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(72) Inventors:
• **BARBIERI, Emanuele**
46010 Buscoldo (MN) (IT)
• **PORTIOLI, Gaetano**
42121 Reggio Emilia (IT)

(74) Representative: **Cernuzzi, Daniele et al**
Studio Torta S.p.A.
Via Viotti, 9
10121 Torino (IT)

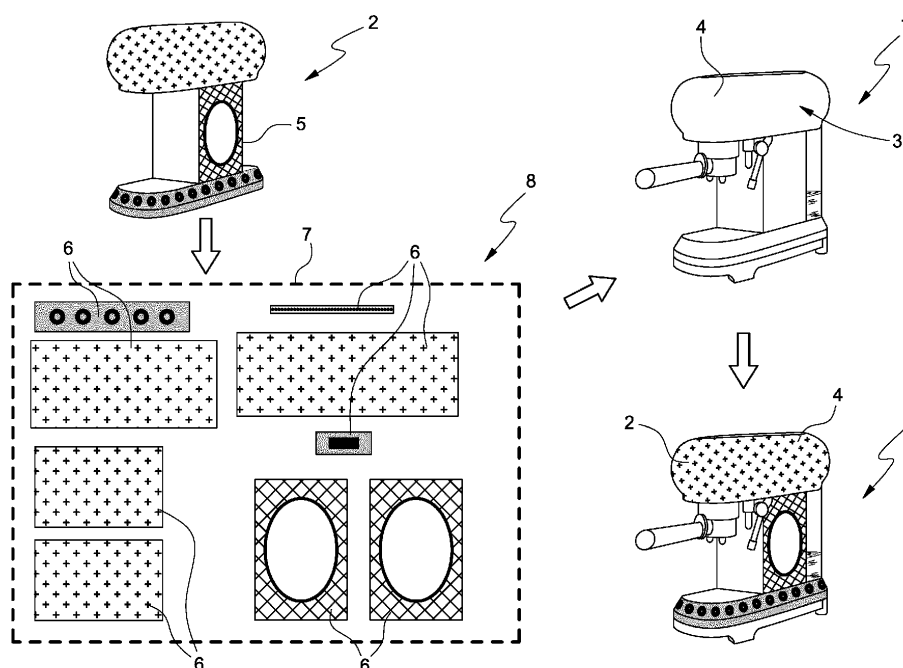
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(71) Applicant: **SMEG S.p.A.**
42016 Guastalla, RE (IT)

(54) **PROCESS FOR DECORATING SURFACES OF HOUSEHOLD APPLIANCES**

(57) A process for decorating surfaces of household appliances comprises the steps of: making a decal having a graphic pattern to be transferred onto a surface of a household appliance to be decorated; transferring the graphic pattern onto the surface of the household appliance by decalcomania technique comprising, in succession, the steps of: applying a first primer on the surface;

applying the decal on the surface having the first primer and transferring the graphic pattern from the decal to the surface; applying a second primer on the surface decorated with the graphic pattern transferred from the decal; applying a transparent finishing paint on the decorated surface.



Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Patent Application claims priority from Italian Patent Application No. 102018000005818 filed on May 29, 2018.

TECHNICAL FIELD

[0002] The present invention relates to a process for decorating surfaces of household appliances, in particular (but not limited to) small household appliances.

BACKGROUND ART

[0003] In the household appliance sector, there are the traditionally so-called 'large household appliances', which are relatively large in size and which, once installed, are not normally moved for use (refrigerators, dishwashers, cooking units, washing machines, etc.); and the so-called 'small household appliances', i.e. small portable or semi-portable appliances which can be easily moved by the user and are generally used on tables or other support surfaces.

[0004] For example, in the field of kitchen household appliances, considered in general as appliances for food and beverage preparation and related activities, microwave ovens, electric ovens, toasters, coffee machines, juicers, blenders, kneading machines, etc. are commonly referred to as small household appliances.

[0005] In this sector, the purely functional aspect is so crucial as the aesthetic and emotional component: therefore, in addition to being practical and efficient, household appliances in general, and small household appliances in particular, must also be aesthetically attractive and original.

[0006] The need is therefore felt to decorate the external surfaces of household appliances, which are normally made of metal or polymeric material (plastic).

[0007] However, the decoration of the external surfaces (or parts thereof) of household appliances is related to various technical problems, since a variety of performances must be ensured, such as in particular:

- a high aesthetic quality;
- an adequate persistence of the decoration over time;
- an adequate resistance of the decoration to aggressive agents such as alcohols, grease, acids, etc.;
- an adequate behavior at high temperatures and vapor;
- suitability for food contact.

[0008] In fact, it is necessary not only to decorate the surfaces in an effective and durable manner, thus ensuring good adhesion of the decoration, whether it be impressed/applied; but also to ensure that the decorated surfaces maintain the characteristics required for their

specific use, being, for example, suitable for contact with food or adequately resistant to the aggressive and/or polluting agents normally used or present in the domestic environment.

[0009] Moreover, many small household appliances (and also some large household appliances) have relatively complex shapes and are provided with external surfaces that are not flat and comprise several surface portions variously shaped and oriented to one another; the decoration of these surfaces is therefore further complicated by their shape, especially if the decoration to be made comprises complex graphic parts, drawings and/or colors that must be coordinated on the different surface portions of the household appliance to form a predetermined overall graphic pattern.

DISCLOSURE OF INVENTION

[0010] Therefore, it is an object of the present invention to provide a process for decorating surfaces of household appliances that is fully effective and allows to obtain high quality decorated surfaces, even with complex graphic patterns, and with durable and resistant decorations.

[0011] The present invention therefore relates to a process for decorating surfaces of household appliances as defined in the attached claim 1.

[0012] Additional preferred features of the invention are defined in the dependent claims.

[0013] The process according to the invention makes it possible to decorate the external surfaces of household appliances, both in metallic and polymeric materials, in a fully satisfactory manner and with a high aesthetic quality, in particular allowing for the creation of decorations and graphic patterns that may be complex, and even on surfaces with a complex shape.

[0014] In particular, the process of the invention allows to decorate not only a surface with a simple shape, but also a three-dimensional body having a complex-shaped external surface, also formed by several surface portions, variously shaped and oriented with respect to one another.

[0015] The decorated surfaces made according to the invention are also suitable for contact with food, suitably persistent over time and resistant to the aggressive agents normally present in the domestic environment (alcohols, grease, acids, etc.), as well as to high temperatures and steam.

[0016] The process according to the invention is particularly suitable for decorating the surfaces of small household appliances such as toasters, juicers, centrifuges, shredders, blenders, whisks, food processors, coffee machines, electric jugs, kettles, mixers, etc. The process according to the invention is suitable for decorating the surfaces of household appliances in general, including large household appliances as well.

[0017] It is understood that the invention may also be used with other appliances, such as irons, sewing machines, slicers, scales, ice cream makers, vacuum clean-

ers and electric brooms, etc.

[0018] Essentially, according to the invention the decoration is applied to the surface to be decorated by decalcomania (decal).

[0019] Decalcomania is a color printing technique that consists in transferring onto a final support (in this case, the surface of the household appliance to be decorated) a graphic pattern previously impressed on a support film (for example, paper).

[0020] The graphic pattern is detached from the film by a wet process, by pressing the printed and moistened part on the final support.

[0021] The graphic pattern to be reproduced on the surface of the household appliance can be a drawing, an image, etc.

[0022] For example, the graphic pattern can be created by an artist who paints it on a form reproducing the item (household appliance) to be decorated, or in a two-dimensional form on a tissue or other support.

[0023] According to the invention, the preparation of the decal (support film with the graphic pattern to be transferred impressed thereon) is carried out according to specific procedures.

[0024] In particular, once created or selected, the graphic pattern is acquired in digital form, for example by means of high-resolution digital photography and scanning.

[0025] The graphic pattern is then subject to reconstruction and two-dimensional adjustment: the overall graphic pattern, which is, in use (i.e. once transferred onto the household appliance to be decorated), three-dimensional, extending on variously shaped and arranged surface portions, is resolved into a plurality of two-dimensional parts.

[0026] This ensures full respect for the original acquired, which is particularly important when the original is a unique work, for example hand-painted.

[0027] The various parts of the graphic pattern are then printed on a support film to make the corresponding decal.

[0028] According to the invention, the graphic pattern is printed on the support film using a mixed offset and silk-screen printing technique.

[0029] In this way, problems related to poor resolution and color and line definition (the so-called "brush stroke" effect) are avoided.

[0030] In general, the graphic pattern is printed in a plurality of printing stages with respective colors or groups of colors, comprising both offset printing stages and silk-screen printing stages.

[0031] In further detail, the graphic pattern is printed in one or more four-color offset printing stages and a plurality of monochromatic silk-screen printing stages with respective colors.

[0032] For example, the printing process comprises, preferably in the indicated sequence, the following printing stages of inks or compositions:

at least one first silk-screen printing stage with a transparent composition;
one or more silk-screen printing stages with a white ink;

one or more four-color offset printing stages;
one or more silk-screen printing stages of the respective colored inks (burgundy, yellow, black, blue, green, red, etc.);

one or more silk-screen printing stages with a transparent composition;

one or more silk-screen printing stages with a peelable composition.

[0033] The graphic pattern is then transferred from the support film to the surface of the household appliance to be decorated by means of a decal technique comprising, in succession, the steps of:

pre-treating the surface to be decorated by passivating the surface, for example by treating it with abrasive wool or paper (dulling), and/or washing it with detergents and/or degreasers, for example with white spirit;

applying a first primer on the surface to be decorated; drying;

applying the decal on the surface having the first primer and transferring the decal graphic pattern onto the surface;

drying;

applying a second primer on the surface decorated with the graphic pattern transferred from the decal; drying;

applying a transparent finishing paint on the decorated surface;

drying;

polishing the decorated and painted surface.

[0034] The surface to be decorated is the external surface, optionally made up of several surface portions, which can be not adjacent and variously oriented and arranged with respect to one another, of a household appliance, in particular (but not necessarily) a small household appliance.

[0035] The invention applies in particular to the body or casing of the household appliance, normally made of metal material (e.g. metal sheet, stainless steel, aluminum, etc.) or polymeric material (e.g. ABS).

[0036] Preferably, the decal is wet-applied with denatured water.

[0037] The application of two primers in two successive application steps solves the problem of an effective adhesion/sticking of the decal to the surface to be decorated.

[0038] The final application of the finishing paint avoids any softening and deterioration of the decoration if exposed to heating, as can be the case during normal use of the appliance.

BRIEF DESCRIPTION OF THE DRAWING

[0039] The invention is further described in the following non-limiting embodiment examples, with reference to the attached figure that schematically shows the execution of a process to decorate surfaces of household appliances according to the invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0040] With reference to the attached figure, a process is described for decorating the external surfaces of a household appliance, in the example a coffee machine, hereinafter referred to as appliance 1.

[0041] It is understood that the process according to the invention can be applied to any other household appliance.

[0042] First of all, a graphic pattern 2 is defined, understood as a set of graphic signs, images, drawings, colors, etc., to be transferred onto the apparatus 1 and precisely on an external surface 3 of the casing 4 or body of the appliance 1, made of metal material (e.g. metal sheet, stainless steel, aluminum, etc.) or polymeric material (e.g. ABS) .

[0043] For example, the graphic pattern 2 to be transferred onto the surface 3 can be created by an artist who paints it on a form 5 reproducing the appliance 1 to be decorated, or in a two-dimensional form on a tissue or other support. Anyway, the graphic pattern 2 can be created in other ways, also in digital form, or selected from a repertoire, etc.

[0044] Clearly, although represented in the figure in an extremely schematic form, the graphic pattern 2 can be of any kind and have figures, drawings, images of any kind; in fact, the invention is adapted to decorate household appliances with particularly complex decorations as they can be handmade works.

[0045] Once created or selected, the graphic pattern 2 is acquired in digital form by means of high-resolution digital photography or another similar scanning method.

[0046] The graphic pattern 2 is then reconstructed and adjusted in two-dimensional mode, in which the graphic pattern 2 is resolved into a plurality of two-dimensional parts 6, corresponding to the respective surface portions of the surface 3 to be decorated.

[0047] The various parts 6 of the graphic pattern 2 are then printed on a support film 7 to make a decal 8 (support film having the graphic pattern to be transferred impressed thereon).

[0048] In particular, the graphic pattern 2 is printed on the support film 7 using a mixed technique of offset printing and silk-screen printing, in a plurality of silk-screen printing stages and offset printing stages with the respective colors or groups of colors.

[0049] Clearly, the sequence of printing stages depends on the graphic pattern 2 and its colors.

[0050] Purely by way of example, the graphic pattern 2 is printed by following the printing stages below:

a first silk-screen printing stage with a transparent composition;
three silk-screen printing stages with a white ink;
four four-color offset printing stages;
one silk-screen printing stage with a dark red ink;
two silk-screen printing stages with a transparent composition;
one silk-screen printing stage with a peelable composition.

[0051] With other graphic patterns 2 other printing cycles will be used, in particular with different colors.

[0052] The decal 8 is then applied to the surface 3 to be decorated by wet decal technique.

[0053] In advance, the surface 3 is pre-treated by passivation, for example by passing an abrasive wool or paper on the surface 3 until the surface becomes opaque, and/or by washing with detergents and/or degreasers, for example white spirit.

[0054] A first primer is then applied on the surface 3 and, after drying, the moistened decal 8 is applied, by pressing the printed part of the decal 8 on the surface 3 and removing the support film 7, so as to transfer the graphic pattern 2 of the decal 8 onto the surface 3.

[0055] Preferably, the first primer is applied in such an amount so as to form a substantially uniform layer having a thickness ranging between about 10 and about 40 microns.

[0056] For example, the first primer is applied in an amount between about 10 and about 50 g/m², in particular between about 20 and about 40 g/m².

[0057] After drying, a second primer is applied to the surface 3 decorated with graphic pattern 2 transferred from the decal 8, which is then dried.

[0058] The second primer is also preferably applied in such an amount so as to form a substantially uniform layer having a thickness ranging between about 10 and about 40 microns.

[0059] For example, the second primer is also applied in an amount between about 10 and about 50 g/m², in particular between about 20 and about 40 g/m².

[0060] Lastly, a transparent finishing paint is applied on the decorated surface 3.

[0061] The finishing paint is applied for example in an amount so as to form a substantially uniform layer having a thickness ranging between about 10 and about 60 microns.

[0062] For example, the paint is applied in an amount between about 20 and about 60 g/m².

[0063] After drying, a final polishing of the decorated and painted surface 3 is carried out.

[0064] In the following examples, further details of the invention process are given (purely by way of a not limiting example), in particular on the application steps of the decal on the surface to be decorated.

EXAMPLE I

[0065] The first primer, in particular a polyester base primer and precisely a modified polyester resin, is applied on the surface 3.

[0066] A suitable primer is, for example, the commercial product LS925 (29925) 2K Helm Basecoat by Lechler.

[0067] By way of (a non-limiting) indication only, the first primer is applied in an amount between about 20 g/m² and about 40 g/m² to form a uniform layer having a thickness ranging between about 15 microns and about 30 microns.

[0068] This is followed by drying, for example air drying for a few hours at room temperature (preferably at least 22°C).

[0069] The decal 8, moistened with denatured water at a minimal temperature of 22°C, is then applied on the surface 3, by pressing the printed part of the decal 8 on the surface 3 and removing the support film 7, so as to transfer the graphic pattern 2 of the decal 8 onto the surface 3.

[0070] This is followed by drying, for example air drying for 24 hours at least 22°C.

[0071] A second primer is applied on the surface 3 decorated with the graphic pattern 2 transferred from the decal 8, in particular an acrylic base primer and precisely a modified acrylic resin.

[0072] A suitable primer is, for example, the commercial product Lechler 31676 Decosealer by Lechler.

[0073] By way of (a non-limiting) indication only, the second primer is applied in an amount between about 20 g/m² and about 40 g/m² to form a uniform layer having a thickness ranging between about 15 microns and about 30 microns.

[0074] This is followed by drying, for example air drying at a minimum temperature of 22°C for 24 hours.

[0075] A transparent finishing paint is then applied to the decorated surface 3, in particular an acrylic paint (a mixture of acrylic resins), for example the commercial product Lechler 31590 Clear Glossy MS-HCR by Lechler, in an amount approximately between about 40 g/m² and about 60 g/m² to form a uniform layer having a thickness ranging between about 30 microns and about 50 microns.

[0076] This is followed by evaporation for at least 12 hours in air at room temperature and drying for at least one hour at 60°C.

[0077] Lastly, a final polishing of the decorated and painted surface 3 is carried out.

EXAMPLE II

[0078] The first primer, in particular a polyacrylate primer and precisely a modified acrylic resin, is applied on the surface 3.

[0079] A suitable primer is, for example, the commercial product s80100 by Bose-X.

[0080] By way of (a non-limiting) indication only, the

first primer is applied in an amount between about 20 g/m² and about 40 g/m² to form a uniform layer having a thickness ranging between about 15 microns and about 30 microns.

[0081] This is followed by drying, for example at 50°C for 30'.

[0082] The decal 8, moistened with water, is then applied on the surface 3, and the support film 7 is removed, so as to transfer the graphic pattern 2 of the decal 8 to the surface 3.

[0083] This is followed by drying, for example at 50°C for 20'.

[0084] The second primer is applied, in particular a polyacrylate primer, for example a modified acrylic resin.

[0085] A suitable primer is, for example, the commercial product s80153 by Bose-X.

[0086] By way of (a non-limiting) indication, the second primer is applied in an amount between about 20 g/m² and about 40 g/m² to form a uniform layer having a thickness ranging between about 15 microns and about 30 microns.

[0087] This is followed by drying, for example at 50°C for 90'.

[0088] A transparent finishing paint is then applied to the decorated surface 3, in particular a crosslinking acrylic base UV paint in an organic solvent, for example the commercial product Lechler UV0030 by Bose-X, in an amount approximately between about 20 g/m² and about 40 g/m² so as to form a uniform layer having a thickness ranging between about 15 microns and about 30 microns.

[0089] Drying for at least 15' with UV lamps follows.

[0090] Lastly, a final polishing of the decorated and painted surface 3 is carried out.

EXAMPLE III

[0091] The first primer, in particular a bi-component colorless transparent primer and precisely a mixture of hydroxylated acrylic resins, is applied on the surface 3.

[0092] A suitable primer is for example the commercial product L0310674 by Lechler.

[0093] By way of (a non-limiting) indication only, the first primer is applied in an amount so as to form a substantially homogeneous layer having a thickness ranging between about 10 and about 30 microns, for example of about 20 microns.

[0094] This is followed by drying, for example at 40°C for 60 min.

[0095] After an (optional) stage with an abrasive, the decal 8 moistened with water is applied and dried for 60 min at 50°C.

[0096] The second primer is applied, in particular a bi-component colorless transparent primer containing a mixture of acrylic resins.

[0097] A suitable primer is, for example, the commercial product L0980174 Acriplast by Lechler.

[0098] The second primer is applied in an amount so as to form a uniform layer having a thickness ranging

between about 10 and about 30 microns, for example with a thickness of about 20 microns.

[0099] This is followed by drying, for example at 40°C for 180 min.

[0100] After a possible further stage with an abrasive, the transparent finishing paint is applied, in particular an acrylic paint (a mixture of acrylic resins), for example the commercial product L0960230 Tixo Klarlack by Lechler, so as to form a layer having a thickness ranging between about 30 and about 50 microns, for example about 40 microns.

[0101] This is followed by drying at 50° for 300 min.

[0102] Lastly, a final polishing of the decorated and painted surface 3 is carried out.

[0103] Lastly, it is clear that further modifications and changes may be made to the process described and illustrated herein without departing from the scope of the attached claims.

Claims

1. A process for decorating surfaces of household appliances, comprising the steps of: making a decal having a graphic pattern to be transferred onto a surface of a household appliance to be decorated; transferring the graphic pattern onto the surface of the household appliance by decalomania technique comprising, in succession, the steps of: applying a first primer on the surface; applying the decal on the surface having the first primer and transferring the graphic pattern from the decal to the surface; applying a second primer on the surface decorated with the graphic pattern transferred from the decal; applying a transparent finishing paint on the decorated surface.
2. The process according to claim 1, comprising respective drying steps after applying the first primer, and/or after applying the decal, and/or after applying the second primer, and/or after applying the finishing paint.
3. The process according to one of the preceding claims, wherein before the step of applying the first primer, the surface to be decorated is pre-treated by passivation with an abrasive and/or by washing with detergents and/or degreasers.
4. The process according to one of the preceding claims, comprising, after the step of applying the finishing paint, a final step of polishing the decorated and painted surface.
5. The process according to one of the preceding claims, wherein the surface to be decorated is made of a metal material, in particular metal sheet, stainless steel, aluminum; or a polymer material, in particular ABS, and is optionally painted.
6. The process according to one of the preceding claims, comprising a step of treating the surface with an abrasive after applying the first primer and before applying the decal; and/or after applying the decal and before applying the finishing paint.
7. The process according to one of the preceding claims, wherein in the step of making the decal, the graphic pattern is printed on a support film using a mixed technique of offset printing and silk-screen printing.
8. The process according to claim 7, wherein the graphic pattern is printed in a plurality of printing stages with respective colors or groups of colors, comprising both offset printing stages and silk-screen printing stages.
9. The process according to claim 8, wherein the graphic pattern is printed in one or more four-color offset printing stages and a plurality of monochromatic silk-screen printing stages with respective colors.
10. The process according to one of the preceding claims, comprising the steps of acquiring in digital form the graphic pattern from an original, using high-resolution digital photography or another similar scanning method; and resolving the acquired graphic pattern into a plurality of two-dimensional parts, corresponding to respective surface portions of the surface to be decorated and which are then printed on a support film to make the decal.
11. The process according to one of the preceding claims, wherein the decal is applied on the surface to be decorated by wet decalomania technique.
12. The process according to one of the preceding claims, wherein the first primer is a polyester or acrylic base primer, in particular comprising at least one modified polyester resin or at least one hydroxylated acrylic resin.
13. The process according to one of the preceding claims, wherein the first primer is applied in an amount so as to form a substantially homogeneous layer having a thickness ranging between about 10 and about 40 microns; and/or in an amount ranging between about 10 and about 50 g/m², in particular between about 20 and about 40 g/m².
14. The process according to one of the preceding claims, wherein the second primer is an acrylic base primer, in particular comprising at least one acrylic resin and/or at least one modified acrylic resin.

15. The process according to one of the preceding claims, wherein the second primer is applied in an amount so as to form a substantially homogeneous layer having a thickness ranging between about 10 and about 40 microns; and/or in an amount ranging between about 10 and about 50 g/m², in particular between about 20 and about 40 g/m². 5
16. The process according to one of the preceding claims, wherein the finishing paint is an acrylic paint. 10
17. The process according to one of the preceding claims, wherein the finishing paint is applied in an amount so as to form a substantially homogeneous layer having a thickness ranging between about 30 and about 50 microns, for example of about 40 microns. 15

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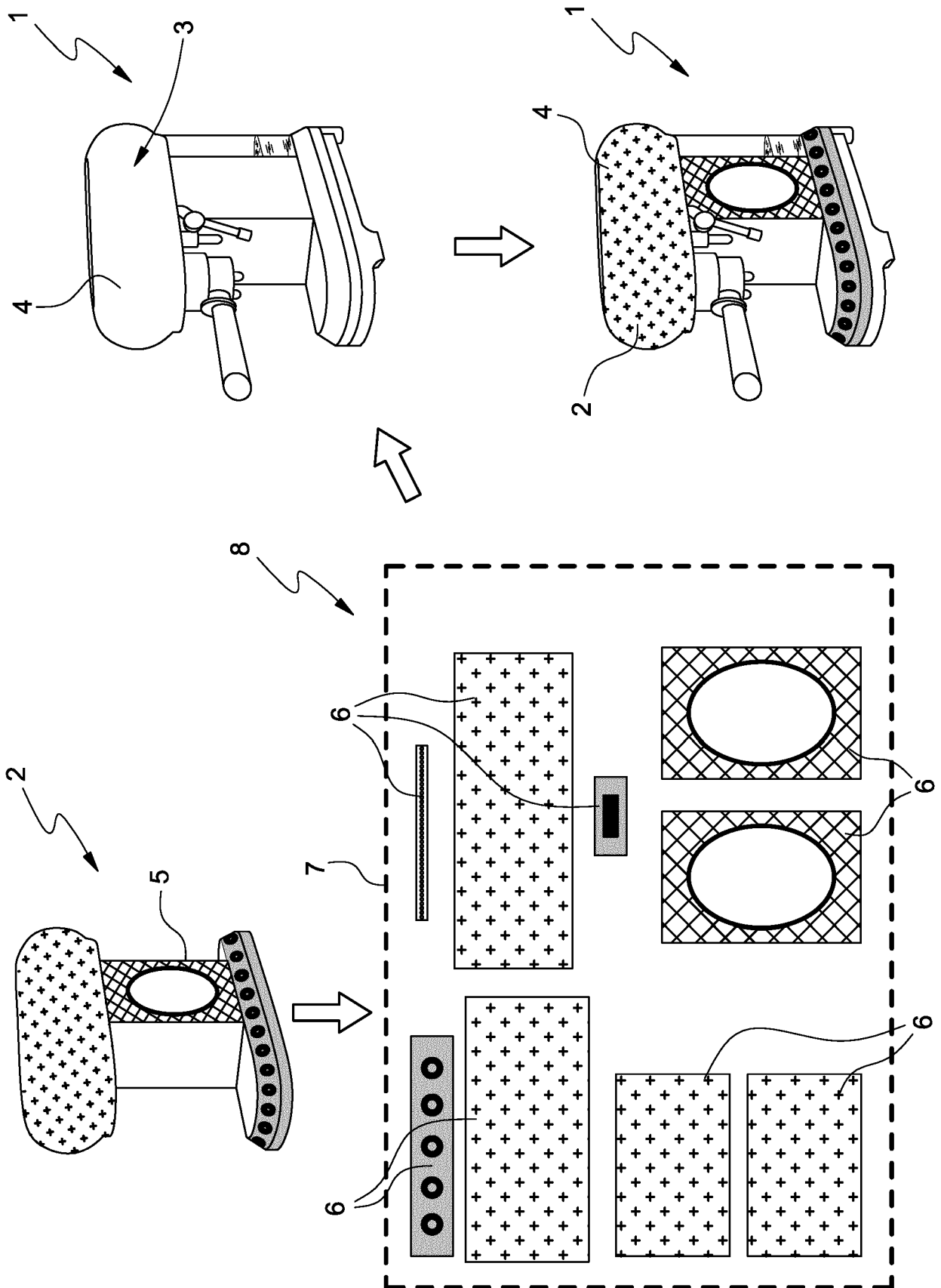
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EUROPEAN SEARCH REPORT

 Application Number
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Place of search Munich		Date of completion of the search 27 September 2019	Examiner Kelliher, Cormac
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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