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GB A 2164199 GB A 2103386 GB 1596630
GB A 2146794 GB A 2032166 GB 1504148
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Maplin 1985 Buyers Guide to Electronic Components, November 1984, Page 34

(58) Field of search
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H1R
H1B
Selected US specifications from IPC sub-classes G05D H05K H01M G04G

(54) Apparatus

(57) A programming apparatus for a domestic central heating/hot water system includes an LCD display panel 8 arranged to display the automatic starting and automatic stopping times which are preset by operation of presetting buttons. Upon initial energization of the LCD display by movement of a slide 30 and a battery thereon into its fully closed position the panel 8 displays starting and stopping times which are commonly employed. Moreover, the apparatus changes its 24-hour day at 3.00 a.m. Furthermore, if programme times have been inoperably entered, those times displays flash until the error is corrected. The battery has a negative terminal of a greater diameter than a positive terminal thereof, and the slide 30 has a lower, forwardly-opening recess of a size too small for the negative terminal but appropriate for the positive terminal, so that incorrect mounting of the battery in the slide 30 is obstructed. In the rear of a casing is a row of plug-and-socket connections, and the top wall of the casing includes a hinged flap turnable into a fully open position to expose the connections for testing of the circuitry by an electrical probe.

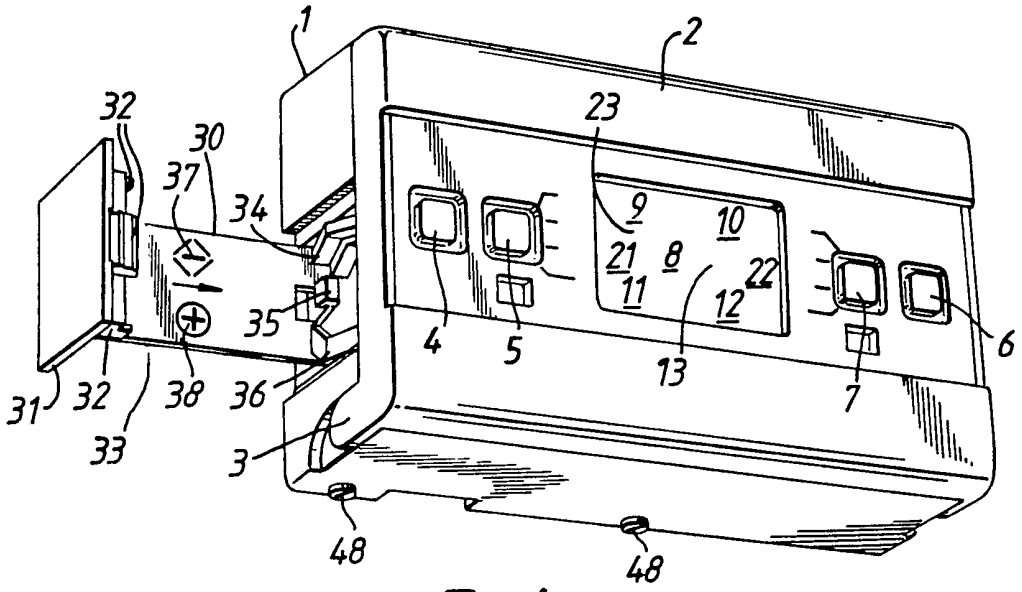

FIG. 1.

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The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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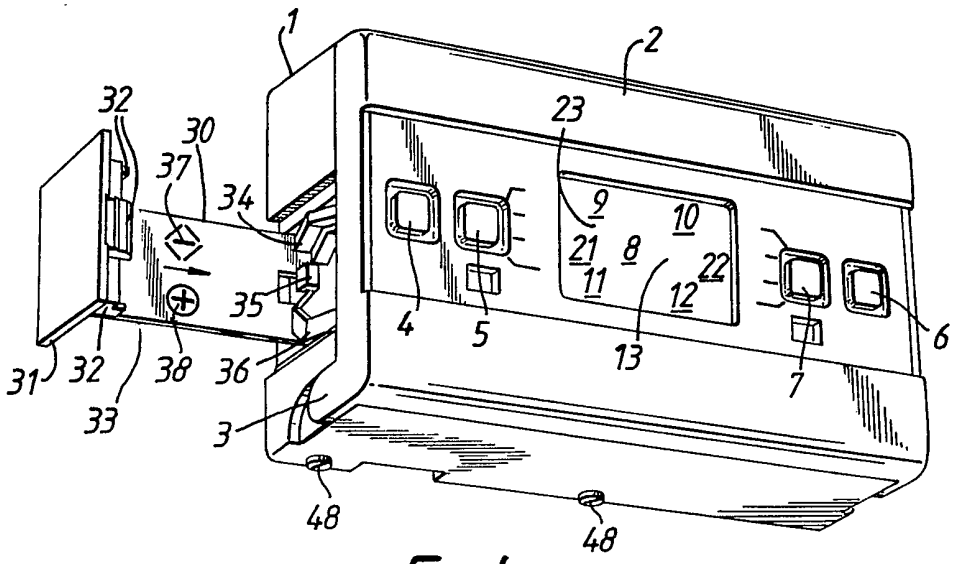
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FIG. 1.

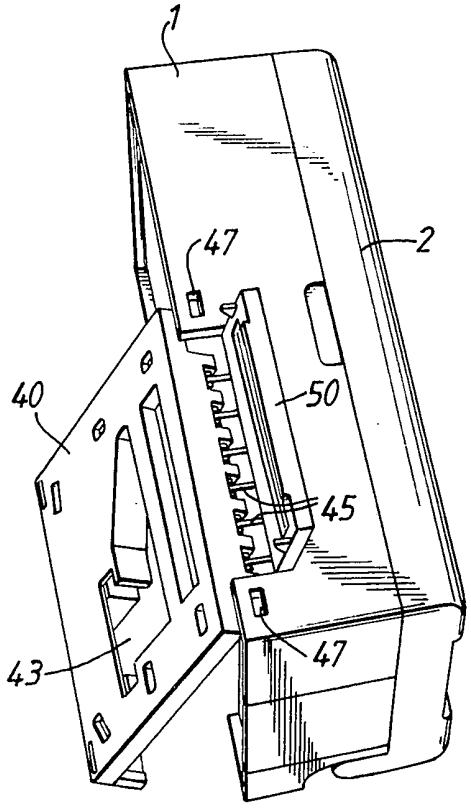
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FIG. 2.

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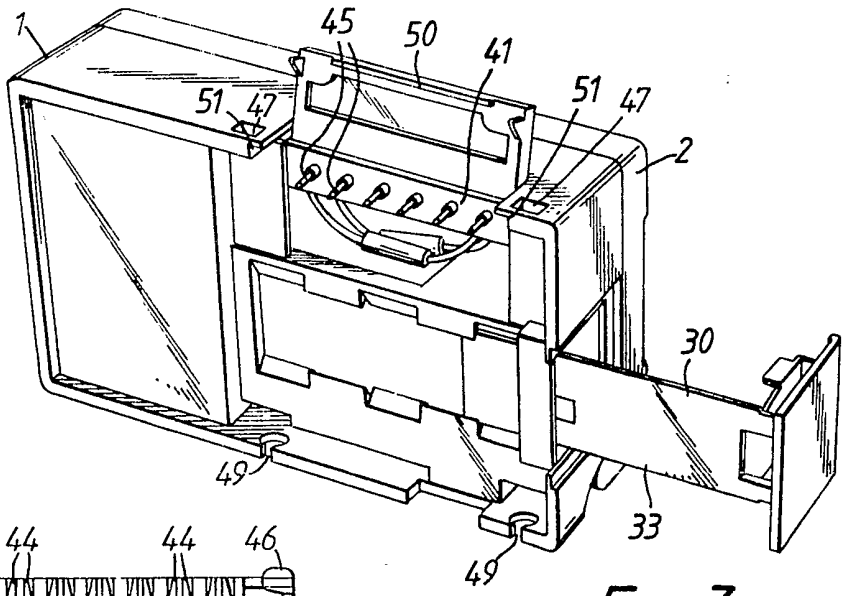

FIG. 3.

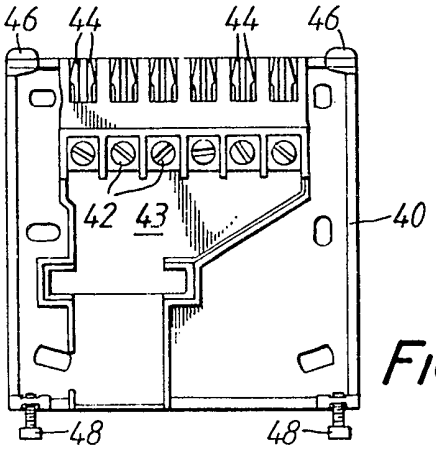

FIG. 4.

SPECIFICATION

Apparatus

According to one aspect of the present invention, there is provided an apparatus for use in presetting times of automatic starting and automatic stopping of equipment, comprising adjustable presetting means arranged to preset said times, display means arranged to display the times for which the presetting means is set, and means arranged to store commonly preferred times of said automatic starting and said automatic stopping and to cause said commonly preferred times to be the displayed times at said display means prior to adjustment of said presetting means.

According to a second aspect of the present invention, there is provided electrical apparatus comprising first and second mounting members, plug-and-socket means of which plug means is carried by the first mounting member and socket means is carried by the second mounting member, one of the members supporting casing means covering said plug-and-socket means, the other of the members being mountable upon a support, and the casing means including a part displaceable relative to the remainder of the casing means to expose said plug-and-socket means to permit an electrical testing device to be applied thereto.

According to a third aspect of the present invention, there is provided electrical apparatus including a battery carrier for carrying a battery having two terminals a dimension of one terminal of which is larger than of the other terminal, the battery carrier including a hole at least part of which is too small to receive said dimension of said one terminal but large enough to receive said dimension of said other terminal, thereby obstructing mounting of said battery in said carrier with said one terminal where said other terminal should be.

According to a fourth aspect of the present invention, there is provided an apparatus for use in presetting times of automatic starting and automatic stopping of domestic equipment, comprising adjustable presetting means arranged to preset said times, display means arranged to display the times for which the presetting means is set, timing means arranged to activate said starting and said stopping when the times are reached, the arrangement being such that the 24-hour day of the apparatus begins at a predetermined time between 1 a.m. and 5 a.m.

The latter predetermined time is preferably between 2 a.m. and 4 a.m., particularly 3 a.m.

According to a fifth aspect of the present invention, there is provided in central heating equipment, an apparatus for use in presetting times of automatic starting and stopping of the equipment, comprising adjustable presetting means arranged to preset said times, and display means arranged to display the times for which the presetting means is set and to provide a warning indication if and when the user attempts to preset inoperable times.

In order that the invention may be clearly understood, and readily carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:–

Figure 1 shows a front perspective view of programming apparatus for a domestic central heating/hot water system, with a battery-carrying slide of said apparatus in a fully open position,

Figure 2 shows a top perspective view of the apparatus of Fig. 1, but with the battery-carrying slide closed and a major part of that apparatus in the process of being removed from a mounting member of the apparatus,

Figure 3 shows a rear perspective view of that major part completely removed from the mounting member and with the battery-carrying slide fully open, and

Figure 4 shows a front elevation of that mounting member.

The programming apparatus to be described with reference to the drawings is of substantially the same form as the programming apparatus of our co-pending British Patent Application 8324833. It thus comprises a casing 1 containing a microprocessor and various other controls for a domestic central heating/hot water system. The front of the casing 1 is partially covered by a frame-form flap 2 surrounding the front of the casing 1. The flap 2 is pivoted at 3 at its bottom to the bottom of the casing 1 and is held in the raised position shown by some form of detent (not shown). The flap 2 leaves exposed at the front of the casing 1 a hot water override button 4 and a hot water selector button 5 to the left as seen in Fig. 1, a central heating override button 6 and a central heating selector button 7 to the right as seen in Fig. 1, and a time and day display panel 8 disposed at the middle of the front of the casing 1. The panel 8 is a liquid crystal display panel and has eight electrical driving circuit arrangements, four of which are situated in the respective corner zones 9 to 12 of the panel 8, a fifth of which is arranged in a central larger zone 13 of the panel 8, and a sixth of which is arranged as a horizontal band 23 across the panel 8 between the zone 13, on the one hand, and the zones 9 and 10, on the other hand, and the other two of which are arranged in respective side zones 21 and 22. Each of the first five zones indicates time in numerals representing hours and minutes and in letters representing ante meridiem and post meridiem, while the sixth zone 23 displays letters representing a selected day of the week. The zone 13 displays the current time. The zone 9 displays, for the day displayed in the zone 23, the time when the central heating

boiler and pump are to be first turned on, and the zone 10 indicates, for that day, the time when the boiler and pump are to be first turned off. The zone 11 displays, for that same day, the time when the boiler and pump can be turned on for a second time, and the zone 12 displays the time when the boiler and pump can be turned off for a second time. Above the zones 9 and 10, the front of the casing 1 carries the respective legends "1st on" and "1st off", and the front also carries the respective legends "2nd on" and "2nd off" below the corresponding zones 11 and 12. The zones 21 and 22 each have a four-position arrow display of which the respective positions are aligned with legends "on", "once", "twice" and "off" on the front face of the casing 1, the left-hand legends being associated with the domestic hot water and the right-hand legends being associated with the central heating. Hidden and protected by a top horizontal front strip of the flap 2 are a button for use in setting when the boiler and pump are to be first turned on, and a button for setting when the boiler and pump are to be first turned off. Hidden and protected by a bottom horizontal front strip of the flap 2 are a button which instructs repetition of a previous day's programme, a button used to set the time for the boiler and pump to be turned on for a second time, a button used to set the time for the boiler and pump to be turned off for a second time, a button used to correct the time shown at the zone 13, and a button used to select the day shown at the zone 23 and to cause that day's programme to be displayed at the zones 9 to 12. Thus all of these buttons usable in altering a programme are protected by the flap 2 against inadvertent operation.

The apparatus has a seven-day programming capability, in other words a whole week's on-off times can be individually predetermined and will repeat week-by-week if desired. The apparatus is also arranged to change its day at 3.00 a.m., to enable users who do not go to bed by midnight to pre-set a programme to be effective up to 3.00 a.m. Moreover, the apparatus has an automatic programme timing error indication, in that if programme times have been inoperably entered, for example an 'off' time prior to an intendedly previous associated 'on' time, those times displays flash until the error is corrected.

Normally held closed by the flap 2 is a battery carrying slide 30 including an outer end wall 31 which, in the closed position of the slide 30 is flush with the casing 1 and has its front edge engaged within the flap 2 to prevent opening of the slide 30. After lowering of the flap 2, the slide 30 can be pulled out into the fully open position shown in Figs. 1 and 3, in which abutments on the casing 1 prevent it from being opened further. In the open position of the slide 30, there can be mounted in, or removed from, the slide a battery (not shown) which is preferably automatically re-charged from the mains and which, in the closed position of the slide 30, maintains the controls energized in spite of interruption of the mains supply. During a mains supply interruption for other than an excessive length of time, the display continues to function and can be re-set, whilst the programme in the memory is maintained, although no programmed commands will be executed, nor will any manual commands be executed to control the central heating/hot water system. The battery has at one end its two negative and positive terminals in the form of two posts, and at its other end a planar face. That other end is closely received among a vertical rear plate 33 of the slide 30 and three projections 32 near the outer end of the slide 30. At a short distance outwards of its inner end the plate 33 is formed with upper, intermediate and lower, forwardly-projecting limbs 34, 35 and 36 which thereby bound between them upper and lower forwardly opening recesses. The upper recess is suitably shaped and sized to receive the negative terminal post of the battery, whilst the lower recess is suitably shaped and sized to receive the positive terminal post of the battery. The negative terminal post of the battery is of a significantly greater diameter than is the positive terminal post. A negative sign 37 and a positive sign 38 moulded into the front face of the plate 33 indicate the correct orientation of the battery. If, however, the user attempts to insert the battery into the slide 30 with the polarities reversed, namely with the negative terminal post in the lower recess and the positive terminal post in the upper recess, because the negative terminal post is too large for the lower recess, the battery will not seat properly in the slide 30 and will in fact protrude forwards to a degree to abut against the casing 1 if the user attempts to press the slide 30 towards its closed position, in which the terminal posts are in electrical contact with spring terminals of electrical circuitry in the casing 1. The slide 30 is of resilient plastics material to allow flexing of the plate 33 during insertion and removal of the battery.

The apparatus includes a square rear mounting member 40 for attachment to a house wall (not shown) and a front mounting member 41 attached to the other parts of the apparatus. The electrical circuitry controlling the pump etc. includes six screw terminals 42 carried by the member 40, bounding a hole 43 through the member 40 and including respective pairs of upwardly extending, resilient, fork prongs 44, and six rearwardly projecting pins 45 carried by the member 41, the pins 45 engaging the respective pairs of prongs 44 in a plug-and-socket-like manner. At its top, the member 40 includes upwardly projecting

lugs 46 which engage in respective slots 47 in the top wall of the casing 1, whilst the bottom of the member 40 is provided with downwardly protruding, captive screws 48, the shanks of which can be received in slots 49 in the rear edge of the bottom wall of the casing 1. The heads of the screws 48 are received in recesses formed in the underneath surface of the bottom wall of the casing 1 and merging into the slots 49. The purpose of providing the mounting member 40 is to enable the remainder of the apparatus to be simply removed from the wall as a unit for repair and maintenance purposes. To achieve such removal, the screws 48 are untightened to lower their heads out of the recesses, and then the casing 1 and its associated parts are swung forward as a unit to bring the slots 49 away from around the screws 48, until the apparatus is in for example the position shown in Fig. 2, in which the casing 1 can simply be lifted to remove the slots 47 from round the lugs 46 and remove the pins 45 upwardly from between the prongs 44.

In order to enable the electrical circuitry to be tested by an electrical probe without the unit needing to be removed from the mounting member 40, the top wall of the casing 1 includes a hinged flap 50 which can be turned about a horizontal axis into a fully open position slightly inclined forwards from the vertical, to expose the pins 45 and the prongs 44 for electrically conductive contact by the probe. The flap 50 includes at the ends of its forward edge respective stubs which engage in respective guide recesses 51 in the underneath surface of the top wall of the casing 1 to enable the flap 50 to be removed from the casing 1 by rearward and then upward movement of those stubs.

The utilization of the apparatus is otherwise as set out in our co-pending Patent application 8324833, except that, upon initial energization of the liquid crystal display 8 by movement of the slide 30 and the battery carried thereby into its fully closed condition, the zones 9 to 12 display times which are commonly employed in programmes for central heating/hot water systems. If the user wishes to set times different from them he adjusts by means of the buttons (not shown) the times set.

CLAIMS

1. An apparatus for use in presetting times of automatic starting and automatic stopping of equipment, comprising adjustable presetting means arranged to preset said times, display means arranged to display the times for which the presetting means is set, and third means arranged to store commonly preferred times of said automatic starting and said automatic stopping and to cause said commonly preferred times to be the displayed times at said display means prior to adjustment of said presetting means.

2. An apparatus as claimed in claim 1, wherein said third means causes said commonly preferred times to be displayed at said display means immediately upon energization of said display means.

3. An apparatus as claimed in claim 1 or 2 and in domestic equipment.

4. An apparatus as claimed in claim 3, wherein said equipment is central heating equipment.

5. An apparatus as claimed in claim 3 or 4, wherein the 24-hour day of the apparatus begins at a predetermined time between 1 a.m. and 5 a.m.

6. An apparatus as claimed in claim 5, wherein said predetermined time is between 2 a.m. and 4 a.m.

7. An apparatus as claimed in claim 6, wherein said predetermined time is 3 a.m.

8. An apparatus as claimed in any preceding claim, wherein said display means is arranged to provide a warning indication if and when a user attempts to preset inoperable times.

9. An apparatus as claimed in any preceding claim, and further comprising first and second mounting members, electrical plug-and-socket means of which the plug means is carried by the second mounting member, one of the members supporting casing means covering said plug-and-socket means, the other of the members being mountable upon a support, and the casing means including a part displaceable relative to the remainder of the casing means to expose said plug-and-socket means to permit an electrical testing device to be applied thereto.

10. An apparatus as claimed in claim 9, wherein said support includes a planar supporting surface extending beyond said casing means, with one side of said casing means being face-to-face with said surface, and said part is provided at second side of said casing means perpendicular to said one side and is located adjacent to said one side.

11. An apparatus as claimed in claim 10, wherein said part when in a fully closed condition extends in a plane substantially parallel to said second side and when in a fully open condition extends in a plane approximately perpendicular to said second side and parallel to said one side.

12. An apparatus as claimed in any preceding claim, and further comprising an electrical battery carrier for carrying a battery having two terminals a dimension of one terminal of which is larger than of the other terminal, the battery carrier including a hole at least part of which is too small to receive said dimension of said one terminal but large enough to receive said dimension of said other terminal, thereby obstructing mounting of said battery in said carrier with said one terminal where said other terminal should be.

13. An apparatus as claimed in claim 12, wherein said dimension is width.

14. An apparatus as claimed in claim 12 or 13, wherein said battery carrier is a slide slidably mounted in a casing portion of the apparatus between a closed position in which said battery maintains said controls energized and an open position in which said battery is removable from said slide, said casing portion defining an opening through which said slide extends and which is of such size and shape as to be unable to receive said battery with said battery incorrectly carried on said slide.

15. An apparatus as claimed in claim 12, 13 or 14, wherein said carrier is resilient, in order that said battery may be resiliently and removably retained thereon.

16. An apparatus comprising first and second mounting members, plug-and-socket means of which plug means is carried by the first mounting member and socket means is carried by the second mounting member, one of the members supporting casing means covering said plug-and-socket means, the other of the members being mountable upon a support, and the casing means including a part displaceable relative to the remainder of the casing means to expose said plug-and-socket means to permit an electrical testing device to be applied thereto.

17. Apparatus as claimed in claim 16, wherein said support includes a planar supporting surface extending beyond said casing means, with one side of said casing means being face-to-face with said surface, and said part is provided at a second side of said casing means perpendicular to said one side and is located adjacent to said one side.

18. Apparatus as claimed in claim 17, wherein said part when in a fully closed condition extends in a plane substantially parallel to said second side and when in a fully open condition extends in a plane approximately perpendicular to said second side and parallel to said one side.

19. Apparatus including a battery carrier for carrying a battery having two terminals a dimension of one terminal of which is larger than of the other terminal, the battery carrier including a hole at least part of which is too small to receive said dimension of said one terminal but large enough to receive said dimension of said other terminal, thereby obstructing mounting of said battery in said carrier with said one terminal where said other terminal should be.

20. Apparatus as claimed in claim 19, wherein said dimension is width.

21. Apparatus as claimed in claim 19 or 20, wherein said battery carrier is a slide slidably mounted in a casing portion of the apparatus between a closed position in which said battery maintains said controls energized and an open position in which said battery is removable from said slide, said casing portion defining an opening through which said slide extends and which is of such size and shape as to be unable to receive said battery with said battery incorrectly carried on said slide.

22. Apparatus as claimed in claim 19, 20 or 21, wherein said carrier is resilient, in order that said battery may be resiliently and removably retained thereon.

23. An apparatus for use in presetting times of automatic starting and automatic stopping of domestic equipment, comprising adjustable presetting means arranged to preset said times, display means arranged to display the times for which the presetting means is set, timing means arranged to activate said starting and said stopping when the times are reached, the arrangment being such that the 24-hour day of the apparatus begins at a predetermined time between 1 a.m. and 5 a.m.

24. An apparatus as claimed in claim 23, wherein said predetermined time is between 2 a.m. and 4 a.m.

25. Apparatus as claimed in claim 24, wherein said predetermined time is 3 a.m.

26. In central heating equipment, apparatus for use in presetting times of automatic starting and stopping of the equipment, comprising adjustable presetting means arranged to preset said times, and display means arranged to display the times for which the presetting means is set and to provide a warning indication if and when the user attempts to preset inoperable times.

27. Programming apparatus, substantially as hereinbefore described with reference to the accompanying drawings.

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