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(71) Applicant: **Electrolux Home Products Corporation N.V.**
**1130 Brussels (BE)**

(72) Inventors:
- **Paschini, Claudio**
  **33080 Roveredo in Piano (IT)**
- **Schadt, Richard**
  **90475 Nürnberg (DE)**

(74) Representative: **Röder, Richard**
**Electrolux Rothenburg GmbH**
**Factory and Development**
**90327 Nürnberg (DE)**

## (54) Component of a domestic appliance and method for producing the same

(57) Component of a domestic appliance, said component comprising a body portion (10), a sealing (14) and a marking (16), characterized in that said body portion (10) comprises a molded plastic part, and both said sealing (14) and said marking (16) are made of an elastic material that is molded to the body portion.

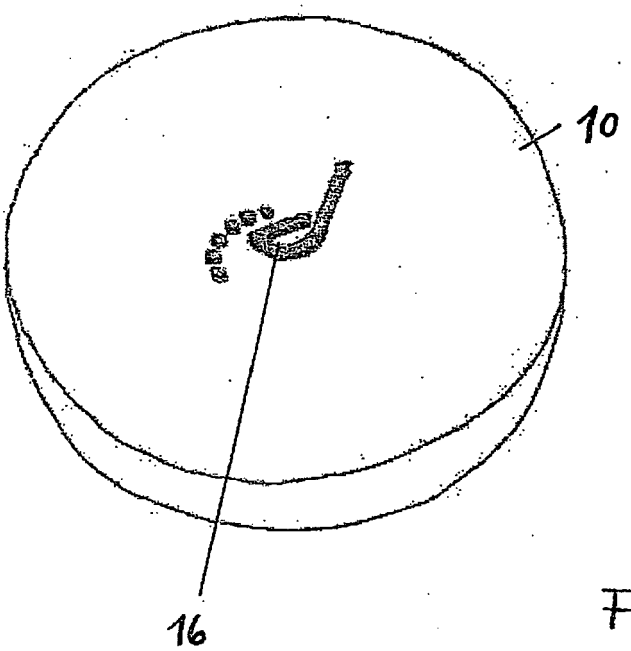



Fig. 2

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## Description

**[0001]** The present invention relates to components of a domestic appliance, such as washing machines, dish washers and the like, as well as to a method of producing the same.

**[0002]** Domestic appliances comprise several parts which are to be provided with a sealing and with a marking, such as for example the cap of a salt container or of a detergent container of a dish washer. Such components thus, on the one hand, comprises a sealing to provide for a water-tight closure of the salt or detergent container, and on the other hand usually comprise a marking, such as text or symbols so as to provide for indications of use of the component.

**[0003]** Particularly if the component is made of a molded plastic material, it is common practice that such markings are formed directly into the component during the molding process, so that the marking comprises an integral part of the component which protrudes from the component or comprises an embossing in the component. An example of such a component of a domestic appliance in which a marking is applied as an embossing during the molding process is shown in DE 101 41 634 A1.

**[0004]** Although in this manner the markings can be formed at relatively low costs, since no individual manufacturing step is required to produce the marking, an inherent disadvantage of such integral markings is that they necessarily have the same color as the component and therefore often are only poorly visible. While in such embossed or recessed markings, the visibility can be improved by enlarging the thickness or the recessing of the marking, this at the same time results in problems in terms of handling and soiling, because due to the larger height or depth of the marking, the probability increases that soil particles adhere to the marking.

**[0005]** An alternative method of providing for a marking is to apply a separate marking onto the component such as by printing or by attaching preformed markings onto the component. While in this manner markings can be produced which have a different colour than the component on which the marking is applied, so that visibility or legibility of the marking is improved, the complexity and hence the costs of the manufacturing process are significantly increased. Furthermore, when the marking is printed onto a component which is to be used in a harsh environment, such as in a dish washer where the component comes into contact not only with the humidity within the washing chamber but further with chemicals such as detergents, rinse aids, water softening agents and the like and all the more is exposed to a wide temperature range, these printed markings often are not very durable but are washed off after a certain time of use.

**[0006]** In view of the above disadvantages of the conventional methods, it is an object of the present invention to provide a component of a domestic appliance comprising a sealing and a marking which can be produced at lower costs.

**[0007]** In a component of a domestic appliance which component comprises a body portion, a sealing and a marking, the above object is solved in accordance with the present invention, in that the body portion comprises a molded plastic part, and both the sealing and the marking are made of an elastic material that is molded to the body portion.

**[0008]** Herein, a sealing of a component of a domestic appliance is a sealing facility that seals a contact area of said component against another component of said domestic appliance, preferably in an essentially liquid-tight and/or essentially air or moisture-tight manner. Herein, a marking of a component of a domestic appliance is a marking facility of said component that is visually and/or tactile perceptible by a user of the domestic appliance as a visible and/or tactile indication. The marking can provide visible and/or tactile information to the user. Preferably the information provided by the marking relates directly or indirectly to the component that comprises the marking. Preferably, the marking comprises a pictogram. Said pictogram preferably provides visible information relating to the component that comprises the marking.

**[0009]** In accordance with the present invention, the marking thus is formed from the same elastic material which is used to form the sealing. In this manner, the marking can be provided in the same manner as or concurrently with providing the sealing onto the component. That is, not only can the same manufacturing tools be used to provide the sealing and the marking, but further is the marking made of a material, the suitability of which for the specific conditions of use of the component already have been approved, since the marking is made of the same material as it is used for the sealing. Thus, the marking can either be made of a material which already has been proved to be suitable as a molded sealing, or, if a new material is to be used for the sealing and the marking, no separate evaluation on suitability has to be made for the sealing and the marking.

**[0010]** Preferred embodiments of the present invention are defined in the dependent claims.

**[0011]** In particular, the sealing and the marking can be made of a thermocurable polymer composition or an elastomeric rubber material, such as ethylene propylene diene monomer rubber (EPDM).

**[0012]** While the sealing and the marking can be formed on the same or on different sides of the body portion, the marking and correspondingly also the sealing can be provided in a recess or a through hole which is provided in the body portion. For example, in a component, such as the cover of a detergent container of a dish washer, wherein a sealing is to be provided on one side of the cover and the marking is to be provided on the opposite side of the cover, a through hole can be provided in the body portion, so that the sealing and the marking can be formed in a single molding step in which the elastic material is injected into the mold from a single side.

**[0013]** In case that a marking shall be provided, which is flush or substantially flush with the surface of the com-

ponent, a recess or through hole can be formed in the component, the shape of which recess or through hole corresponds to the shape of the marking. Applying the marking into such a recess or through hole not only allows to provide for markings that do not or not substantially protrude from the surface in which they are formed, so that the marking is not prone to spoiling, but also can increase the stability with which the marking is applied to the component.

**[0014]** Preferably the elastic material is visually discriminable from the body portion such as by having a different brightness and/or a different color than the body portion. In order to improve the visibility and/or legibility of the marking, the elastic material preferably is a material which provides for a large contrast to the plastic material of which the body portion is made.

**[0015]** While the concept suggested herein can be applied to any component of a domestic appliance which is to be provided with a sealing and a marking, as it applies to any domestic appliances in which the component during its use is exposed to liquids or to humidity, such as washing machines, dish washers, refrigerators, cooking utensils and the like, the present concept is considered to be of particular advantage when applied to components of a water-bearing domestic appliance, such as a laundry washing machine or dish washer, such as the cover of a container for chemical additives such as detergent containers, rinse agent containers, or containers for a water softening agent such as regenerative salt.

**[0016]** In accordance with a second aspect of the present invention, the above object is solved by a method for producing a component of a domestic appliance, which component comprises a body portion, a sealing and a marking, wherein the method comprises forming both said sealing and said marking by injection molding an elastic material onto the body portion.

**[0017]** While the specific molding process selected is of secondary concern provided the sealing and the marking are made of the same elastic material, the method generally can be implemented either as an over-molding process, that is as a process in which the body portion is prefabricated in a first molding process and then, is placed into an injection molding apparatus in which the said elastic material is injected on the body portion so as to form the sealing and the marking. On the other hand, the method of the present invention also can be implemented as a co-injection process, that is as a two-component molding process in which in a first process step a thermocurable material is injected so as to form the body portion and in a second step an elastic material is injected so as to mold the sealing and the marking. While in such process generally any sequence of steps could be used, usually the harder component is injected first, i.e. usually first the thermocurable material for the body portion is injected and then the softer elastic material is injected of which the sealing and the marking are formed. Such two-component molding process can be implemented in any conventional manner, such as by using a molding apparatus wherein access to the individual mold cavities for the body portion, the sealing and the marking is provided for example by means of gates, rotary tables, shifting plates and the like.

**[0018]** Examples of components made in accordance with the present invention are described below by reference to the accompanying drawings in which

FIGS. 1 and 2 show perspective bottom and top views, respectively, of a cover for a salt container of a dish washer and

FIGS. 3 and 4 show a detergent and rinse aid container for a dish washer in the closed and opened state, respectively.

**[0019]** FIG. 1 shows a cover 10 for the salt container of a dish washer (not shown), as it is usually provided in the bottom of the tub of a dish washer. Cap 10 comprises threads 12 by means of which the cover can be screwed onto the fill opening of the salt container. In order to seal the salt container towards the washing tub, which during use of the dish washer is filled with cleaning liquid, cover 10 is provided with a sealing member 14 which is molded onto the bottom side of cover 10 about the circumference of cover 10 where it contacts the upper rim of the salt container.

**[0020]** As can be seen in FIG. 2, cover member 10 is provided at its upper side with a marking 14 which designates that cover 10 is the cover of the salt container: While the sealing 14 and the marking 16 could be molded onto cover 10 from different sides of cover 10, i.e. by using a first mold cavity into which the elastic material for the sealing is injected and using a second mold cavity into which the sealing material for the marking 16 is injected, in the embodiment shown in FIGS. 1 and 2, marking 16 is formed by providing correspondingly shaped through holes within the cover member 10, the shape of which through holes correspond to the shape of the marking 16, and which through holes, during the molding process, are filled with elastic material from the bottom side of the cover member 10. In order to avoid the need to provide for separate injection channels to provide elastic material to the region of the mold where the sealing 14 is to be formed, and to the region where the marking 16 is to be formed, a molding apparatus can be used which comprises a single mold cavity both for the sealing and the marking. While in such an embodiment the finished product may comprise some elastic material in a region 18 connecting the sealing 14 and the marking 16, which connection region 18 neither serves sealing nor marking purposes, the additional material costs of such connecting portion 18 are by far compensated by the savings in tooling that can be achieved by being able to inject the material for the sealing and the marking via a single injection nozzle.

**[0021]** In FIGS. 3 and 4 there is shown a further example of a component made in accordance with the

present invention. In particular, FIGS. 3 and 4 show the cover member of a detergent container and a rinse aid container, which either may be manufactured as a single part or which are designed as separate components.

**[0022]** Preferably, cover member for the detergent container and the rinse aid container is designed as a single part 20 comprising a first lid 22 and a second lid 24 which both are hingedly connected to cover member 20. In the embodiment shown in Figs. 3 and 4 lid 22 constitutes the lid of a detergent container into which detergent in powder of tablet form is filled. Lid 24 comprises the lid of a rinse aid container into which a liquid rinse aid is filled. Whereas lid 22 is automatically opened during each washing process so as to release at a certain time during the washing process the detergent contained in the detergent container, lid 24 only is opened for refilling purposes, whereas the addition of the rinse aid to the washing liquid is effected via automatic release means (not shown).

**[0023]** Similarly as it was the case for the salt container cover member 10 of the salt container shown in FIGS. 1 and 2, also lid 22 comprises at its lower side a sealing portion 26 which is molded onto the lid 22 and which seals the opening of the detergent container when the lid 22 is closed. Lid 22 is provided with a marking 30 which indicates to a user of a dish washer that lid 22 is the cover of the detergent container. Marking 30 can be a symbol, as shown in FIG. 3, but also could be letters, numbers or the like. Marking 30 is formed by providing corresponding through holes within lid 22 which through holes, during the manufacturing process, are filled with the elastic material of which the sealing portion 26 is made. In order to be able to mold both the sealing 26 and the marking 30 via a single injection channel, the mold cavity for the elastic material comprises a connecting portion which connects sealing portion 26 with the central portion where marking 30 is to be formed, so that the finished product comprises a connecting portion 28, as shown in FIG. 4.

**[0024]** Instead of using a mold cavity for the elastic material which provides for a connecting portion, such as connected portion 28, the sealing and the marking may also be formed as a continuous single piece of elastic material, as it is shown in FIGS. 3 and 4 for lid 24 of the rinse aid container. Similarly as lid 22, also rinse aid lid 24 is provided with a plurality of through holes in the shape of a marking 32 which provide for a visual indication that lid 24 is the cover of the rinse aid container. The lower or rear side of lid 24 is provided with a sealing portion the shape of which corresponds to that of a fill opening 34 of the rinse aid container. However, in contrast to sealing 26 of lied 22 of the detergent container, sealing portion 36 for the rinse aid container is not an annular rim of elastic material, but rather is part of a continuous area which is molded onto the bottom or rear side of lid 24 and which covers both the sealing portion 36 and the central portion where the marking 32 is to be formed.

**[0025]** As is shown in the drawings, the plastic material of the body portion and the elastic material of which the sealing and the marking are formed should be selected to have a high contrast so as to provide for a good visibility of the marking. Thus, as is shown in the drawings, for example a light color, such as white or light grey could be used for the cover member, and a dark elastic material, preferably a black elastic material, such as thermocurable polymer compositions or elastomeric rubber materials could be used for forming the sealing and the marking.

**[0026]** In the above manner components of domestic appliances can be manufactured in a cost-effective manner, wherein no individual manufacturing steps are required to attach the sealing and to apply a marking, and wherein by using for the marking the same material as is used for the sealings, particularly durable markings can be formed which can be clearly distinguished from the components on which these markings are formed and which do not lose their visibility even after extended use of the component.

## Claims

1. Component of a domestic appliance, said component comprising a body portion (10; 22; 24), a sealing (14; 26; 36) and a marking (16; 30; 32), **characterized in that** said body portion (10; 22; 24) comprises a molded plastic part, and both said sealing (14; 26; 36) and said marking (16; 30; 32) are made of an elastic material that is molded to the body portion.

2. The component of claim 1, wherein said sealing (14; 26; 36) and said marking (16; 30; 32) are made of a thermocurable polymer composition or of an elastomeric rubber material, such as EPDM (ethylene propylene diene monomer (M-class) rubber).

3. The component of claim 1 or 2, wherein said sealing (14; 26; 36) and said marking (16; 30; 32) are provided on the same side of the body portion (10; 22; 24).

4. The component of any one of the preceding claims, wherein said sealing (14; 26; 36) and said marking (16; 30; 32) are part of the same piece of said elastic material.

5. The component of claim 4, wherein said sealing (14; 26; 36) and said marking (16; 30; 32) are provided on opposite sides of the body portion (10; 22; 24), wherein the body portion comprises at least one through hole, via which the sealing and the marking are connected with each other.

6. The component of claim 5, wherein the shape of the through hole corresponds to the shape of the mark-

ing (16; 30; 32).

**7.** The component of any one of the preceding claims, wherein said elastic material is visually discriminable from said body portion (10; 22; 24), preferably has a different brightness and/or a different color than said body portion.

**8.** The component of any of the preceding claims, wherein the sealing is an essentially liquid-tight or an essentially air or moisture-tight sealing and/or wherein the marking comprises a pictogram.

**9.** The component of any one of the preceding claims, wherein said component is a dishwasher part.

**10.** The component of claim 9, wherein said component is a cover of a detergent container, a cover of a rinse agent container or a cover of a salt container.

**11.** Method for producing a component of a domestic appliance, said component comprising a body portion, a sealing and a marking, the method comprising:

forming both said sealing and said marking by injection molding an elastic material onto said body portion.

**12.** The method of claim 11, in which said body portion is prefabricated and then is placed into a an injection molding apparatus, in which said elastic material is injected onto the body portion so as form said sealing and said marking.

**13.** The method of claim 11, in which, prior to placing said body portion into a said injection molding apparatus, a through hole is formed in the body portion, said through hole having a shape corresponding to the marking to be formed.

**14.** The method of claim 11, comprising:

providing an injection molding apparatus having a first mold cavity the shape of which corresponds to the shape of the body portion, at least one second mold cavity the shape of which corresponds to the shape of the sealing to be applied to the component and at least one third mold cavity the shape of which corresponds to the shape of the marking to be applied to the component;
injecting a thermocurable material into said first mold cavity so as to mold the body portion; and
injecting an elastic material into said second and third mold cavities so as to mold both said sealing and said marking.

**15.** The method according to any of claims 11 to 14, wherein the sealing is an essentially liquid-tight or an essentially air or moisture-tight sealing of said component and/or wherein the marking comprises a pictogram.

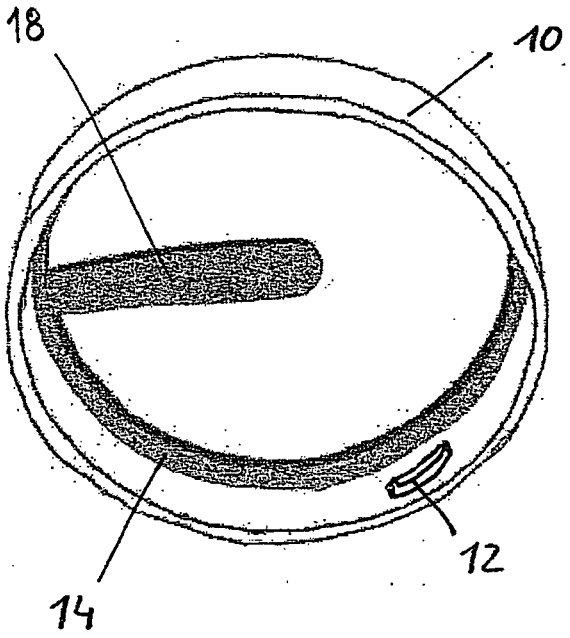



FIG. 1

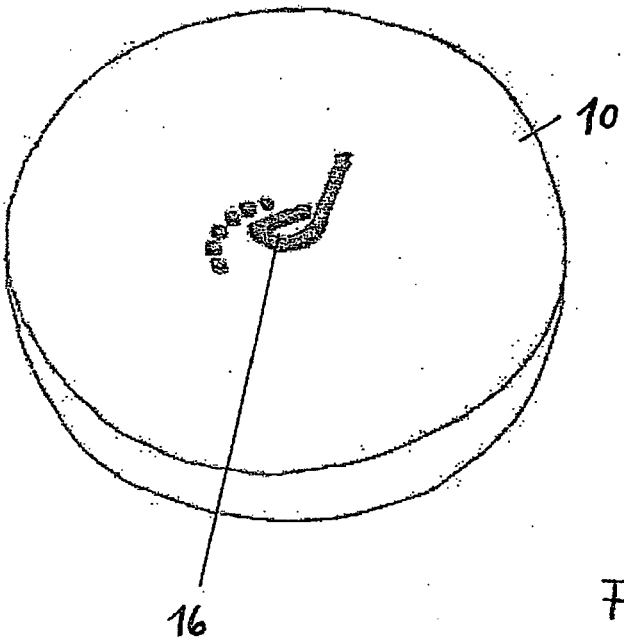



FIG. 2

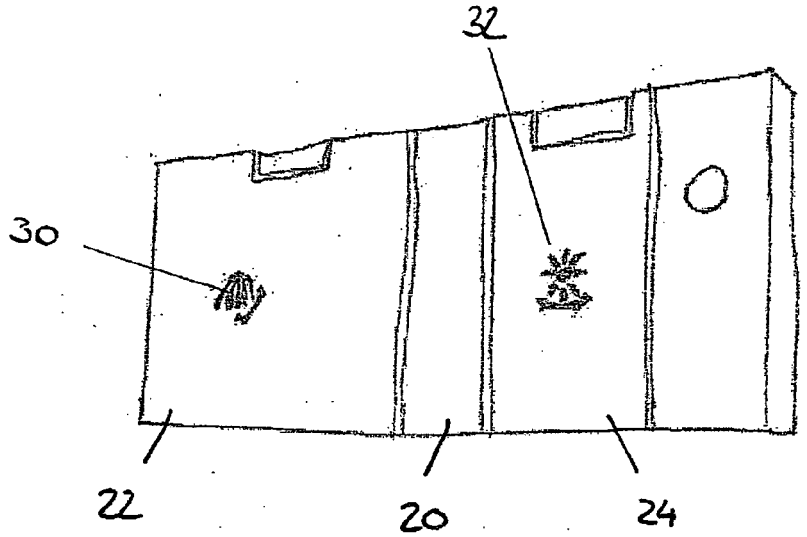



FIG. 3

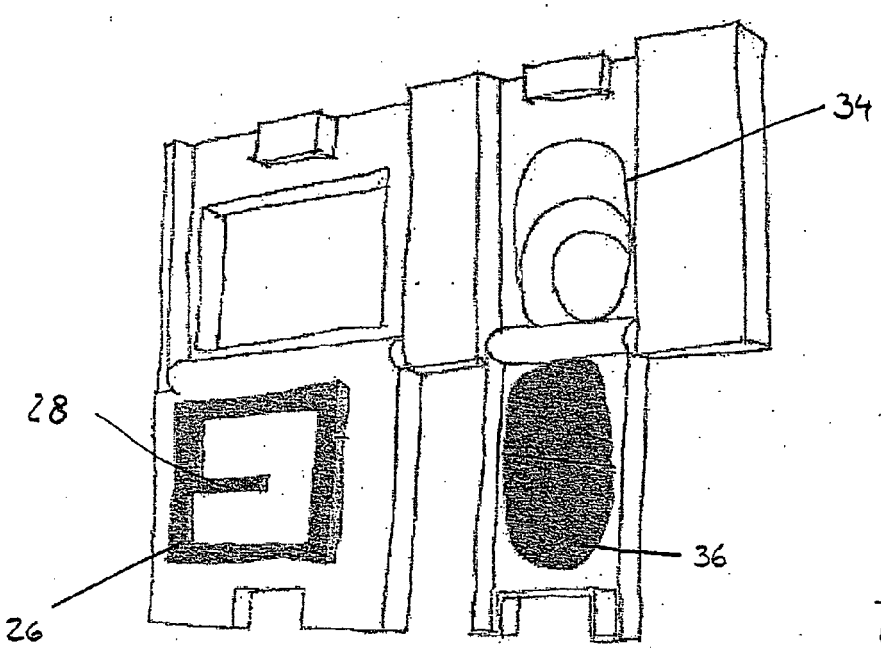



FIG. 4

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# EUROPEAN SEARCH REPORT

Application Number
EP 09 01 5117

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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 |
|---|---|---|
| Munich | 9 July 2010 | Kising, Axel |

CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 01 5117

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

## REFERENCES CITED IN THE DESCRIPTION

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