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(54) **Method of manufacturing luminous indicators and luminous indicators produced**

(57) This invention discloses a method of manufacturing a luminous indicator which comprises:

- the prior preparation of a half-shell (11) in insulating plastic material, having an intermediate housing (19) and two channels (20) open on one side and a hollow (21) that is open at the other end of the half-shell;

- the positioning of the wires (13) of a light bulb (12) in said channels (20), at least one resistance (15,16) in said intermediate housing (19) and contact reeds (14,14') in said hollow,
- the use of an additional element (22) to block the wires (13) in said channels (20) and resistance (15,16) in said intermediate housing (19); and
- the overprinting of an external body or enclosure (27) on said half-shell (11) to enclose and block all the components.

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## Description

**[0001]** This invention concerns the field of luminous indicators for electrical household appliances and similar, and, in particular, refers to the method of production of luminous indicators and to the luminous indicators produced by said method.

**[0002]** The type of luminous indicator considered here consists essentially of a supporting body in an insulating plastic material, a light bulb applied to one part of said body and two electrical conductors or connecting terminals connected to the bulb across an electrical resistance that passes into the body while being accessible from the opposite side of said body.

**[0003]** According to a well-known method, the above-mentioned type of luminous indicator is laboriously assembled by hand, and requires the conductors to be inserted into the insulating body, which is a single piece, their connection to the light bulb and then the fastening of the body onto the conductors once the bulb has been positioned on the support body. The resulting luminous indicators are not air-tight and consequently are liable to suffer from humidity and dust and, above all, are subject to high wastage, given the difficulty in connecting the components together perfectly in the tight space of the support body.

**[0004]** Another method of execution, designed to make the luminous indicator easier to construct and render it air-tight, uses initial operating components, namely the light bulb, electrical conductors or connecting terminals, electrical resistance, which are pre-assembled and may or may not be fixed in a support bushing for the light bulb. Then these are partially sunk during the moulding stage in an element made of plastic which functions as support body and is intended to stabilise the resulting whole. However, this method of execution has the disadvantage of having to position and support the pre-assembled components properly, in a shapeless structure, in one moulding during the shaping of the surrounding insulating body, as well as still having a high wastage rate due to poor positioning or disconnection of the components at the moment of moulding the body.

**[0005]** The first aim of this invention is to propose a new method of making the above-mentioned luminous indicators which eliminates, or at least reduces, the problems and disadvantages of the traditional technique and, consequently, limits the wastage rate during production.

**[0006]** Another aim of the invention is to furnish another version of the said luminous indicator which is more convenient, simple and economic to manufacture, as well as being highly-reliable, suitable for industrial production and practically air-tight.

**[0007]** The first aim is met by means of a production method that includes:

- a previously prepared half-shell in plastic with housings open both longitudinally and laterally;

- the assembly and inter-connection of the operative electrical components in said housings in the half-shell in such a way that the said components are held tight and remain in their intended position;
- the placing of the half-shell, complete with electrical components, in a mould; and
- the moulding of a body or external enclosure in plastic around the half-shell, at least in the housings open laterally in order to block said components and provide a support for the resulting whole.

**[0008]** The second aim of the invention is met by a luminous indicator where the operative electrical components, which include a light bulb with two connecting wires, two connecting terminals for connection to the light bulb wires over at least one electrical resistance, are pre-mounted in the plastic half-shell and firmly held there by means of a plastic body moulded over the half-shell which covers it and at least part of the said components.

**[0009]** In accordance with the present invention, improved results will be especially apparent in:

- the conformation of the body, ideal for housing the light bulb wires, without forcing, as well as one or two resistances, according to necessity, and the contact terminals or reeds;
- the addition of a contact carrier with an insulating part for the contact reeds;
- the conformation of the contact reeds which are turned in such a way as to favour a continuous electrical contact; and
- the presence of a sealing cap for the half-shell, with the role of separator for the light bulb wires and as a stop for the electrical resistance.

**[0010]** Compared to the luminous indicators known to date, the indicator made in accordance with this invention is more convenient because of:

- the relatively easy assembly of the various components, given the absence of additional connecting elements, such as clasp rings etc.;
- the universal application of this luminous indicator, thanks to the contact reeds that remove the need for electrical conductors, which vary in length according to the type of cabling used, and were one of the reasons for the proliferation of different types of luminous indicators.

**[0011]** Greater detail about the invention will become clear from the description given below, with reference to the enclosed drawings, which are indicative but not binding, in which:

Fig. 1 shows a view of the initial half-shell, the additional separator seal, the contact reeds and separate contact carriers;

Fig. 2 shows a view of the base of the initial half-shell;

Fig. 3 shows a view of the top of the initial half-shell;

Fig. 4 shows a longitudinal section of the half-shell according to the arrows IV-IV in Fig. 1, complete with electrical components;

Fig. 5 shows another cross-section of the half-shell according to the arrows V-V in Fig. 1, complete with electrical components;

Fig. 6 shows a cross-section of the half-shell according to the arrows VI-VI in Fig. 1; and

Fig. 7 shows the finished assembled indicator.

**[0012]** The luminous indicator in question is made from a half-shell 11 in insulating plastic material, a light bulb 12 with two respective conducting wires 15, two contact reeds 14, 14' an electrical resistance in series 15 and/or an electrical resistance in parallel 16, a contact carrier 17 and a hood 18 for covering and protecting the light bulb.

**[0013]** The half-shell 11 is obtained by moulding and includes at least one intermediate housing 19, open laterally, a couple of channels or longitudinal grooves 20, also open on one side in the upper portion of the half-shell, and which extend so as to communicate with the intermediate housing 19, and a hollow 21 in the bottom portion of the half-shell and communicating likewise with the intermediate housing.

**[0014]** The lateral intermediate housing 19 is designed to receive one or both of the resistances 15 and 16, the pair of longitudinal channels 20 are designed to house the conducting wires 13 of the light bulb 12; the base hollow 21 is designed to receive the two contact reeds 14, 14', placed parallel and separate.

**[0015]** The light bulb 12 is located above the half-shell 11, and one of its wires 13, which are set in the channels 20, comes into contact with a hood of the resistance in series 15 and from there reaches one of the contact reeds 14 in the base hollow 21, while the other wire comes into contact with the other hood of the resistance in series 15 and thereafter reaches the hood of the resistance in parallel 16, the other hood of which rests against the other contact reed 14'.

**[0016]** The wires 13 and the electrical resistance 15 are kept in place by a stop cap 22 applied to the upper lateral part of the half-shell. This cap 22 has a peg 23 which is forcibly inserted into a hole 24 made in the half-shell. The latter also has two attachments 25 for blocking the wires 13 and at least one baffle 26 for blocking said resistance.

**[0017]** The contact reeds 14, 14' are, in turn, held in the base hollow 21 by means of the contact carrier 17, which is applied by pressure to the base of the half-shell and which has a wall 17' that goes between the contact reeds 14, 14', insulating them from each other.

**[0018]** The covering hood 18 for the light bulb is applied to the upper part of the half-shell, that is, at the level of the stop cap 22.

**[0019]** Once all the electrical components and the light bulb hood have been mounted on the half-shell 11, the whole is completed with the overprinting of a body or enclosure 27, also made of plastic, to block and hold fast all the pre-assembled elements. The material used for the external body or enclosure may be the same as or different from the material of the half-shell. The contact reeds 14, 14' are set up in such a way as to ensure continuous electrical connections and to simplify the connection of the cabling conductors.

## Claims

1. Production method of a luminous indicator having a support body in plastic material and electrical components that include a light bulb with two conducting wires, at least one electrical resistance and two contact reeds for connecting the cabling conductors, the method including:

- the prior preparation of a half-shell in insulating plastic material, having an intermediate housing open on one side, two channels which are also open on one side and that join said intermediate housing to one end of the half-shell, and a hollow that communicates with said intermediate housing and that is open at the other end of the half-shell;
- the positioning of the wires of the light bulb in said channels, of the resistance or resistances in said first lateral housing and of the contact reeds in said hollow and all connected together electrically;
- the use of an additional element to block the wires in said channels and at least one resistance in said lateral housing;
- the closure of the base hollow by means of a contact carrier, having a wall for separating the two contact reeds; and
- the overprinting of an external body or enclosure on said half-shell to enclose and block all the components, including a protection hood for the light bulb.

2. Luminous indicator including a support body in insulating plastic material and electrical components including a light bulb with the two relative conducting wires, at least one electrical resistance and two contact reeds connected to the light bulb wires across one or more electrical resistances and to which the cabling conductors are connected, characterised by the fact that said electrical components are pre-mounted and connected together on a half-shell (11) in insulating plastic material, and are held fast there by means of an external body or enclosure (27), also made in insulating plastic material, printed on the half-shell to fix this and at least part

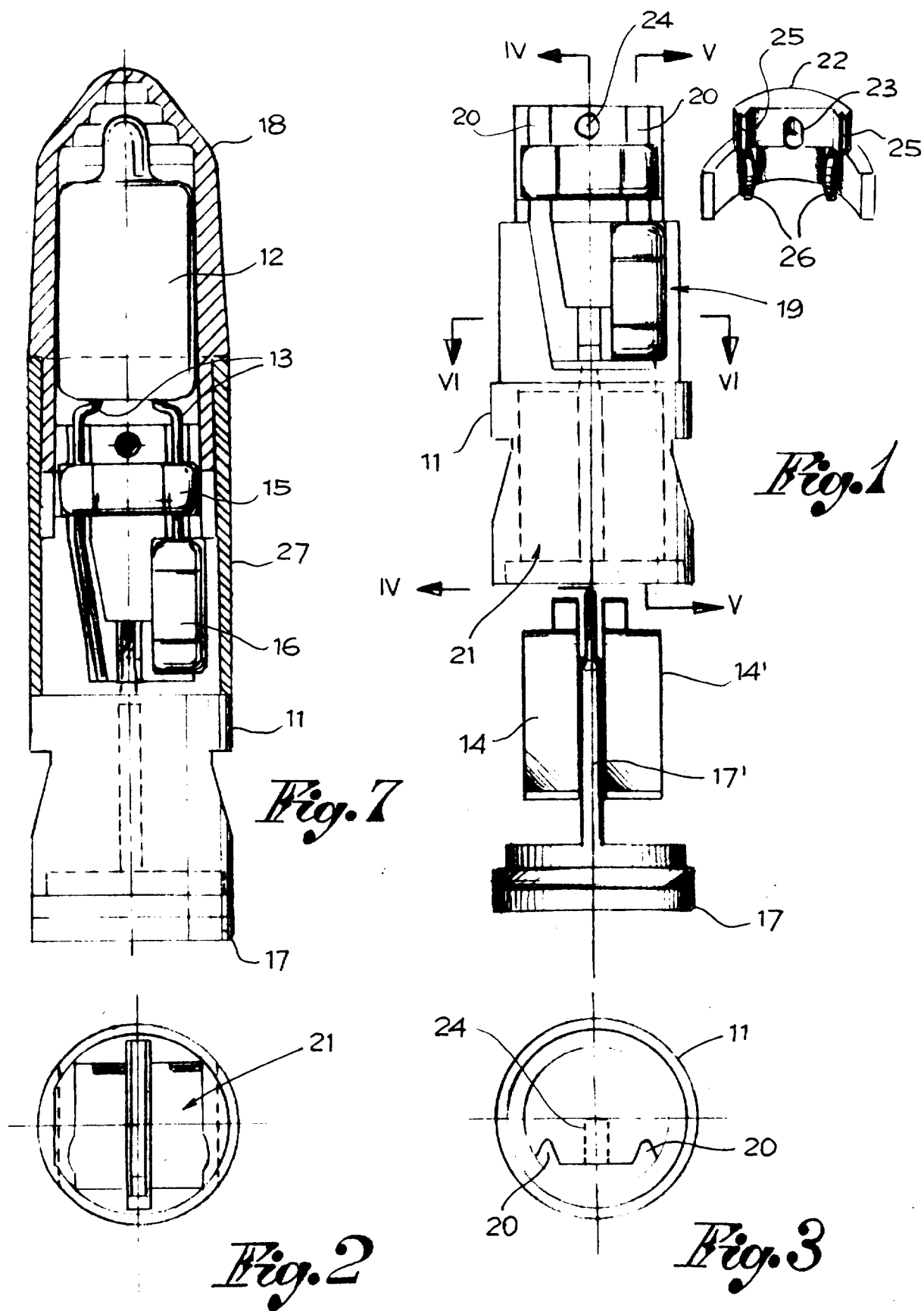
of the said components in place.

3. Luminous indicator according to claim 2, characterised by the fact that said half-shell (11) has an intermediate housing (19), opened laterally and designed to accommodate one or more electrical resistances, two longitudinal channels (20), open on one side, which extend from the intermediate housing to the upper end of the half-shell and are intended to take the wires from the light bulb, and a hollow (21) which opens towards the other end, the base, of the half-shell and is designed to take the two contact reeds (14, 14'), which are connected electrically to the light bulb wires and the one or more electrical resistances, by the fact that said wires and at least one electrical resistance are held fast in their respective housings by means of a stop cap (22) applied to the upper wall of the half-shell, and by the fact that the half-shell with the electrical components are all enclosed in an overprinted external body or enclosure (27). 5 10 15 20
4. Luminous indicator according to claim 3, in which said stop cap (22) is applied by pressure to the half-shell and has two attachments for closing the longitudinal channels (20) and blocking the wires of the light bulb and at least one baffle (26) to block at least one electrical resistance. 25
5. Luminous indicator according to claims 3 and 4, in which the contact reeds (14, 14') are held fast in the hollow (21) by means of a contact carrier (17) applied to the base of the half-shell and having a wall (17') inserted between the contact reeds (14, 14'), insulating them from each other. 30 35
6. Luminous indicator according to claims 3 and 5, in which the light bulb is protected by a hood blocked between the half-shell and the external body or enclosure. 40

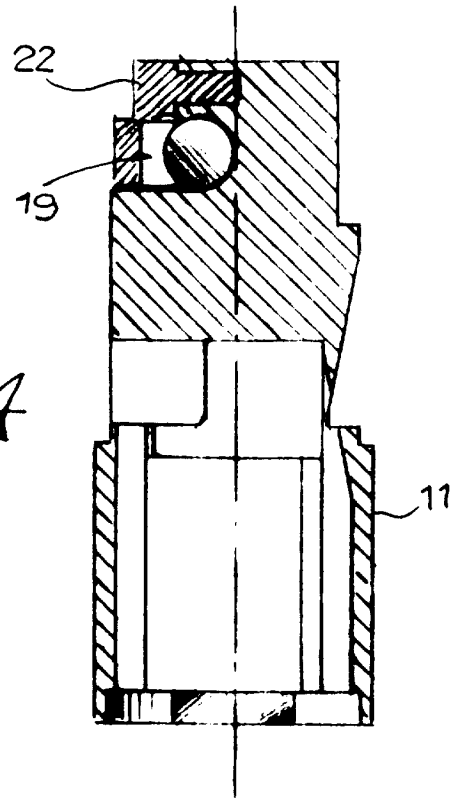
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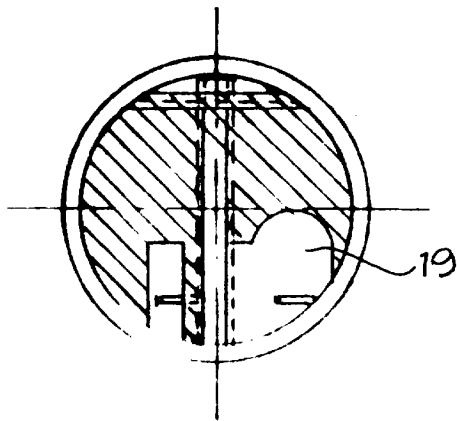
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*Fig. 4*



*Fig. 6*



*Fig. 5*

