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(54) Title: METHOD FOR PRODUCING A HOUSEHOLD APPLIANCE COMPONENT WITH A MARK IN A RECESS AS WELL AS HOUSEHOLD APPLIANCE COMPONENT

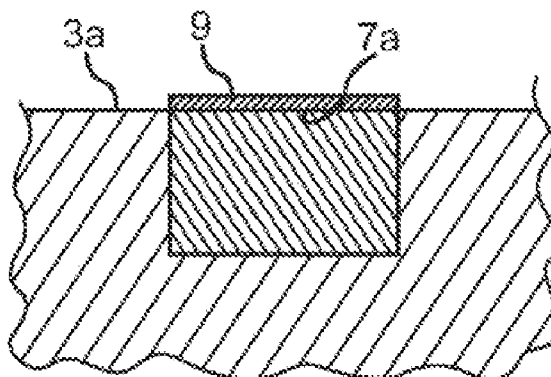


Fig.3

(57) Abstract: The invention relates to a method for producing a household appliance component (1), in which a base part (2) of the household appliance component (1) is provided, and in which a mark (8) is generated on a top side (3) of the base part (2), wherein a recess (4) is formed on the top side (3) and the mark (8) is formed in the recess (4). The invention also relates to a household appliance component (1).

METHOD FOR PRODUCING A HOUSEHOLD APPLIANCE COMPONENT WITH A MARK IN A RECESS AS WELL AS HOUSEHOLD APPLIANCE COMPONENT

The invention relates to a method for producing a household appliance component, in
5 which a base part of the household appliance component is provided, and in which a mark
is generated on a top side of the base part. Furthermore, the invention relates to a
household appliance component, which is produced according to a corresponding
method.

10 It is known that extensive processing of materials is allowed by means of laser. In this
context, plastics can also be processed. The laser beam acts on the plastic material and it
fuses it on the top side. By such approaches, marks can be generated, since thus for
example dark plastics can for example be white discolored by this action of the laser
beam. In this melt, as it is generated by the laser beam on the top side of the plastic, small
15 gas bubbles form, which increase the volume such that plastic foam is virtually generated.
The enclosed gas bubbles reflect the light in diffuse manner, whereby the processed area
appears brighter than the surrounding material. It can also be provided that this mark
projects or protrudes beyond the surface of the adjoining plastic, which is not foamed, in
raised and thus tactile manner. Then, this is a foamed mark.

20 However, it is to be noted that especially such marks with the areas of the plastic foam are
too high or too severely foamed and thereby have disadvantages.

A problem in these marks arising by foaming a plastic material by laser directly on a
25 surface of a top side of the base part, is also to be seen in that these marks are very
fragile. Due to the enclosed gas bubbles in this generated plastic foam area and the
porosity resulting from it, a reduced mechanical stability results. By the plastic areas then
usually generated in raised manner, they are also little protected and can also be
damaged with then more extensively acting forces.

30

However, corresponding problems also occurred if a mark is applied directly on a surface of a base part, which can then for example also be formed of plastic, with a paint material, for example a colored ink, by an inkjet method.

- 5 It is an object of the present invention to provide a method as well as a household appliance component, with which or in which marks are formed improved with respect to undesirably acting forces on the base part.

This object is solved by a method and a household appliance component according to the
10 independent claims.

In a method according to the invention for producing a household appliance component, a base part of the household appliance component is provided. On a top side of the base part, at least one mark is generated. A substantial idea of the invention is to be considered
15 in that a recess is formed on the top side and the mark is then formed in the recess. By this formation of the mark virtually embedded at least in certain areas or recessed at least in certain areas, it can be disposed more protected. Thereby, the damage by undesirably acting forces can also be reduced with mechanically little stable marks. In that the mark is generated virtually no longer completely directly on the surface of the top side of the base
20 part, and thus does not correspondingly protrude or is exposed completely in raised manner, the probability is reduced that damage of this mark occurs by hitting it.

Preferably, the component is formed of plastic at least on the top side. The plastic material is of any kind of thermoplastic as for example polypropylene, polystyrene, polyvinyl,
25 polyethylene and preferably ABS and PMMA. By this material specification and the formation of a recess being then effected, in which the generation of the mark is then also effected, a base part very light on the one hand and produced complex in shape on the other hand can be provided. Since especially with plastics, the action of the laser generates plastic foam areas, which are then used as marks, and they yet are relatively
30 fragile and instable, such a mark is substantially improved by the invention especially with a base part formed of plastic. Correspondingly, this is then also improved for implementations, in which the mark is generated by a colored ink, since it then forms in the recess. The method will work also when some filler or additive, such as pigments or flame retardants, is added to the plastic.

Preferably, the base part is produced as an injection molding. Therefore, it is in particular completely produced of plastic, whereby the above mentioned advantages also extensively come into effect. Especially in generating as an injection molding, by a
5 corresponding injection mold, the recess can be very precisely preset in its configuration, and in introducing the plastic material into this injection mold, this recess is then virtually also automatically already generated as well and correspondingly cast. Therefore, in this configuration, then, it is no longer required to generate this recess in the base part afterwards, whereby production time is saved and the shape and positional precision of
10 the recess is increased.

Preferably, the mark is generated by action of a laser on the plastic material of the top side in the area of the recess and a plastic foam area is formed in the recess, which then represents the mark. Besides the recessed or at least partially embedded formation of the
15 mark, this is also advantageous to the effect that certain boundaries for the plastic foam area are also virtually preset by the recess. In particular, in this context, the laser only acts on the material or substantially only on the material on the bottom of the recess such that foaming and thus upward migrating of the material treated with the laser in the recess is then also limited by the corresponding sidewalls of the recess.
20 A very sharp contour of this mark is then also allowed such that here too high shape precision of the mark is accommodated.

In an alternative configuration, the mark is generated by introducing a colored ink into the recess by an inkjet method. Thereby too, the above mentioned advantages are given, and
25 virtually by filling the ink into the recess, an at least partially embedded embodiment of the mark is generated. Here too, by the recess, the contour precision of the mark is then advantageously improved because the ink can no longer flow away to the side. By the introduction into the recess, then, a certain protected position from undesired force influences on the ink is again achieved such that here too a certain impact protection is
30 formed.

It can be provided that the mark in the recess is covered by an additional cover layer. Thereby, the mark, whether it is now in particular formed as a colored ink or preferably as a plastic foam area, is disposed virtually completely shrouded and encapsulated. Even if it

is then mechanically relatively instable, external influence can virtually no longer act because this material of the plastic foam or the ink is no longer exposed at any location.

Preferably, the cover layer is transparent and can for example be a varnish. Thereby, it
5 can be applied very simply, thin and locally very precisely.

Preferably, it is provided that the cover layer is formed as a scratch-resistant layer such that here too the mark then cannot be scratched.

10 Preferably, the cover layer is only applied on the mark or on the mark material and is then not applied on the adjoining areas of the base part, which adjoin the recess.

Preferably, it is provided that on its surface, the mark is formed flush with the surface as it enters the recess such that the mark does no longer protrude to the top in raised manner.

15 The above mentioned advantages then emerge to a special degree.

Preferably, the cover layer has a thickness between 100 μm and 200 μm . By the material of the mark, in particular colored ink or the plastic foam area, an optical area configuration different in color with respect to the area of the base part adjoining thereto is generated.

20 However, it can also be provided that the cover layer also extends at least partially on a surface of the base part. This can be generated depending on situation and can be formed depending on the adhesive characteristics of the material of the cover layer and the material of the base part.

25 Furthermore, the invention relates to a household appliance component, which is produced according to the method according to the invention or an advantageous development thereof.

Preferably, at least one letter and/or at least one number and/or at least one symbol are
30 generated as the mark. Thereby, for example, names of the manufacturer and/or of the appliance type can be generated as the mark. However, symbols indicating an operating function of a household appliance, which this household appliance component has, can also be generated.

As the household appliance components, for example, control panels of a control front of a household appliance for caring pieces of laundry, such as for example of a washing machine or a clothes dryer or a washer-dryer, can be produced. However, control panels for a household appliance for preparing food such as for example a baking oven or a microwave cooking appliance can also be produced. Similarly, here, a control panel for a dishwasher can for example be produced. It is mentioned that the cited enumerations of examples for household appliance components and household appliances are not to be construed as exhaustive.

Further features of the invention are apparent from the claims, the figures and the description of figures. The features and feature combinations mentioned above in the description as well as the features and feature combinations mentioned below in the description of figures and/or shown in the figures alone are usable not only in the respectively specified combination, but also in other combinations or alone without departing from the scope of the invention. Thus, implementations are also to be considered as encompassed and disclosed by the invention, which are not explicitly shown in the figures and explained, but arise from and can be produced by separated feature combinations from the explained implementations.

Below, embodiments of the invention are explained in more detail based on schematic drawings. There show:

Fig. 1 a schematic sectional illustration through an embodiment of a household appliance component according to the invention in a first manufacturing state;

Fig. 2 the household appliance component according to Fig. 1 in a second manufacturing state; and

Fig. 3 the household appliance component according to Fig. 2 in an optional third manufacturing state.

In the figures, identical or functionally identical elements are provided with the same reference characters.

In Fig. 1, in a schematic sectional illustration, a household appliance component 1 is shown, which has a base part 2. The base part 2 can be formed of plastic at least in certain areas, and preferably is an injection molding. To this, the base part 2 is already prefabricated corresponding to the illustration in Fig. 1 and correspondingly provided. Thus, it has a recess 4 on a top side 3.

In a further manufacturing step, a mark is generated in the recess 4 by means of a laser 5. To this, in particular in the area of a bottom 6 of the recess 4, the material of the base part 2, which is preferably plastic here, is processed with the laser 5. By the action of the laser 5, therein, this plastic material is foamed such that a plastic foam area 7 is then formed according to the illustration in Fig. 2, which represents a mark 8. In this context, the recess 4 is then completely filled with this plastic foam material or plastic foam area 7. This plastic foam area 7 is porous or formed with a considerably lower density than the plastic material adjoining the recess 4 according to the introductorily presented explanation. By gas bubbles being enclosed in the plastic foam area 7, the mechanical stability is also considerably reduced compared to the plastic material adjoining the recess 4 and thus also the plastic foam area 7. As it is apparent in Fig. 2, the plastic foam area 7 is then bounded by the recess 4 and virtually embedded therein. As it is indicated in Fig. 2, it can also protrude beyond the surface 3a of the top side 3 in raised manner. However, it can also be provided that a surface 7a of the plastic foam area 7 is then formed flush with the surface 3a. For example, in this context, material ablation of the plastic foam can then be effected subsequent to the generation of the plastic foam area 7.

In an advantageous implementation, a cover layer 9, which is preferably a scratch-resistant layer, can then be additionally applied to the plastic foam area 7, as it is illustrated in Fig. 3. For example, this cover layer 9 can be a transparent varnish. In an implementation, it can be applied such that it only covers the surface 7a. However, alternatively, the surface 3a can also additionally at least partially be covered with the cover layer 9.

As it is indicated in Fig. 3, in an implementation, the cover layer 9 can be applied, in which the surface 7a is formed flush with the surface 3a. However, it can also be provided that the surface 7a, as it is shown in the illustration according to Fig. 2, protrudes beyond the surface 3a in raised manner, and in such a state, a cover layer 9 can then also be applied.

In an alternative implementation, based on the illustration in Fig. 1, in which the base part 2 is basically provided and the recess 4 is already formed, a mark 8 can be subsequently generated by introducing colored ink into the recess 4. Here, processing with a laser 5 is not required, and the ink is introduced with an inkjet method. In this implementation too, the further explanations, as they were stated to Fig. 2 and Fig. 3, can be taken into account. Thus, here, a cover layer 9 can then also be applied and/or a flush configuration of a surface of the ink with the surface 3a can be generated.

10 Preferably, the thickness of the cover layer 9 is between 100 μm and 200 μm . In this context, with respect to the thickness ratios between the cover layer 9 and the material of the mark 8, thus preferably of the plastic foam area 7 or the colored ink, in the illustration in Fig. 3, proportionality is not necessarily to be extracted. Completely other thickness ratios between the cover layer 9 and this material of the mark 8 in the recess 4 can also
15 be formed.

List of reference signs

	1	household appliance component
	2	base part
	3	top side
5	3a	surface
	4	recess
	5	laser
	6	bottom
	7	plastic foam area
10	7a	surface
	8	mark
	9	cover layer

CLAIMS

1. Method for producing a household appliance component (1), in which a base part (2) of the household appliance component (1) is provided, and in which a mark (8) is generated on a top side (3) of the base part (2), **characterized in that** a recess (4) is formed on the top side (3) and the mark (8) is formed in the recess (4).
2. Method according to claim 1, characterized in that the base part (2) is formed of plastic at least on the top side (3).
3. Method according to claim 1 or 2, characterized in that the base part (2) is produced as an injection molding.
4. Method according to claim 2 or 3, characterized in that the mark (8) is formed by action of a laser (5) on the plastic material of the top side (3) and generating a plastic foam area (7) in the recess (4).
5. Method according to any one of claims 1 to 3, characterized in that the mark (8) is generated by introducing colored ink into the recess (4) by an inkjet method.
6. Method according to any one of the preceding claims, characterized in that the mark (8) is covered by a cover layer (9) in the recess (4).
7. Method according to claim 6, characterized in that the cover layer (9) is formed as a scratch-resistant layer.
8. Method according to claim 6 or 7, characterized in that the cover layer (9) is only formed on the mark (8).
9. Household appliance component (1), which is produced according to a method according to any one of the preceding claims.

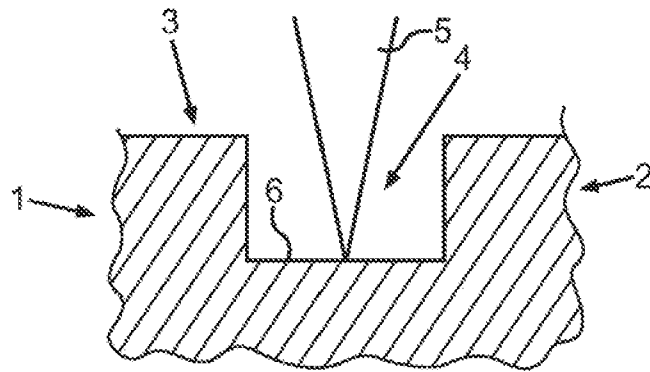


Fig.1

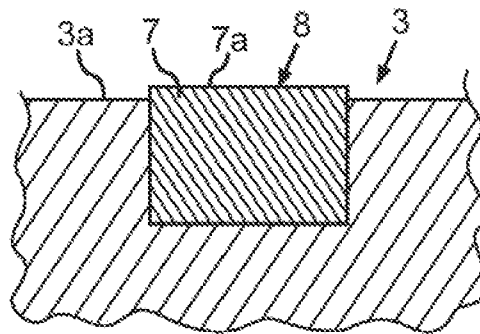


Fig.2

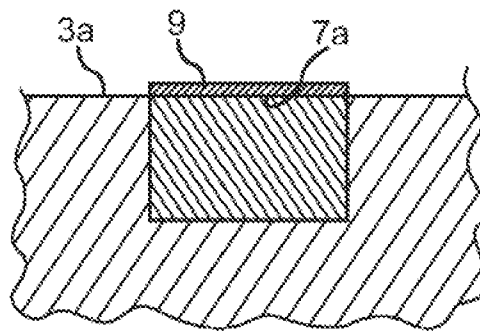


Fig.3

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/053271

A. CLASSIFICATION OF SUBJECT MATTER

INV. B29C44/04 B41M5/00 C03C23/00 B29C67/20
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B23K B44D C03C B29C B29K C08J B41M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	paragraphs [0001], [0009], [0010], [0027] - [0030]; figures 1,2	4
X	WO 2010/001767 A1 (NISSHA PRINTING [JP]; FUJII KENTARO [JP]; YASUI TOSHIYUKI [JP]) 7 January 2010 (2010-01-07)	1-4,9
A	abstract; figure 1	5-8
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X	EP 0 996 549 A1 (OTIS ELEVATOR CO [US]) 3 May 2000 (2000-05-03)	1-3,9
	paragraphs [0001], [0013] - [0016], [0024] - [0028]	
	----- -/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/053271

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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