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## (54) Integrated programmer-timer for domestic appliances

(57) Integrated programmer-timer (10) for domestic appliances, such as in particular washing machines, drying machines or dish washers, comprising a supporting frame (26) of typical components for the timing and conditioning function, said timer being able to be connected to a plurality of components which are not typical of the timing function, the frame (26) including means (13) on which at least one of said functional components (12) not typical of the timing function is able to be integrally mounted, before the timer is assembled onto the appliance.

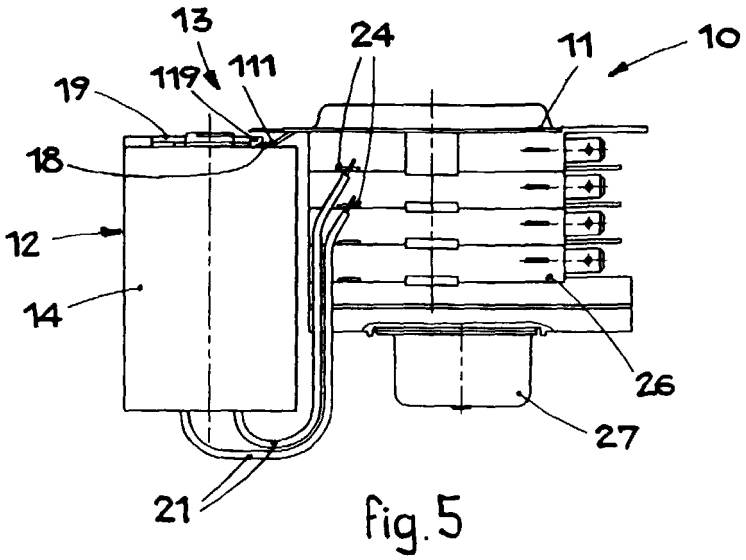


Fig. 5

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## Description

### FIELD OF THE INVENTION

**[0001]** This invention concerns an integrated programmer-timer of the type used in association with domestic appliances such as washing machines, dish washers or similar machines to time and condition the working cycles and the functions of said appliances.

### BACKGROUND OF THE INVENTION

**[0002]** The state of the art includes programmers-timers (hereafter referred to as timers) used in domestic appliances such as washing machines, dish washers or similar, to define and condition the activation times and duration of the working cycles and functions.

**[0003]** These timers consist of electromechanical devices which are mounted inside the appliance and connected, by means of cables supplied for this purpose, to one or more functional components which are in turn present in the appliance.

**[0004]** The functional components consist of electric or electronic devices of various types, such as power condensers, inlet filters, pressure sensors, electrovalves or suchlike; they are necessary for the appliance to function or they are commanded by the timer itself to carry out the various cycles and functions of the appliance.

**[0005]** The timer and these functional components are mounted and connected when the appliance is at its point of assembly, where the timer is delivered; for each timer the appropriate and specific assembly elements are used, such as rods, plates or suchlike, which are attached with screws or bolts normally to the frame of the appliance.

**[0006]** This implies using a high number of assembly elements and relative bolts or screws, and also any other adapter or connection elements.

**[0007]** Moreover, there are numerous cables between the functional components and the timer, which are not always easy to achieve and entail using wires or cables of considerable length considering the distances to be covered.

**[0008]** The worker responsible for assembling the appliance is therefore obliged to perform a high number of operations of attachment and cabling, which are long and difficult to do, also because of the lack of space available where he is obliged to work.

**[0009]** Moreover, given the difficult access and the limited time available, it may not always be possible to assemble the parts in a completely satisfactory manner, and in time, this may cause malfunctions and anomalies in the appliance.

**[0010]** All this causes an increase in assembly costs and time, and more generally in production costs and time, not to mention a greater complexity in construction and a frequent need for overhauling and maintenance.

**[0011]** WO 85/02488 describes a safety device for children applied on timers for televisions, comprising an anti-contact cover and a de-activating switch.

**[0012]** DE-U-8321192 describes a combination of components having the same functions, a clock and a regulator, wherein the additional advantage of the cabling serves to optimize the working of the components themselves; it does not serve to optimize the overall cabling of a third element on which the devices are applied.

**[0013]** US-A-4,013,219 shows a thermostat device comprising a manually activated timer and an electric switch driven by said timer. In this case too, the combination of the different components is intended to optimize the functioning of the device itself, and does not influence the cabling or optimize the assembly of a further element to which the device is applied.

**[0014]** The present Applicant has devised and embodied this invention to overcome these shortcomings and to obtain other advantages.

### SUMMARY OF THE INVENTION

**[0015]** The invention is set forth and characterized in the main claim, while the dependent claims describe other characteristics of the invention.

**[0016]** The purpose of the invention is to provide a programmer-timer for domestic appliances, particularly washing machines and drying machines, which can be assembled easily and quickly on the appliance, allowing to reduce the number of cables to be made to connect other functional components of the appliance.

**[0017]** Another purpose of the invention is to limit the number of attachment elements used to assemble the functional components, as distinct from the timer, to the frame of the appliance, so as to simplify and accelerate these operations, which are done at the point of assembly.

**[0018]** A further purpose of the invention is to reduce the production times and costs of said appliances, lightening the work load of the assembly workers, and also reducing the burden of managing the supply of components at the point of assembly.

**[0019]** In accordance with these purposes, a timer according to the invention has a substantially conventional structure; during the pre-assembly step onto the domestic appliance and therefore before final assembly, one or more components, of those which have a function other than timing but which are provided and which have to be connected in order for the appliance to work, are integrally associated with said structure.

**[0020]** In a preferential form of embodiment, the timer is provided with an assembly plate used to attach it to the appliance; support means are made on the plate to integrally associate and attach at least one of the functional components.

**[0021]** According to another embodiment, the sup-

port means for the functional component, integrated with the timer, are something other than the plate used to mount the timer itself on the appliance.

**[0022]** In a first embodiment, the at least one functional component is associated with the support means by means of clamping means for example screws, bolts or similar.

**[0023]** According to a variant, the at least one functional component is associated with rapid attachment means.

**[0024]** By associating one or more functional components with the timer during the pre-assembly step, before the final assembly, it is possible, on the one hand, to eliminate auxiliary rods, screws, or bolts which are needed to mount the functional component inside the appliance, and on the other hand it makes the operations to mount the timer on the appliance quicker and more simple, since it already integrates in its structure at least some of the components which in the state of the art are physically separate and distant therefrom, although connected by means of cabling.

**[0025]** According to a preferential form of embodiment, at least some of the electric connections between the various functional components and the relative timer are made by wires arranged in advance on the functional component during the production step.

**[0026]** This further simplifies the assembly and cabling operations and limits the length of the wires used for the electric connections.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0027]** These and other characteristics of the invention will become clear from the following description of some preferred forms of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

| | |
|---|---|
| Fig. 1 | shows a timer for domestic appliances according to the invention in a first form of embodiment; |
| Figs. 2 and 3 | show two variants of Fig. 1; |
| Fig. 4 | is a plane view of Fig. 3; |
| Fig. 5 | shows a timer for domestic appliances according to the invention in a second form of embodiment; |
| Fig. 6 | shows a variant of Fig. 5; |
| Fig. 7 | is a plane view of Fig. 6. |

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

**[0028]** With reference to the attached drawings, the reference number 10 denotes generally the integrated programmer-timer for domestic appliances, particularly washing machines and drying machines, according to the invention.

**[0029]** The timer 10 is provided with an assembly plate 11, which can be made either of plastic, or of metal, or of any other able material, by means of which the timer 10 is able to be attached to the frame of the appliance to which it has to be applied.

**[0030]** The timer 10 comprises, in a conventional manner, a box-like frame 26 inside which a plurality of cam disks are arranged, associated with a drive motor 27 which makes them rotate according to the timing cycles of the appliance on which it is installed.

**[0031]** According to the invention, during the pre-assembly step, that is to say, before it is installed on the appliance and its final assembly, the timer 10 integrates one or more functional components 12 which are not typical of the timer function, but which are connected thereto inside the appliance to carry out the functions and the working cycles of said appliance.

**[0032]** The timer 10 and functional component 12 therefore constitute a single body, which can be assembled on the domestic appliance in a single operation, thus avoiding mechanical attachments and long and complicated operations to connect the cables.

**[0033]** In this case, the assembly plate 11 integrally includes a support element 13 to which one or more functional components 12 are able to be solidly associated; the functional components 12 are of the electric or electronic type and are necessary for the timer 10 to work, or are commanded thereby. The timer 10 is electrically connected to the functional components 12 when it is in its assembled condition on the appliance.

**[0034]** In the embodiments shown here, the support element 13 consists of a lateral extension 111 of the assembly plate 11 and is used to mount a functional component 12, in this case consisting of a power condenser 14 to command asynchronous motors.

**[0035]** In other embodiments, the functional component 12 may consist of an inlet filter, a pressure sensor, an electrovalve, etc.

**[0036]** it is obvious, however, that the support element 13 may have a different shape and allow to associate a larger number and different types of functional components 12.

**[0037]** Moreover, even if the embodiments shown here refer to the lateral extension 111 of the assembly plate 11 as a support element 13, it is obvious that the functional component 12 may be attached to other parts of the timer 10 which make up the box-like frame 26.

**[0038]** In the embodiments shown in Figs. 1-4, the lateral extension 111 has a through hole 16 inside which a screw 15, arranged at one end of the condenser 14, is able to be inserted.

**[0039]** The condenser 14 is associated to the lateral extension 111 by tightening a nut 17 on the screw 15, with a washer 25 between the two.

**[0040]** In the embodiments shown in Figs. 5-7, on the contrary, the lateral extension 111 has a slit 18; in correspondence therewith the hook-shaped end 119 of a flexible fin 19 arranged on the condenser 14 is able to be attached, to define the clamping of the two parts.

**[0041]** In the specific case of Figs. 6 and 7, the lateral extension 111 has a shape able to allow the association of a parallelepiped condenser 14, the shape of which allows to optimize the bulk of the timer 10/condenser 14 combination.

**[0042]** It is obvious that the condenser 14 may also be arranged in another position, for example on the other side or opposite the timer 10.

**[0043]** By using a timer 10 which already includes assembled thereon, in the pre-assembled condition, one or more functional components 12 which are not typical of the timing function but necessary for the appliance to function, we greatly facilitate and accelerate the operations to assemble the appliance itself and eliminate the need for a plurality of attachment and cabling operations.

**[0044]** By applying the assembly plate 11 on the frame of the appliance using screws or bolts inserted into the holes 20 made on the assembly plate 11, it is possible to assemble the timer 10 and the condenser 14, or other functional component 12 associated therewith, at the same time; therefore, they reach the place where the appliance is assembled already in this pre-assembled state, without needing to use further attachment rods or screws.

**[0045]** The integrated assembly of the condenser 14 and the timer 10 also allows a considerable simplification of the electrical connections which in this case are made by means of a pair of wires 21.

**[0046]** In a first embodiment shown in Fig. 1, the wires 21 are connected to terminals 22 of the condenser 14 by means of fast-on connectors 23, arranged in correspondence with one end of the wires 21.

**[0047]** The connection to the terminals 24 of the timer 10, on the other hand, is achieved by welding the free ends of the wires 21.

**[0048]** In the embodiment shown in Fig. 2, on the contrary, the two wires 21 include fast-on connectors 23 in correspondence with both ends, by means of which they are able to be connected both to the terminals 22 of the condenser 14 and also to the terminals 24 of the timer 10.

**[0049]** In the variant shown in Figs. 3-7, the condenser 14 is integrally provided with wires 21 associated with the end opposite that associated with the assembly plate 11.

**[0050]** The wires 21 may be arranged in advance during the production of the condenser 14 and may be of a standard length, as the pre-assembly position of the condenser 14 with respect to the timer 10 is pre-determined.

**[0051]** In this case the cabling operations are all done at the point of production of the timer and/or provide only the welding of the free ends of the wires 21 to the terminals 24 of the timer 10.

**[0052]** It is obvious, however, that modifications and/or additions may be made to the integrated timer 10 for domestic appliances as described heretofore, but these shall remain within the field and scope of the invention.

**[0053]** For example, the functional components 12 may be associated with the assembly plate 11 by means of a different type, and also the connections of the wires 21 may include connectors of a different type.

**[0054]** It is also obvious that, although this invention has been described with reference to specific examples, a person of skill in this field will certainly be able to achieve many other equivalent forms of timer for domestic appliances, but these shall all come within the field and scope of the invention.

## Claims

1. Integrated programmer-timer for domestic appliances, such as in particular washing machines, drying machines or dish washers, of the type able to time and condition the cycles and functions of said appliances, said timer comprising a supporting frame (26) of typical components able to perform said timing and conditioning function, said timer being able to be connected, inside the appliance, to a plurality of components which are not typical of the timing function but are necessary for the functioning of the appliance and/or commanded by said timer to perform the cycles and functions of the appliance, the integrated programmer-timer being characterized in that said frame (26) includes means (13) on which at least one of said functional components (12) not typical of the timing function is able to be integrally mounted, before the timer is assembled onto the appliance.

2. Integrated programmer-timer as in Claim 1, characterized in that at least one functional component (12) consists of a power condenser (14).

3. Integrated programmer-timer as in Claim 2, characterized in that said power condenser (14) is able to command an asynchronous motor.

4. Integrated programmer-timer as in Claim 1, characterized in that said at least one functional component (12) consists of an inlet filter.

5. Integrated programmer-timer as in Claim 1, characterized in that said at least one functional component (12) consists of a pressure sensor.

6. Integrated programmer-timer as in Claim 1, characterized in that said at least one functional component (12) consists of an electrovalve.

7. Integrated programmer-timer as in Claim 1, characterized in that said frame (26) integrally comprises an assembly plate (11) able to attach the timer (10) onto the appliance, said means (13) to assemble

said at least one functional component (12) being made on said plate (11).

**8.** Integrated programmer-timer as in Claim 7, characterized in that said means (13) consist of a lateral extension (111) of said assembly plate (11).

**9.** Integrated programmer-timer as in Claim 7, characterized in that said means (13) comprise at least an insertion seating (16) for screw means (15) arranged on said functional component (12).

**10.** Integrated programmer-timer as in Claim 7, characterized in that said means (13) comprise at least a constraining seating (18) for mating rapid attachment means (19) arranged on said functional component (12).

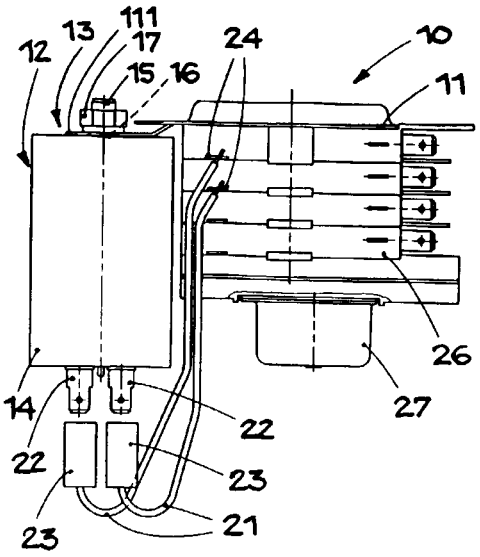


Fig.1

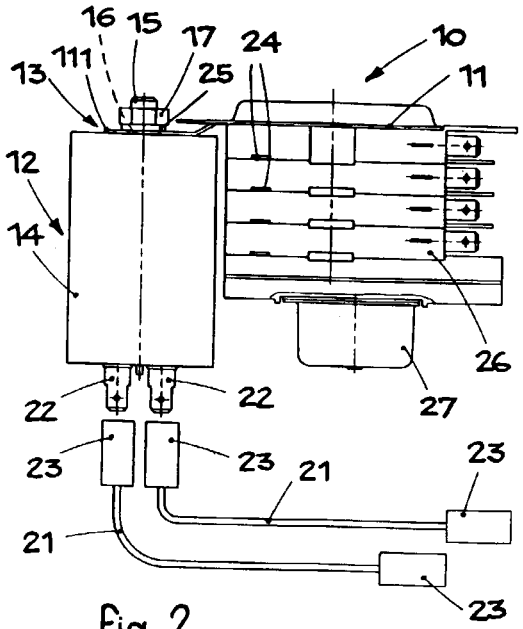


Fig.2

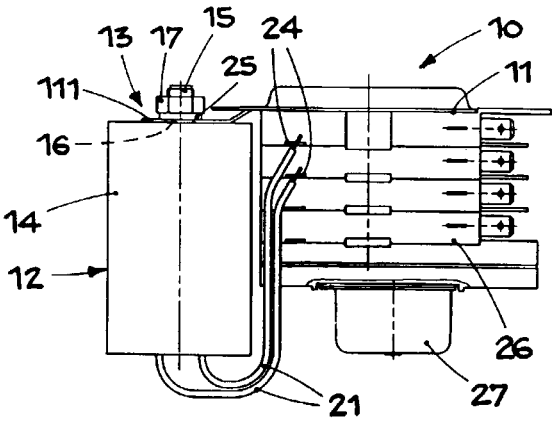


Fig.3

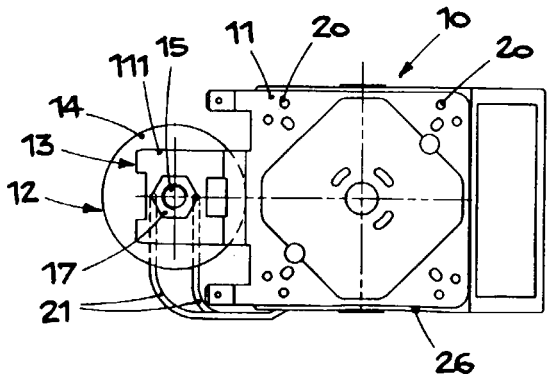


Fig.4

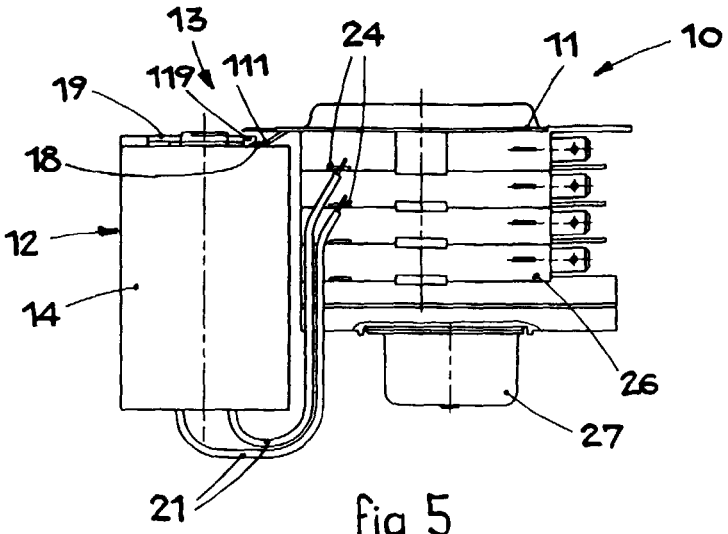


Fig.5

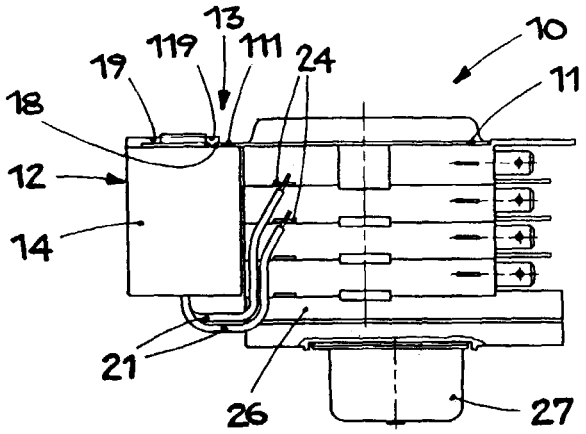


Fig.6

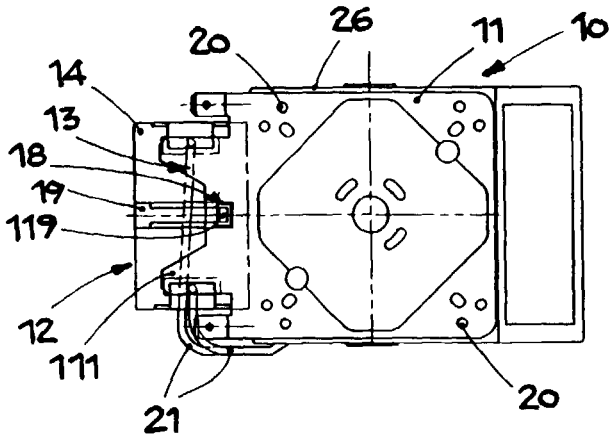


Fig.7

European Patent Office

# EUROPEAN SEARCH REPORT

Application Number
EP 00 11 6691

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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 6 November 2000 | Durand, F |

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 11 6691

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