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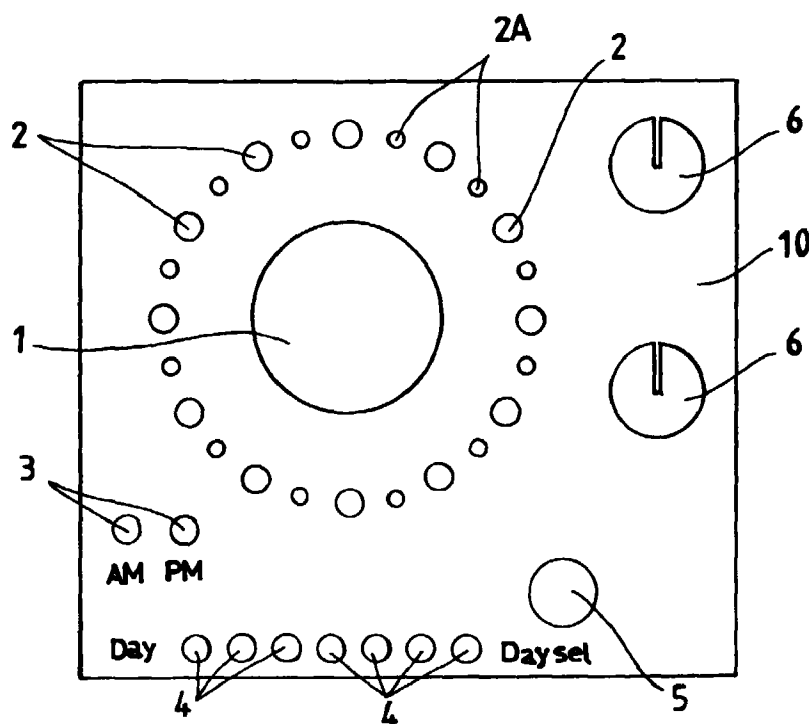
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(54) **An electronic instrument for the programming and the control of peripheral devices and the relative method**

(57) An electronic instrument for the programming and control of peripheral devices, comprising a front lighted dial (10) wherein it is possible to perform the programming by means of a rotating knob (1) having also an axial motion. Further on the dial (10) there are as many control lights (2) as the time subdivisions to oper-

ate on and, if required, two lights (3) showing the a. m. or p.m. hours. It is possible to provide, if required, seven additional lights (4), which indicate the days of the week, a push button (5) to select the day and at least one knob (6) to select the temperature.

Fig.3



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Description

[0001] The present invention refers to an electronic instrument for the programming and the control of peripheral devices and to a related method. Various types of electronic programming devices (the so called "timers") are very well known, said programming devices control, over a period of time, the operations of household appliances (as microwave or electric ovens, washing machines, dish washing machines, toasters, television sets, refrigerators, freezers), recording or video recording devices, lighting installations, watering installations, antitheft devices or other similar devices.

[0002] Alternatively, the electronic programming devices can be manufactured and connected to or integrated with a specific system to be controlled (dedicated programming device) or they can operate in a generic way, typical of any timer and they can be connected to various peripheral devices.

[0003] Nonetheless, the known programming devices have some substantial disadvantages which would be desirable to eliminate or at least to reduce.

[0004] First of all, a significant disadvantage is the complexity in the use of said devices; in fact, it is necessary that the user learns, in order to properly operate the device, too complex procedures, through consultation of instruction manuals, which are usually bulky and, often, difficult to be understood upon a quick reading.

[0005] This is a sign of poor ergonomic design, since many problems arise for the users in relation to the design of electronic instruments of this type; for instance the programming and the control of said devices require the repeated and orderly activation of several push buttons of the programming device, the reading of figures or symbols, and the repeat of all the already performed steps in case of mistake or of interruption of the electric power.

[0006] Finally, the known programming devices are usually provided with liquid crystal displays having various indications under numeric and/or symbolic form, the production costs of said displays affects significantly the costs of the whole instrument.

[0007] A purpose of the present invention is, then, to provide an electronic instrument for the programming and the control of peripheral devices, said instrument being suitable to overcome the above mentioned disadvantages, and to be utilised by a user through a simple and intuitive method of programming and of control and, therefore, easy to memorise and to repeat.

[0008] Another purpose of the present invention is to realise an electronic instrument for the programming and control of peripheral device, wherein the data relative to the working situation are the strictly necessary ones and are displayed in a clear way, so that said data are quickly understood.

[0009] A further purpose of the invention is to disclose an electronic instrument for the programming and the control of peripheral devices, wherein there are no

requirements for particular display arrangements, nor for specific integrated drive circuits.

[0010] A further purpose of the invention is to disclose an electronic instrument for the programming and the control of peripheral devices and the relative programming and control method which are easy to realise, without the use of expensive components and of complex technologies.

[0011] These and other purposes are attained by a programming and control electronic instrument according to claim 1 and by the relative programming and control method according to claim 13, said claims are herein indicated as reference.

[0012] Advantageously, the electronic instrument of the invention comprises a front lighted dial, where it is possible to adjust the current hour and to program the peripheral devices by means of one single rotating knob having also an additional axial motion.

[0013] The knob is surrounded by a dial with as many control lights as the time subdivisions to operate on. Typically, but not exclusively, twelve lights are provided to represent the hours and another twelve lights to represent the half hours, as in a watch dial, and altogether there are twentyfour lights in total positioned around the knob.

[0014] According to a preferred but not limiting example, there are provided two additional lights which indicate the a.m. or the p.m. hours and other lights which indicate the days of the week and a push button to select the desired day.

[0015] Alternatively, the adjustment of the current hour and the programming of the peripheral devices can be done through a slider which moves inside a slot, along a straight line; in this case, the control lights are positioned along a line, in parallel to the slot.

[0016] Further purposes and advantages of the present invention will be better understood from the following description and from the attached drawings, provided merely as a non limiting example, in which:

Figure 1 is a front view of the dial of a first embodiment of an electronic instrument for the programming and the control of peripheral devices, according to the present invention;

Figure 2 is a front view of the dial of a second embodiment of an electronic instrument for the programming and the control of peripheral devices, according to the present invention;

Figure 3 is a front view of the dial of a third embodiment of an electronic instrument for the programming and the control of peripheral devices, according to the present invention;

Figure 4 is a front view of an alternative embodiment of the dial of an electronic instrument for the programming and the control of peripheral devices, according to the present invention.

[0017] With reference to the above Figures, numeral

10 indicates generally the front surface of the dial relative to the electronic programming and control instrument of the present invention, meanwhile numeral 1 indicates a rotating knob surrounded by twelve control lights, similar to a watch dial, provided in correspondence to the hours; said control lights are indicated by reference numeral 2.

[0018] In correspondence to the half hours, in between the hour lights, another twelve control lights are provided, which are smaller in size and which are positioned in a circular arrangement comprising twenty four control lights in total; the lights positioned in correspondence to the half hours are indicated with reference numeral 2a.

[0019] Alternatively, a slider 11 is located on dial 10, said slider slides inside the rectangular slot 12; in parallel to slot 12, there are twelve control lights 13, corresponding to the twelve hours and another twelve control lights corresponding to the half hours, said lights are positioned along an imaginary straight segment.

[0020] The control lights 2, 2A and 13, 14 are preferably LED diodes.

[0021] According to non limiting examples of the preferred embodiments of the electronic instrument of the present invention, there are provided on the dial 10 two additional control lights, indicated by numeral 3, relative to the a.m. and p.m. hours and, possibly, another seven lights which indicated the days of the week and which are indicated by numeral 4, together with a push button, indicated by numeral 5, for the selection of the day.

[0022] Also the control lights 3 and 4 are, preferably, LED diodes.

[0023] In a further non limiting preferred embodiment of the instrument, there are provided, on the dial 10, two additional knobs for the adjustment of two temperatures, which are associated to the on/off state of the control lights 2 and 2A of the circular arrangement; said knobs are indicated by the reference numeral 6.

[0024] The electronic instrument for the programming and control of peripheral devices works as follows; at rest, i.e. in absence of the user intervention, one of the control lights 2 or 13, corresponding to the current hour, flashes, while one of the control lights 3 stays steadily lighted, whether it is an "ante meridiem" hour (light 3 corresponding to the AM letters) or a "post meridiem" hour (light 3 corresponding to the PM letters).

[0025] The control lights 2, 2A or 13, 14 of the circular arrangement or of the linear segment, except the light which indicates the current hour, indicate the activated programming state, in such a way that each of the lights 2, 2A or 13, 14, when they are off, indicate that the particular peripheral device controlled by the electronic instrument according to the invention is deactivated on the hour (or half an hour) corresponding to said lights 2, 2A or 13, 14.

[0026] Similarly, each of the lights 2, 2A or 13, 14, when they are on, means that the particular peripheral device controlled by the electronic instrument according

to the invention is activated on the hour (or half an hour) corresponding to said specific light 2, 2A or 13, 14. The control light 4, corresponding to the current day, is steadily on, if present on the dial 10.

[0027] As the days of the week go on, the control lights 2, 2A of the circular arrangement (or the lights 13, 14 of the straight segment) indicate, then, the forecast programming for the half day indicated by the lights 3. The advancing of the signal of the current hour, which is obtained through the flashing of the lights 2, 2A or 13, 14, is assured by a known inside electronic control of the control lights state and by a clock pulse generator of the traditional type.

[0028] A simple clockwise or counterclockwise rotation, by the user, of knob 1 causes a correspondent progressive change of the flashing control lights 2, 2A.

[0029] Similarly, a simple straight movement of the slider 11, back or forth along the slot 12, causes a progressive change of the correspondent flashing lights 13, 14. In both cases, the adjustment of the current hour, which can be done simply and in an intuitive way directly on the programming device, is greatly facilitated.

[0030] Once the rotation of knob 1 or the movement of slider 11 is stopped, the instrument restarts the normal advancement of the hour signal, in such a way that the twenty four hour sequence of the whole day is visualised through two apparent rotations (or through two, back and forth, movements) of the flashing signal along the circular arrangement (or along the straight segment) of the control lights 2, 2A or 13, 14. The difference between a.m. and p.m. hours (and half hours) is displayed by the alternate lighting of one of the control lights 3, which are automatically set on the on or off position at noon or at midnight.

[0031] In this way, through one or more subsequent pushes of the push button 5 of the day selection, it is possible to adjust the electronic instrument on the current day, indicated by the control lights 4, which are steadily on and which are adjusted by the inside electronic controls.

[0032] The adjustments of the current hour and day has to be done, however, any time that the activation or deactivation of the peripheral devices is scheduled and, timewise, after the programming of said devices has been completed.

[0033] In summary, the user can program the electronic instrument of the present invention as follows:

- select the day of the device activation through one or more consecutive pushes of the push button 5;
- push or pull out and simultaneously rotate clockwise the knob 1: this will cause the steady lighting of the control lights 2, 2A corresponding to the movement caused on the dial 10 up to a defined light 2, 2A relative to a selected programming hour (or half hour);

it should be noted that a first complete apparent rotation of the lights 2, 2A corresponds to the a.m.

hours, while a second complete apparent rotation of said lights 2, 2A corresponds to the p.m. hours programming, as likewise indicated by the steady lighting of light 3, on the a.m. or p.m. letters.

- push or pull out and simultaneously rotate counter clockwise the knob 1: this will cause the turn-off of the corresponding control lights 2, 2A, and, then, the deactivation of a device already set on a selected hour (or half hour); this is particularly useful in case of mistakes during the programming; the alternate presence of on and off states indicated by the lights 2, 2A of the circular arrangements of the dial 10 is the daily program which is recorded in a proper electronic memory, of traditional type, present inside the instrument;
- select a new day through consecutive pushes of the push button 5 and proceed every time as in the preceding points for any further programming activation or deactivation;
- once completed the programming of the hours and of the days, select the current day through the procedure indicated above (push the push button 5);
- finally, select the current hour through the procedure indicated above (rotate knob 1 without pushing or pulling said knob).

[0034] The adjustment of the current hour and/or the programming of the peripheral devices can be obtained, alternatively, by pushing or pulling the slider 11 and/or by moving said slider along the slot 12; in this case, the activated programming will be visualised through the control lights 13, 14.

[0035] The features and the advantages of the electronic instruments for the programming and for the control of the peripheral devices of the present invention are clear from the preceding description.

[0036] In particular, said features and advantages refer to the following characteristics:

- the instrument is easy to use;
- the working and programming signals are evident, clear and understandable in a quick and sure manner;
- the realisation of the product does not require particular screens, nor specific integrated drive circuits;
- the utilised programming method is natural and intuitive and can easily be recalled and repeated, also because the movements required to set up the desired values are simple and similar to the every day movements of any person, as the opening of a door with keys, turning a tap on, the adjustment of the volume of radio, recorder or television sets.

[0037] It is understood that the electronic instrument of the present invention may undergo several changes, without departing from the innovative principles of the invention, as well as it is understood that, in the embodiments of the invention, the materials, the shapes and

the dimensions of the shown details may have any configuration and said details may be substituted with other technically equivalent details.

[0038] For instance, the two temperatures of reference can be set up through the control action of two knobs positioned on the instrument dial and each knob is associated to a working state (on or off) of the control lights of the circular arrangement or of the straight segment.

[0039] Each knob allows the set up of a defined temperature value comprised between two limit values; said values are preferably equal to 5 and 30° C, respectively.

[0040] Said electronic instrument, without the day programming push button and the corresponding control lights, can be a chronothermostat having only a daily program.

Claims

1. An electronic instrument for the programming and control of peripheral devices, characterised in that it comprises:

- at least one front dial (10), on which it is possible to adjust the current hour and/or the programming of the peripheral devices, through one single rotating knob (1) provided with an axial movement or by means of a single slider (11), which can be moved along a straight line inside a slot (12) and said slider being provided with an axial movement;
- a plurality of first control lights (2, 2A, 13, 14) in a number equal to the number of time subdivisions which are desired and which visualise the current hour and/or the current programming state.

2. An electronic instrument according to claim 1, characterised in that on said dial (10) there are further provided two second control lights (3), which indicate the ante meridiem (a.m.) and the post meridiem (p.m.) hours.

3. An electronic instrument according to claim 2, characterised in that on said dial (10) there are a plurality of third control lights (4), which indicate the days of the week, a push button (5) to select the day and/or at least one knob (6) to select at least one temperature, associated to the on/off state of said control lights (2, 2A, 13, 14).

4. An electronic instrument according to claim 1, characterised in that there are twenty-four of said first control lights (2, 2A, 13, 14), twelve lights (2, 13) represent the hours and the other twelve lights (2A, 14) represent the half hours of a half day, said first control lights (2, 2A) are positioned around said rotating knob (1) according to a circular arrange-

ment, similar to a watch dial.

5. An electronic instrument according to claim 1, characterised in that there are twenty-four of said first control lights (2, 2A, 13, 14), twelve lights (2, 13) represent the hours and the other twelve lights (2A, 14) represent the half hours of a half day, said first control lights (2, 2A) are positioned in parallel to said slot (12), along a straight segment. 5
6. An electronic instrument according to claim 3, characterised in that there are seven of said third control light (4), corresponding to the number of days in a week. 10
7. An electronic instrument according to claim 3, characterised in that said first (2, 2A, 13, 14), second (3) and third control lights (4) are LED diodes. 15
8. An electronic instrument according to claim 4, characterised in that the "off" state of each one of said first control lights (2, 2A, 13, 14) means that the specific peripheral device controlled by the electronic instrument is deactivated on the hour or on the half hour corresponding to said first control lights (2, 2A, 13, 14). 20 25
9. An electronic instrument according to claim 4, characterised in that the "on" state of each of said first lights (2, 2A, 13, 14) means that the specific peripheral device controlled by electronic instrument is activated on the hour or on the half hour corresponding to said first defined control light (2, 2A, 13, 14). 30
10. An electronic instrument according to claim 3, characterised in that at least one of said third control lights (4), which indicate the current day, is steadily turned on. 35
11. An electronic instrument according to claim 1, characterised in that the indication of the current hour is obtained through the flashing of said first control lights (2, 2A, 13, 14). 40
12. An electronic instrument according to claim 3, characterised in that said knob (6) suitable to select at least one temperature, associated to the on/off states of said first control lights (2, 2A, 13, 14), allows the selection of at least one temperature value comprised between the 5-30° C value range (including the end values). 45 50
13. A method for the programming and the control of peripheral devices, characterised by comprising the following phases: 55

- selection, by the user, of the day of activation of

at least one peripheral device, through at least a plurality of consecutive pushes of at least one selection push button (5);

- push or pull out and simultaneous rotation in one selected direction or straight translation along one direction of one single knob (1) or slider (11), so as to cause the steady consecutive lighting of a plurality of control lights (2, 2A, 13, 14) corresponding to the activation range of the controlled peripheral device;
- push or pull out and simultaneous rotation in a direction opposite to the preceding one or straight translation along a direction opposite to the preceding one of said knob (1) or slider (11), so as to cause the turn-off of said control lights (2, 2A, 13, 14) corresponding to the range wherein the controlled peripheral device is not activated;
- selection of a new day, through a plurality of repeated pushes of said day selection push button (5);
- a further procedure as in the preceding points for any further activation or deactivation programming of said peripheral devices;
- selection of the current day by pushing said day selection push button (5);
- selection of the current hour through the rotation of said knob (1) or through the straight translation of said slider (11) without pushing or pulling out said knob or slider.

Fig.1

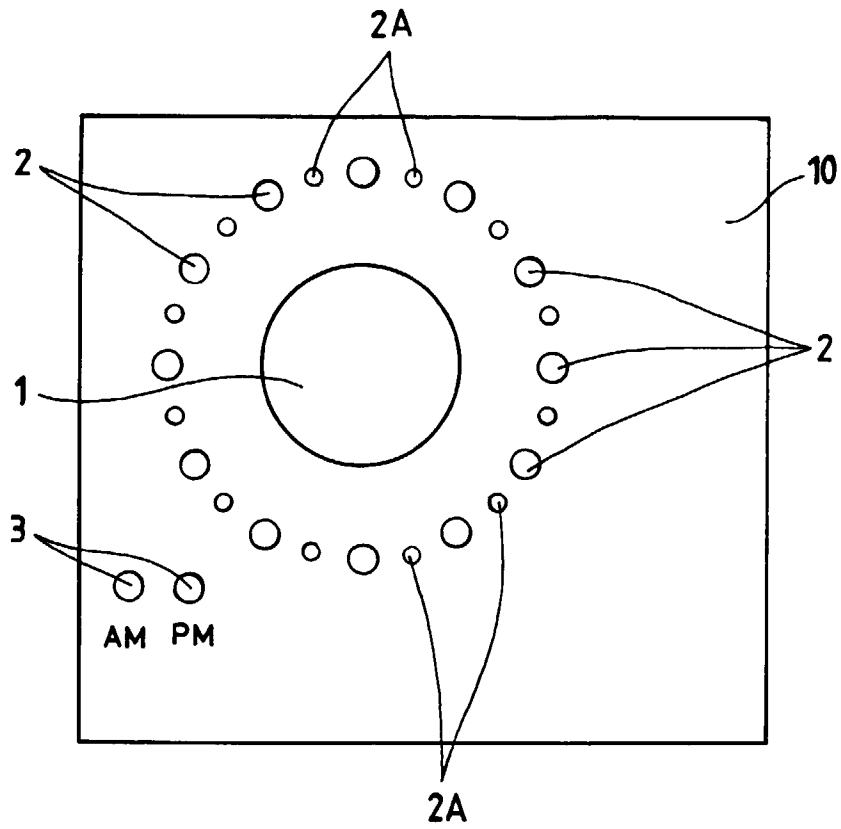


Fig.4

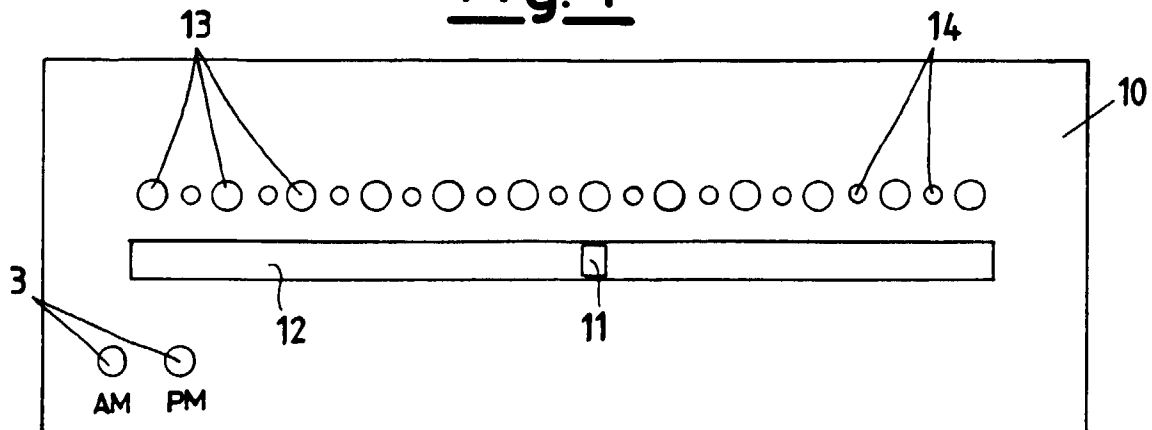


Fig.2

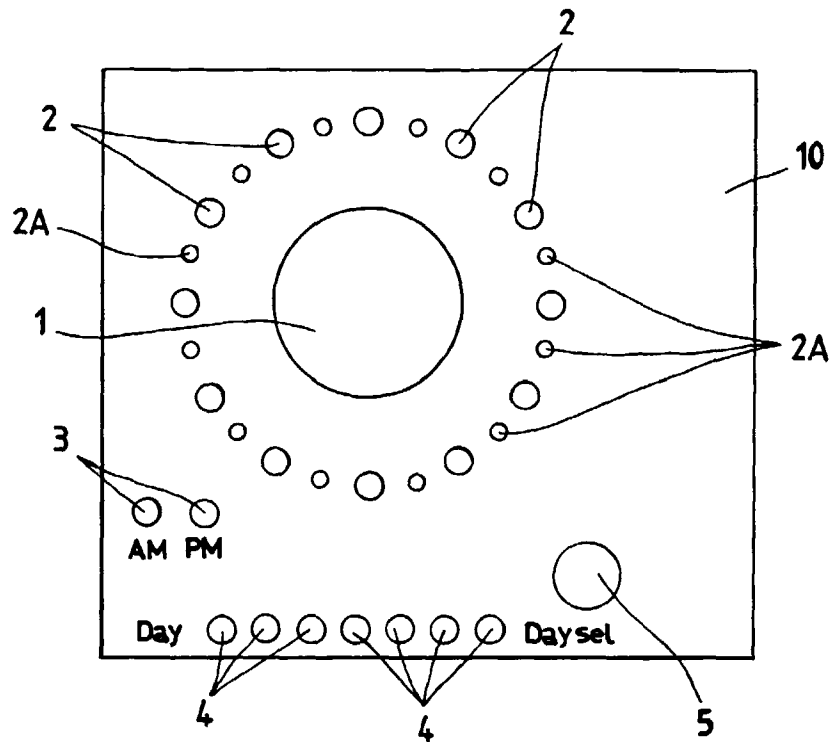
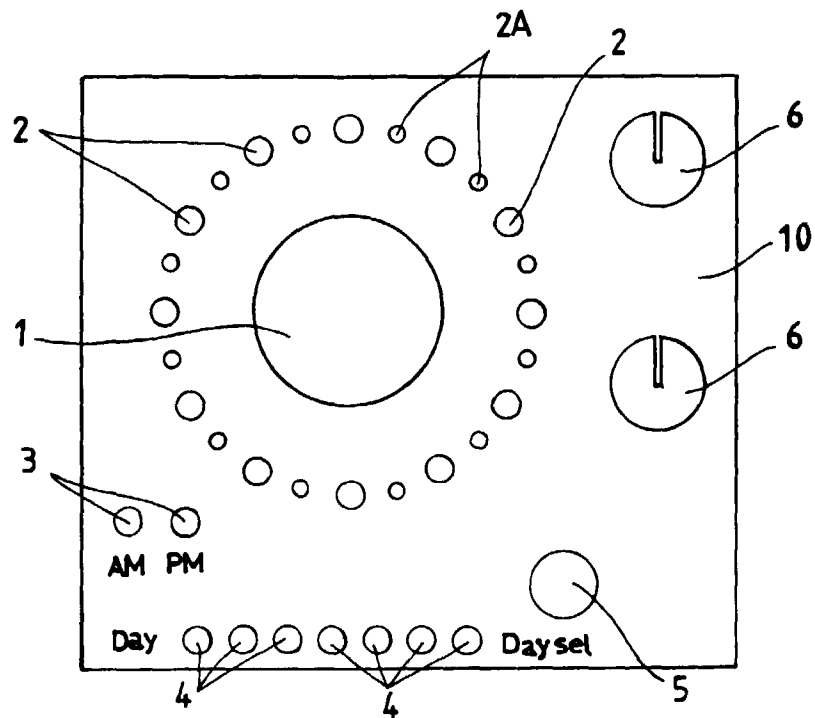


Fig.3





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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 1283

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	GB 2 091 914 A (RANDALL ELECTRONICS LTD) 4 August 1982 (1982-08-04) * page 1, line 103 - page 2, line 122; figure 1 *	1-13	G04G15/00
Y	US 4 432 652 A (MUNEKATA KATSUSUKE ET AL) 21 February 1984 (1984-02-21) * figures 1-4 *	1-13	
Y	EP 0 119 312 A (VISSMANN WERKE KG) 26 September 1984 (1984-09-26) * figures 1-5 *	1-13	
A	GB 2 054 908 A (VEDETTE HORLOGERIE) 18 February 1981 (1981-02-18) * figure 1 *	1-13	
A	FR 2 493 552 A (HITACHI LTD) 7 May 1982 (1982-05-07) * figure 2 *	1-13	
A	EP 0 167 848 A (ELESTA AG ELEKTRONIK) 15 January 1986 (1986-01-15) * figures 1-7 *	1-13	TECHNICAL FIELDS SEARCHED (Int.Cl.6) G04G
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		7 September 1999	Exelmans, U
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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