum to swing, a set of four electromagnets 77, 78, 79, 80 are provided, with the active poles 81—84 of said electro-magnets arranged 90° apart in a group which surrounds the pendulum near its lower end. Mounted on rod 59 but insulated therefrom is a cruciform magnetic metal mass 85 which is adapted to be attracted by and make contact with whichever electromagnetic pole is energized. As shown in Fig. 8, whenever the magnetic member 85 is in contact with such a pole, contact plate 61 is in electrical contact with one of the spring contacts 66—69. To prevent contact of magnetic member 85 simultaneously with two poles, insulating guides 86—89 are fixed to the electromagnets respectively below the poles; each insulating guide has a re-entrant portion, as shown in Figs. 7 and 10, while the cruciform magnetic member 85 has a pronged insulating member 90 which fits over rod 59 and has its prongs 91 filling the areas between the arms of the cruciform magnetic member. The length or height of the pronged insulating member 90 is the same as the corresponding dimension of the cruciform magnetic member 85 so that the upper ends of both member 85 and the insulation 90 are flush with each other. An insulating washer 92 fits over rod 59 and is held against the assembly of magnetic member 85 and its insulation 90 by means of a cotter pin 93 passed through a bore in rod 59. The lower end of magnetic member 85 is seated on the bottom of insulation 90, as shown in Fig. 8, and below insulation 90 is another cruciform magnetic member 94 which is of the same width as magnetic member 85 but is not so high. An insulating member 95, which is pronged like insulating member 90 and which fits around and under the cruciform magnetic member 94, is slipped on rod 59 and is held thereon by contact plate 61. Thus contact plate 61 is itself insulated from every element of the pendulum except rod 59, and rod 59, which is a conductor, may, if desired, be electrically connected to a power source such as battery (not shown) so that energy from said battery will be delivered to one of the lamps to light it whenever one of the electromagnets contacts the cruciform magnetic member 85. However, in the drawings I have

shown a slightly different arrangement as will be described.

The function of cruciform magnetic member 94 is to contact a holding magnet which is one of four like permanent magnets 98, 99, 100, 101 (Fig. 9) fixed for convenience to an electromagnet (77—80) by insulation guides 86—89 and hence insulated therefrom. Permanent magnets 98—101 are of steel, "Alnico" or similar highly efficient magnetic alloy, and they act to hold the pendulum member in circuit-closing position after it has once been swung into such position by one of the energized electromagnets 77—80. However, the holding magnets are of insufficient strength to resist the magnetic pull of any of the energized electromagnets 77—80 on the magnetic mass 85. Instead of permanent magnets for pendulum-holding means, a set of spring latches 105 may be used, as shown in Fig. 11, each spring latch being fixed to stationary ring 70 with its inner end free to flex and thus latchingly engage a groove 106, which is one of four grooves formed in the lower side of contact plate 61. The holding power of spring latches 105 must of course be such as to yield to release the pendulum when one of the electromagnets is energized. In the arrangement of Fig. 11, for convenience the spring latches 105 perform the dual function of latching the pendulum and conducting electrical current; hence insulation 107 is placed between each latch 105 and stationary ring 70.

As shown in Fig. 6, the receiving set box or casing 110, which is located anywhere on the bus, has an antenna 111 which may be built into the roof structure of the bus or may be attached as a whip antenna to the bus body, or may have any other desirable form. Antenna 111 has connections with four receiving means 112, 113, 114 and 115, each of which is fixedly tuned to a different signal-broadcasting means (only two being shown at 46, 47, Fig. 1). When any one of the receiving means 112—115 is receiving a signal, it will cause a contact to close. In Fig. 7 contact 118 is closed, and contacts 116, 117 and 119 are open as the corresponding receiving means 112, 113 and 115 are receiving no signals or else the signals received are too weak to be effective. Once a contact 116—119 is closed, a circuit will be closed including battery 120 (Figs. 6 and 7) and the corresponding electromagnet will be energized to actuate the pendulum switch as already explained. Battery 120 furnishes the energy necessary for lighting the hour hand light (25, 26, 27 or 28) as well as for energizing the electromagnets.

It will be appreciated that many changes may be made in the described mechanism. Thus instead of four hour indicia, a greater number than four or as few as two may be employed. Instead of illuminated openings for the hour indicia, other hour-hand-simulating members may be employed under the control of the described circuits so as to appear and disappear automatically; for example, automatically movable shutters each of which is both white and black may show their white areas to match the white hour disk 20 and hence at a little distance be indistinguishable therefrom, with one of the shutters actuated by signals as described herein to expose its black area and give the appearance of a black hour hand, contrasting with the white face of disk 20. The hour disk could be a stationary dial having twelve hour indicia and a selected hour indicium (one of the twelve) may be made visible or more prominent than the others as controlled by the described mechanism and system. Other modifications and variations within the scope of the appended claims will occur to those skilled in the art.

What I claim is:

1. In combination, two sources of wave energy broadcasting on different frequencies, said sources of wave energy being of very low power and being located in two adjacent time zones but close to an artery of commerce traversing said time zones and close to the boundary between said adjacent time zones; a vehicle having a receiving set and time-indicating means, said time-indicating means comprising an hour indicator, a minute indicator and a source of power coupled with said indicators to drive both indicators in timed relation to tell time; said hour indicator having at least two hour indicia; said receiving set having means which are sensitive to the signals broadcast from a single one of said sources of wave energy, said receiving set including means acting automatically responsive to a change in condition of said signal-sensitive means to change the hour reading of the hour indicator without affecting the minute indicator, so that said hour indicator automatically and instantaneously indicates a loss of exactly one hour when the vehicle enters the time zone which is generally to the east and automatically and instantaneously indicates a gain of exactly one hour when the vehicle enters the generally westward time zone.

2. The invention defined in claim 1, wherein said hour indicator consists of a rotating dial having simulations of hour hands thereon, all of said hour hand simulations being visually indistinct except one which in cooperation with the minute hand tells the time; electric illuminating means to make readily visible the hour hand simulation which tells the time; a switch to select the hour hand simulation which tells the time; a source of electric current; and circuits connecting said source, said switch, and said illuminating means.

3. The invention defined in claim 1, wherein the hour indicator comprises at least two illuminatable means spaced one hour apart on a clock dial, a source of electricity for energizing said illuminatable means, and circuits including a selector switch for controlling the illuminatable means so that a single illuminatable means is energized at one time, said circuits also including magnetic means actuated by the signal-sensitive means to change the position of said selector switch in accordance with a change in signals received by the receiving set.

4. The invention defined in claim 3, wherein said circuits also include other magnetic means to hold said selector switch in any circuit-closing position which it may be compelled to assume, the first-mentioned magnetic means being more powerful than said other magnetic means so as to overcome the latter to change the position of said selector switch responsive to signals received.

5. The invention defined in claim 3, wherein said circuits also include plural spring latching means to latch said switch in any circuit-closing position which it may be compelled to assume, said magnetic means being sufficiently powerful to overcome the hold of the spring latching means to change the position of said selector switch responsive to signals received.

6. The invention defined in claim 5 wherein the plural spring latching means are conductors

and individually form part of an electrical circuit including said source of electricity and said selector switch.

7. In combination, at least two sources of wave energy broadcasting on different frequencies, said sources of energy being of very low power and being located in different time zones but close to an artery of commerce traversing said time zones, a vehicle having a receiving set and cooperating time-indicating means, said receiving set being sensitive to the signals broadcast from the nearest one of said sources of energy, said time-indicating means including an hour disk, a minute hand, and a clock mechanism for driving the hour disk and minute hand in timed relation, the hour disk having at least two hour indicia and electric illuminating means arranged to light individually each hour indicium, the receiving set having a mechanism sensitive to the signals broadcast from said sources of wave energy and including an electro-magnetically operated selector switch acting to close the circuit of one of said illuminating means responsive to received signals of a certain frequency and acting to close the circuit of another of said illuminating means responsive to received signals of another frequency emanating from another time zone, the parts being so constructed and arranged that the circuit of but one illuminating means is closed while the circuits of all the other illuminating means are then open, and a source of electric energy for energizing said illuminating means and said electro-magnetically operated selector switch.

8. A time-indicating receiving set sensitive to signals of low power and different frequencies and capable of support in a vehicle within sight of the occupants thereof, comprising an annular dial, time indicia on the dial, an hour disk surrounded by the annular dial and supported for rotation relative thereto, a minute hand supported for rotation over the dial, clock mechanism to drive the hour disk and minute hand in the conventional manner, a plurality of transparent areas simulating clock hands provided on the hour disk, a plurality of sources of electric light behind said transparent areas, each such source of light being directed to the corresponding transparent area and being shielded from all the other transparent areas, a source of electric energy for energizing said sources of light, circuit-controlling means for switching the sources of light on and off, and means actuated by signals of low power to operate the circuit-controlling means to switch on only one source of light for each signal frequency.

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No references cited.