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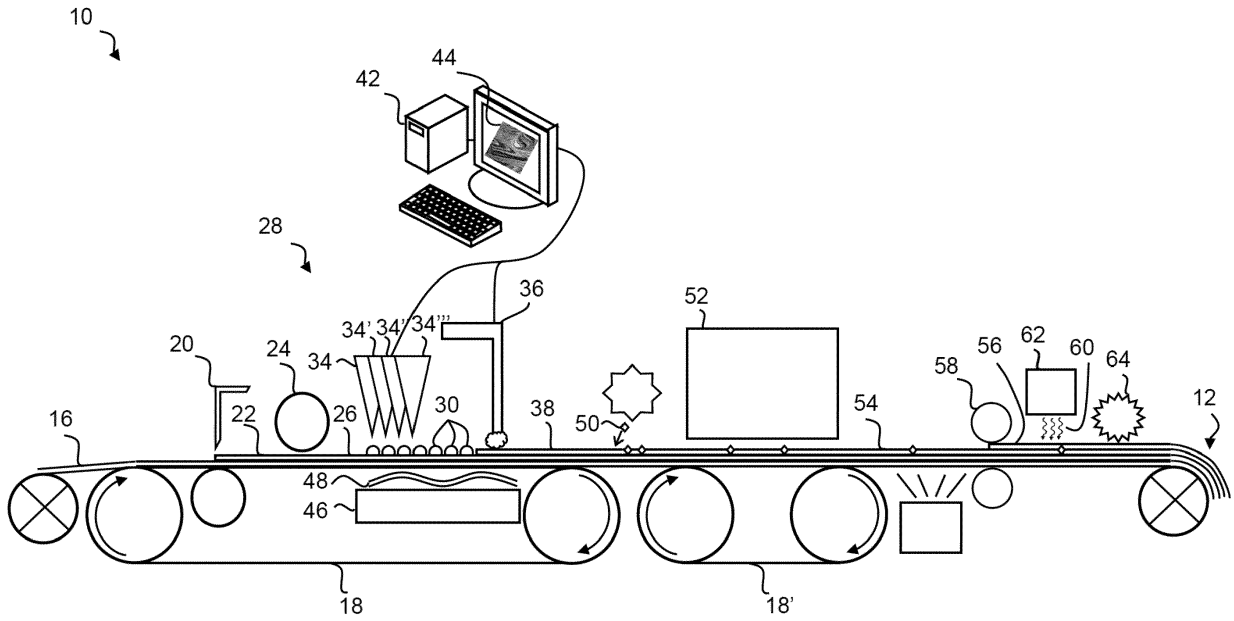
(54) A SURFACE COVERING WITH A MARBLED DECORATIVE PATTERN

(57) An aspect of the invention pertains to a method for producing a resilient decorative surface covering (12) (e.g. a wall or floor covering) with a marbled pattern (e.g. having a streaked or swirled appearance, optionally with irregular patches) on the exposed side. The method comprises applying coloured plastisol paste blobs (30) on a band-shaped base plastisol (22) to create a blob pattern. The coloured plastisol paste blobs forming the blob pattern are then smeared over the base plastisol to create a smeared plastisol layer (38) featuring the marbled pattern. A further aspect of the invention pertains to a production line (10) on which that method may be implemented, comprising a paste dispenser (28) for applying the coloured plastisol blobs and a robotized wiper (36) for smearing the blobs.

Fig. 1



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Description

Field of the Invention

[0001] The invention generally relates to a resilient decorative surface covering (e.g. a decorative floor or wall covering) with a marbled decorative pattern, a method and a production line for producing the same.

Background of the Invention

[0002] Polymer-based surface coverings, also called polymeric or synthetic surface coverings, are typically made of, e.g., polyolefins, polyesters, polyamides and/or polyvinyl chloride (PVC). The present invention more specifically relates to surface coverings comprising at least one structural layer made of thermoplastic plastisol.

[0003] Such plastisol-based surface coverings have an important share in the market. Their popularity can be attributed, amongst others, to their availability in various aesthetic designs.

[0004] Document US 4,673,596 relates to a method for producing a decorative sheet. The method comprises applying a synthetic resin paste onto the upper surface of a substrate sheet to form an undercoat layer. Then, one or more pastes, each being of the same material and having approximately the same viscosity as the paste of the undercoat layer, are laterally sprayed so as to drop onto the undercoat layer. The pattern layer and the undercoat layer cooperate to form a smooth patterned surface. Finally, the pattern layer is heated and jelled.

[0005] Document US 3,923,941 relates to a method for producing a marbleized plastic sheet. In particular, multiple plastisol compositions having differing decorative characteristics are simultaneously individually fed to a receptacle to form a heterogeneous mixture thereof. An applicator ball is positioned in an opening in the receptacle's bottom. Rotation of the ball during an oscillating movement of the receptacle, with the ball in contact with a moving substrate, produces a marbleizing effect in the coating applied thereby. Heat is used to gel the marbleized coating. A clear, unfilled plastisol coating is applied over the marbleized coating and the coatings are then heat fused.

[0006] Document US 5,645,889 relates to a method for manufacturing a decorative surface covering. The method for manufacturing such decorative surface coverings comprises the steps of applying to a substrate a coating of a first coloured fluid plastisol. In order to create "raised" and "depressed" areas in the first coloured fluid plastisol, the substrate may comprise a foamable resinous layer and foaming agent modifiers. The method further comprises distributing in the first coloured fluid plastisol a second coloured fluid plastisol to form a patterned fluid plastisol mixture, e.g. by dripping, sprinkling, streaming or spraying. The second coloured fluid plastisol then slowly penetrates into the thickness of the layer of the first coloured plastisol.

Technical Problem

[0007] An aspect of the present invention aims at providing an improved method for producing a resilient decorative surface covering with a marbled pattern.

[0008] A further aspect of the invention aims at providing a method for producing plastisol-based decorative surface coverings with new marbled patterns that cannot be achieved or can only be achieved with difficulties using known production methods.

General Description

[0009] An aspect of the invention pertains to a method for producing a resilient decorative surface covering (e.g. a wall or floor covering) with a marbled pattern (e.g. having a streaked or swirled appearance, optionally with irregular patches) on the exposed (visible) side. The method comprises applying coloured plastisol paste blobs on a band-shaped base plastisol to create a blob pattern. The coloured plastisol paste blobs forming the blob pattern are then smeared over the base plastisol to create a smeared plastisol layer featuring the marbled pattern.

[0010] As used herein, the term "plastisol paste" designates a fluid suspension or dispersion of a thermoplastic polymer resin (e.g. PVC, polyvinyl acetate) and a compatible plasticizer, optionally further comprising additives like stabilizers, dyes, pigments or filler material. Examples of plasticizers include phthalate-based plasticizers, such as, e.g., dioctyl phthalate (DOP), diisononyl phthalate (DINP), bis(2-ethylhexyl) phthalate (DEHP), etc., or other plasticizers, such as, e.g., terephthalates (for instance, di-(2-ethylhexyl) terephthalate (DEHT)), trimellitates, alkyl citrates, adipates, sebacates, benzoates, maleates, 1,2-cyclohexane dicarboxylic acid diisononyl ester (DINCH), etc. Particularly preferred are phthalate-free plasticizers. Heating of a plastisol paste causes physical changes in the flowability of the plastisol. In particular, as the temperature of the plastisol is raised, the particles of polymeric material gradually absorb the plasticizer on their surfaces, whereby the particles swell and the fluidity of the plastisol decreases. The fluid suspension or dispersion gradually turns into a gelled dispersion and finally a "fused" dispersion, corresponding to a state of mutual dissolution of the plasticizer and the polymer (cf. e.g. SPI Plastics Engineering Handbook, M. Berins, 5th edition, 1994, p. 452, Fig. 16-5). As used herein, and unless otherwise apparent from context, the term "plastisol" may designate the fluid suspension or dispersion as well as the fused dispersion or any intermediary state.

[0011] The band-shaped base plastisol could be a prefabricated product or produced on site, e.g. by applying fluid base plastisol on a band-shaped substrate. The substrate may, e.g., comprise a calendared sheet and/or a fibrous backing (e.g. a felted, matted or woven fibrous sheet or a glass fibre veil). When the base plastisol is produced on site, the base plastisol is preferably gelled (e.g. by a gelling drum) upstream of the application of

the coloured plastisol paste blobs.

[0012] According to an embodiment, the band-shaped base plastisol has a height comprised in the range from 0.5 mm to 5 mm, preferably in the range from 1 mm to 4 mm, and even more preferably in the range from 2 mm to 3 mm.

[0013] The blob pattern applied on the base plastisol may form a regular lattice (e.g. rectangular lattice, an oblique lattice, a hexagonal lattice) or a combination (superposition and/or juxtaposition) of different lattices. The blob pattern could also be arranged in a partially regular way (i.e. only specific areas are regularly arranged as a lattice), be quasicrystalline (ordered by not periodic) in two dimensions, or be stochastic. The surface density of blobs (number of blobs per unit area) on the base plastisol could vary over the surface of the surface covering. Preferably, however, the surface density of blobs and/or the mass of applied plastisol paste per unit area is constant or at least approximately constant (within -10% to +10% from the average value) on the scale of an area corresponding to 4 to 10 times the average area occupied by one blob.

[0014] The blob pattern preferably extends over the whole width (transversal to the machine direction) of the band-shaped plastisol. The smearing of the blobs over the base plastisol is preferably carried out in such a way that the smeared plastisol layer and thus the marbled pattern continuously covers the entire surface of the band-shaped base plastisol. Preferably, the smearing is achieved in an automated manner, using a robotized wiper. The robotized wiper preferably carries out curvilinear motions while being dipped into the plastisol of the blob pattern so as to spread the plastisol paste over the entire surface of the base plastisol. According to a preferred embodiment, the production process is carried out on a continuous production line, wherein the band-shaped base plastisol moves forward with more or less constant speed. In this case, the robotized wiper is preferably controlled in such a way that each portion of the base plastisol is swept over at least once before it moves out of the reach of the robotized wiper.

[0015] The blob pattern preferably comprises blobs of different colours, i.e. two or more colours. As used herein, the term "colour" designates the visual appearance of a plastisol to the human eye and includes, in particular, any element from a colour space or palette (e.g. RGB, CMYK, Pantone, RAL, etc.) as well as any hues thereof, as well as transparency, translucency, metallic, glossy or matt appearance, etc. As used herein, plastisols are considered to be of different colours if they exhibit visually different coloration. In some instances, the colour differences will be sharp and in other instances they may be subtle. Particularly preferred blob patterns may include blobs with several different colours, some of these colours being visually similar and one or more of these colours standing in contrast to the visually similar colours. Coloration of a plastisol is preferably achieved by addition of pigments or dyes.

[0016] Each of the plastisol blobs may be of a single, uniform colour. It is not excluded, however, that a particular plastisol paste blob could have multiple colours, i.e. consist of differently coloured (not homogeneously mixed) paste components.

[0017] According to an embodiment, the volumes of the plastisol paste blobs are preferably comprised in the range from 10^{-6} l to 10^{-1} l (1 l = 1 litre = 1 dm^3), preferably in the range from 10^{-4} l to 10^{-1} l, even more preferably in the range from 10^{-3} l to 10^{-2} l. The blobs of a given blob pattern may have all the same volume or different volumes.

[0018] The height of the smeared plastisol layer preferably has a height comprised in the range from 0.5 mm to 3 mm, more preferably in the range from 0.7 mm to 2 mm, and even more preferably in the range from 0.8 mm to 1.5 mm.

[0019] The method may further comprise applying vibrations in order to level the plastisol paste blobs and/or the smeared plastisol layer on the base plastisol. The vibrations may be generated by a shaker, a plate vibrator or any other suitable device.

[0020] According to an embodiment, the method comprises scattering granules and/or chips, preferably of synthetic material, on the smeared plastisol layer so as to create inclusions in the marbled pattern. The granules and/or chips preferably have a melting temperature higher than the fusion temperature of the plastisol, so that they are not altered during solidification of the plastisol. Alternatively, all or part of the granules and/or chips may be fusible and have a melting point lower than the fusion temperature of the plastisol, so that the aspect of the inclusions changes during solidification of the plastisol. The granules and/or chips may have a variety of geometrical shapes.

[0021] In one embodiment, the application of the coloured plastisol paste blobs and/or the smearing of the coloured plastisol paste blobs may be controlled by a controller or a system of controllers (e.g. comprising one or more microcontrollers and/or one or more computers).

[0022] The method may further comprise gelling the smeared plastisol layer. Preferably, the base plastisol and the smeared plastisol layer are fused, e.g. in an oven.

[0023] According to an embodiment, the method may comprise applying a UV-curable polyurethane composition on top of the smeared plastisol layer. In a subsequent step, the polyurethane composition is cured with UV radiations.

[0024] Another aspect of the invention pertains to a surface covering production line for producing a resilient decorative surface covering with a marbled pattern. The surface covering production line comprises a paste dispenser and a robotized wiper. The paste dispenser is configured to apply coloured plastisol paste blobs on a band-shaped base plastisol in such a way as to create a blob pattern. The robotized wiper is configured to smear the coloured plastisol paste blobs forming the blob pattern over the base plastisol to create a (continuous, all-

over) smeared plastisol layer featuring the marbled pattern.

[0025] The paste dispenser may comprise a plurality of storage compartments configured to store plastisol pastes of different colours. The paste dispenser may further comprise nozzles selectively connectable (e.g. by means of a feeding system with conduits and valves) to the storage compartments in order to dispense differently coloured plastisol paste blobs. The feeding system may be controllable to connect each nozzle to one or more than one storage compartment. The feeding system may also be controllable to connect a plurality of nozzles to the same storage compartment at a time.

[0026] The robotized wiper may, e.g., comprise a robotic arm, or a rotatable wiper mounted on a carriage that it movable transversally to the machine direction and/or in the machine direction. The robotized wiper may be configured to perform any suitable motion to smear the blob pattern on the base plastisol, e.g., a random or pseudorandom motion (i.e. a motion that exhibits statistical randomness while being generated by a deterministic process) or any other prescribed motion.

[0027] The surface covering production line may further comprise a controller or a system of controllers configured to control the paste dispenser and/or the robotized wiper. Preferably, the paste dispenser and/or the robotized wiper comprise each one or more microcontrollers that are themselves controlled (directly or indirectly) by a central control computer (network) with one or more user interfaces. The central control computer (network) preferably runs software configured to allow a user to define parameters of the application of the coloured plastisol paste blobs and/or of the smearing of the coloured plastisol paste blobs. Optionally, the software may provide a simulation mode allowing the user to visualise the decorative pattern predicted by the software to result from a certain choice of parameters.

[0028] Optionally, the surface covering production line may further comprise a vibration unit (e.g. a shaker, a plate vibrator or any other suitable device) configured to apply vibrations in order to level the plastisol paste blobs and/or the smeared plastisol paste on the base plastisol.

[0029] A further aspect of the invention pertains to a resilient decorative surface covering with a marbled pattern produced according to the method described hereinabove.

Brief Description of the Drawings

[0030] The accompanying drawings illustrate several aspects of the present invention and, together with the detailed description, serve to explain the principles thereof. In the drawings:

Fig. 1: is a simplified schematic of a system for producing a resilient decorative surface covering with a marbled pattern on a band-shaped carrier;

Fig. 2: is a block diagram of a production process for producing a resilient decorative surface covering with a marbled pattern on a band-shaped carrier;

Fig. 3: is an example of marbled pattern;

Fig. 4: is a schematic layout of a blob pattern made of coloured plastisol paste blobs;

Fig. 5: is a schematic layout of a possible spatial distribution of plastisol paste blobs on the base plastisol layer.

[0031] It should be noted that the figures are schematic, not scale-true, drawings and, therefore, do not disclose exact proportionality of the depicted elements. For example, the height of the surface covering in Fig. 1 has been greatly exaggerated to increase the readability of the figure.

Detailed Description of Preferred Embodiments

[0032] Fig. 1 shows a production line 10 for producing a synthetic resilient decorative surface covering 12 (e.g. a floor or wall covering) with a marbled pattern that is visible when looking at the exposed side of the surface covering 12. The production line 10 produces the surface covering 12 using the method 14 schematically depicted in Fig. 2. An example of marbled pattern that can be produced by the production line 10 is shown in Fig. 3.

[0033] The synthetic resilient decorative surface covering 12 made with the production line 10 comprises two layers of gelled plastisol. The specifics of the two layers will be discussed hereinafter. Each of the plastisols comprises a synthetic resin (such as, e.g. a polyvinyl chloride resin) and a liquid plasticizer. The quantity of liquid plasticizer relative to the quantity of synthetic resin controls, to some extent, the flexibility (resiliency) of the (semi-) finished surface covering 12. The person skilled in the art is well aware of the relative quantities of these two components, for each layer, that are needed to arrive at a surface covering with desired properties. The plastisols typically also comprise stabilizers and/or other additives, in particular filler material and pigments.

[0034] In step S10, a substrate or carrier 16 is unwound on conveyor belts 18, 18'. The carrier 16 could e.g. be a calendared sheet or a fibrous backing (e.g. a glass fibre fabric). The carrier 16 then moves along the production line 10 implementing the method 14 to produce the surface covering 12.

[0035] In a first production step (S12 in Fig. 2), the carrier 16 is covered with a band-shaped base plastisol 26. To this end, a coating head 20 uniformly spreads a first plastisol paste (the "base plastisol paste" 22) on the carrier 16. The spread base plastisol paste 22 is then gelled by a gelling drum 24.

[0036] Downstream of the gelling drum 24, a paste dispenser 28 applies (step S14 in Fig. 2) plastisol paste

blobs 30 of different colours on the band-shaped base plastisol 26 to create a two-dimensional blob pattern.

[0037] An example of a blob pattern 32 is depicted in Fig. 4. The blob pattern 32 comprises a plurality of plastisol paste blobs 30 of different colours 30a, 30b, 30c (different textures are used in the drawing to illustrate different colours) applied by the paste dispenser 28. While Fig. 4 shows a rectangular lattice of coloured plastisol paste blobs 30 on the base plastisol 26, other blob patterns are of course possible. The rectangular lattice extends over the whole width L of the band-shaped plastisol 26.

[0038] The number of colours of the blob pattern, the positions of the differently coloured blobs on a given lattice, the shape of the lattice formed by the blobs, the volume of each blob, etc., can be adapted at will. The spatial distribution of the blobs may be regular, irregular or partially regular (e.g. with zones that are ordered and zones wherein the blobs are arranged in a more or less random fashion). An example of such a type of blob pattern is shown in Fig. 5 where some regular zones 30d, 30e can be seen in a generally disordered spatial distribution of blobs.

[0039] The paste dispenser 28 may have any suitable number of storage compartments to store the coloured plastisol pastes and may have any suitable number of deposition nozzles to apply the coloured plastisol paste blobs 30.

[0040] The nozzles may be spatially arranged in any suitable way over the width of the production line, e.g., as a linear array or a two-dimensional array. The nozzles could also be motorized in order to rearrange themselves in a different constellation. The nozzles could also dynamically rearrange to apply blobs at specific deposition locations.

[0041] A feeding system (not shown in Fig. 1) connects the nozzles to the storage compartments 34, 34', 34", 34"'. The feeding system may have a fixed configuration (defining the association between the nozzles and the storage compartments) or a dynamically adjustable configuration.

[0042] The paste dispenser 28 is preferably configured in such a way that the colour, the volume and the deposition location of each blob can be controlled individually.

[0043] It is also worth noting that blobs of different colours could be deposited at the same deposition location (e.g. one on top of the other).

[0044] According to a preferred embodiment, the paste dispenser 28 comprises a KCM depositor (trade name) from Knobel, which is usually used for the production of confectionery products. Depositors of this type allow for individual control of the deposition nozzles (by CAD) and are able to provide a very precise and controllable dose (volume) for each coloured plastisol paste blob. The metering technology is described, for instance, in US 8,388,324.

[0045] In the next step (step S16 in Fig. 2), the blob pattern 32 is smeared over the gelled band-shaped base plastisol 26 by a robotized wiper 36. The robotized wiper 36 may e.g. comprise a robotic arm featuring a spreading knife or rake at its extremity for spreading the plastisol paste blobs 30. A smeared plastisol layer 38 featuring a marbled pattern is thereby formed. An example of a swirled marbled pattern 40 is shown in Fig. 3. The motion of the robotized wiper 36 for creating the marbled pattern may be any suitable motion. For instance, the control unit steering the robotized wiper 36 could be programmed to make the robotized wiper carry out a random or pseudorandom motion or any other prescribed motion, under the constraint that the entire area of the base plastisol is swept over at least once.

[0046] In alternative embodiments, step S16 may be performed using a plurality of robotized wipers in order to, e.g., speed up the smearing process and allow for a higher throughput of the production line 10.

[0047] It will be appreciated that the cooperation between -and the high degree of controllability provided by- the paste dispenser 28 and the robotized wiper 36 allows to map a given blob pattern created by the paste dispenser 28 and a prescribed motion of the robotized wiper 36 to a marbled pattern (e.g. the swirled marbled pattern 40). The production line 10 therefore provides a way to produce a marbled pattern for the surface covering 12 in a reproducible way.

[0048] The total quantity of coloured plastisol paste blobs (volume of each blob, the number of blobs, the surface density of blobs, etc.) is adapted so that, after the smearing step, the desired height of the plastisol paste 48 layer is obtained.

[0049] In the illustrated embodiment, the paste dispenser's 28 microcontroller and the robotized wiper's 36 microcontroller are controlled by a control computer 42. The control computer 42 controls the paste dispenser 28 by providing instructions to the associated microcontroller(s), comprising a set of, e.g., volumes, specific colours and application locations for the plastisol blobs 30. The control computer 42 also controls the robotized wiper 36 by providing instructions to the associated microcontroller(s), comprising, e.g., a set of specific movements (i.e. the prescribed motion of the robotized wiper 36) to smear the blob pattern 32.

[0050] The control computer 42 preferably runs software configured to allow a user to define patterns of coloured plastisol paste blobs and/or how these patterns are thereafter smeared. For instance, the set of movements of the robotized wiper may be prescribed by the user through a pointing device (e.g. with a mouse, a trackball, a touchscreen, a touchpad, etc.) or any other suitable means. The software then translates the user inputs into lower-level instructions sent to the paste dispenser 28 and the robotized wiper. Optionally, the software may provide a simulation mode allowing the user to visualise the marbled pattern predicted by the software to result from a certain choice of user inputs.

[0051] It will be appreciated that the synergy between the control computer 42, the paste dispenser 28 and the

robotized wiper 36 makes the production line 10 fully configurable for achieving virtually any desired marbled pattern.

[0052] In the illustrated embodiment, a vibration unit 46 applies vibrations 48 to the carrier 16 in order to level the plastisol paste blobs 30 before they are smeared over the base plastisol. It should be noted that vibrations could also be applied to the smeared plastisol in order to level the smeared plastisol layer.

[0053] Coloured chips and/or granules 50 are then scattered on the smeared plastisol paste 38 so as to create the appearance of small inclusions in the marbled pattern (step S18, see Fig. 2). The chips and/or granules 50 may have a plurality of colours and/or a plurality of geometrical shapes.

[0054] The assembly of the smeared plastisol paste 38 on the base plastisol 26 layer is then fused in an oven 52 (or any other suitable heater). In case the base plastisol 26 was not completely gelled by the gelling drum 24, the gelling step S20 also finishes the gelling/fusion process of the base plastisol 26.

[0055] The fused smeared plastisol 54 and the fused base plastisol 26 are then relaxed by cooling (step S22, see Fig. 2).

[0056] The fused plastisol 54 is thereafter coated with a polyurethane (PU) composition (step S24) by a coater 58. The PU coating 56 is then cured by UV radiations 60 generated by a UV source 62 (e.g. a UV lamp).

[0057] In the following step (step S26, see Fig. 2), the surface covering 12 is embossed with an embossing press or an embossing cylinder 64.

[0058] Finally, the surface covering 12 is wound up (step S28a) on a roll that can easily be transported.

[0059] Instead winding up the surface covering 12, it could also be cut into slabs (step S28b) and then precisely dimensioned (step S28b') into tiles or planks using a die cut press or the like.

[0060] While specific embodiments have been described herein in detail, those skilled in the art will appreciate that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. Accordingly, the particular arrangements disclosed are meant to be illustrative only and not limiting as to the scope of the invention, which is to be given the full breadth of the appended claims and any and all equivalents thereof.

Claims

1. A method for producing a resilient decorative surface covering with a marbled pattern, the method comprising:

   applying coloured plastisol paste blobs on a band-shaped base plastisol to create a blob pattern; and
   smearing the coloured plastisol paste blobs forming the blob pattern over the base plastisol to create a smeared plastisol layer featuring the marbled pattern.

2. The method according to claim 1 wherein the blob pattern comprises blobs of different colours.

3. The method according to claim 1 or 2, further comprising applying vibrations in order to level the plastisol paste blobs and/or the smeared plastisol layer on the base plastisol.

4. The method according to any one of claims 1 to 3, further comprising scattering granules and/or chips on the smeared plastisol layer.

5. The method according to any one of claims 1 to 4, comprising gelling the base plastisol upstream of the application of the coloured plastisol paste blobs.

6. The method according to any one of claims 1 to 5, wherein the application of the coloured plastisol paste blobs and/or the smearing of the coloured plastisol paste blobs is controlled by a controller or a system of controllers.

7. The method according to any one of claims 1 to 6, comprising gelling the smeared plastisol layer.

8. The method according to any one of claims 1 to 7, comprising applying a UV-curable polyurethane composition on top of the smeared plastisol layer and curing the polyurethane composition with UV radiations.

9. The method according to any one of claims 1 to 8, wherein the band-shaped base plastisol is formed by applying base plastisol on a band-shaped substrate, the substrate comprising a calendared sheet and/or a fibrous backing.

10. The method according to any one of claims 1 to 9, wherein the band-shaped base plastisol has a height comprised in the range from 0.5 mm to 5 mm, preferably in the range from 1 mm to 4 mm, and even more preferably in the range from 2 mm to 3 mm.

11. The method according to any one of claims 1 to 10, wherein the smeared plastisol layer has a height comprised in the range from 0.5 mm to 3 mm, more preferably in the range from 0.7 mm to 2 mm, and even more preferably in the range from 0.8 mm to 1.5 mm.

12. A surface covering production line for producing a resilient decorative surface covering with a marbled pattern, the surface covering production line comprising:

a paste dispenser configured to apply coloured plastisol paste blobs on a band-shaped base plastisol to create a blob pattern; and
a robotized wiper configured to smear the coloured plastisol paste blobs forming the blob pattern over the base plastisol to create a smeared plastisol layer featuring the marbled pattern.

13. The surface covering production line according to claim 12, wherein the paste dispenser comprises a plurality of storage compartments configured to store plastisol pastes of different colours and nozzles selectively connectable to the storage compartments to dispense differently coloured plastisol paste blobs.

14. The surface covering production line according to any one of claims 12 to 13, further comprising a controller or a system of controllers configured to control the paste dispenser and/or the robotized wiper.

15. The surface covering production line according to any one of claims 12 to 14, further comprising a vibration unit configured to apply vibrations in order to level the plastisol paste blobs and/or the smeared plastisol paste on the base plastisol.

16. A resilient decorative surface covering with a marbled pattern produced according to the method of any one of claims 1 to 11.

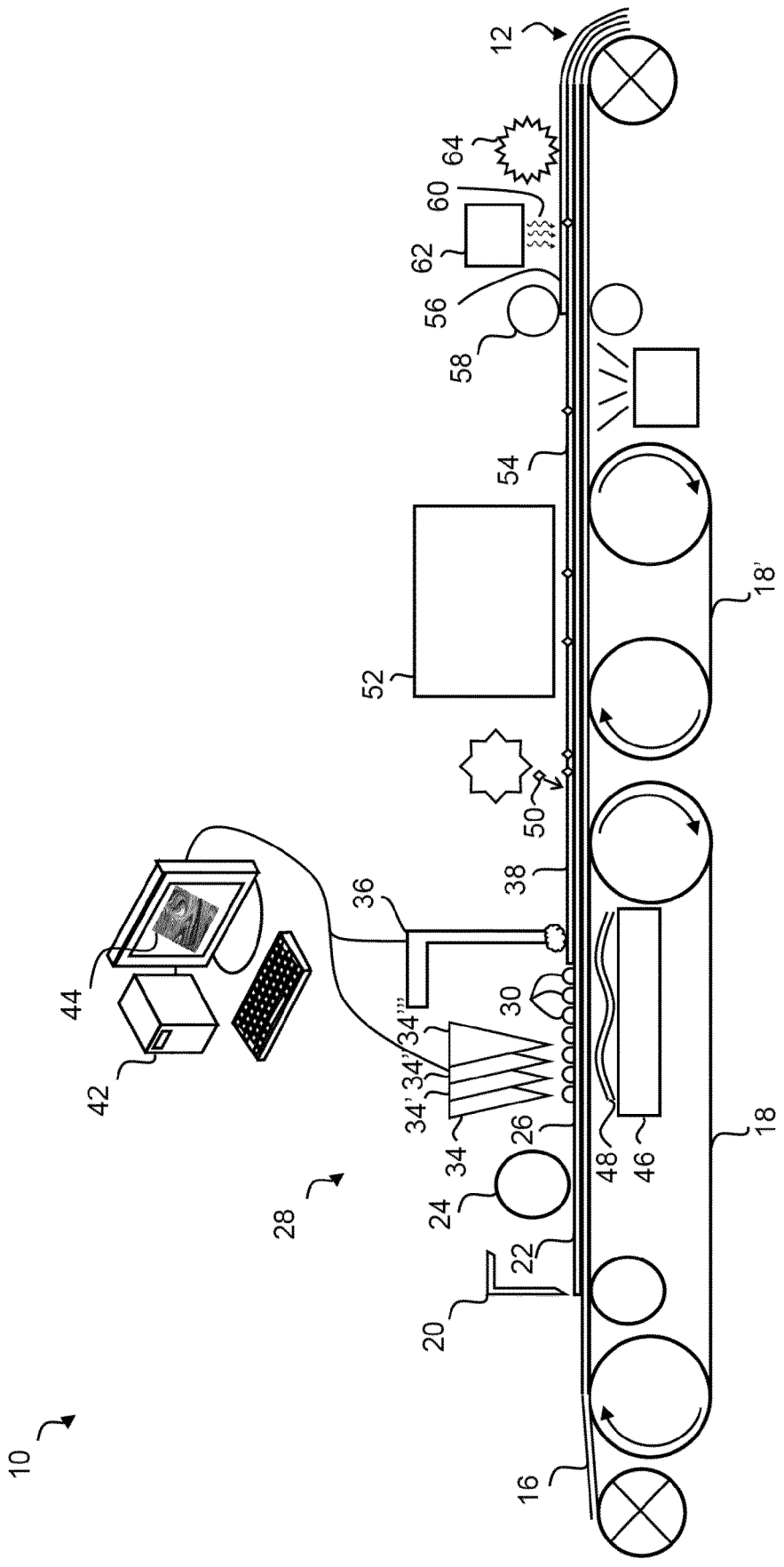
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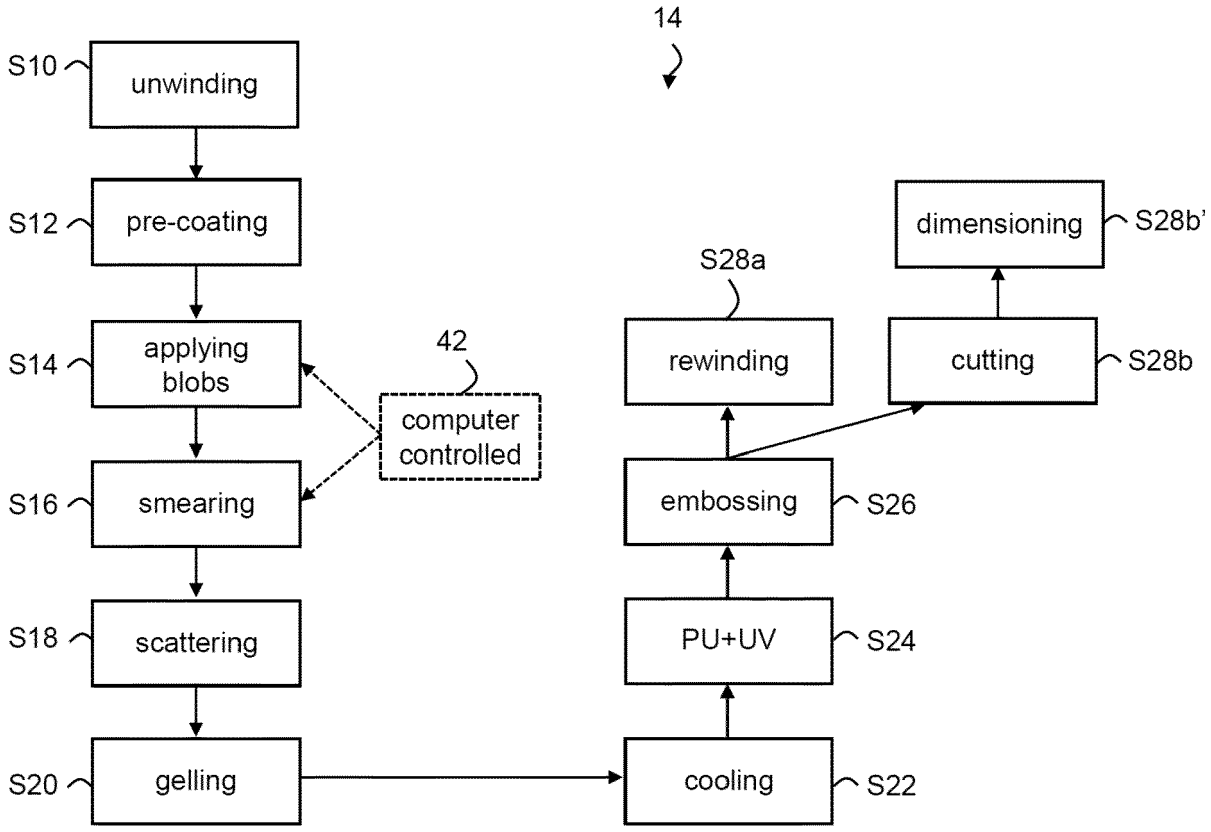
Fig. 1

Fig. 2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S12
pre-coating
S14
applying blobs
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computer controlled
S16
smearing
S18
scattering
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cooling
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embossing
S26
S28a
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dimensioning
S28b'

Fig. 3

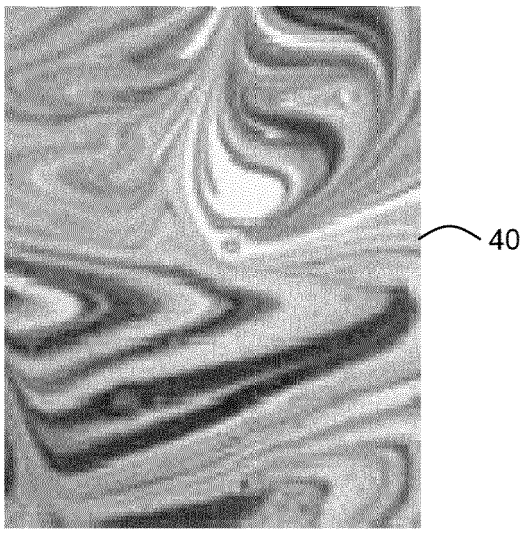
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Fig. 4

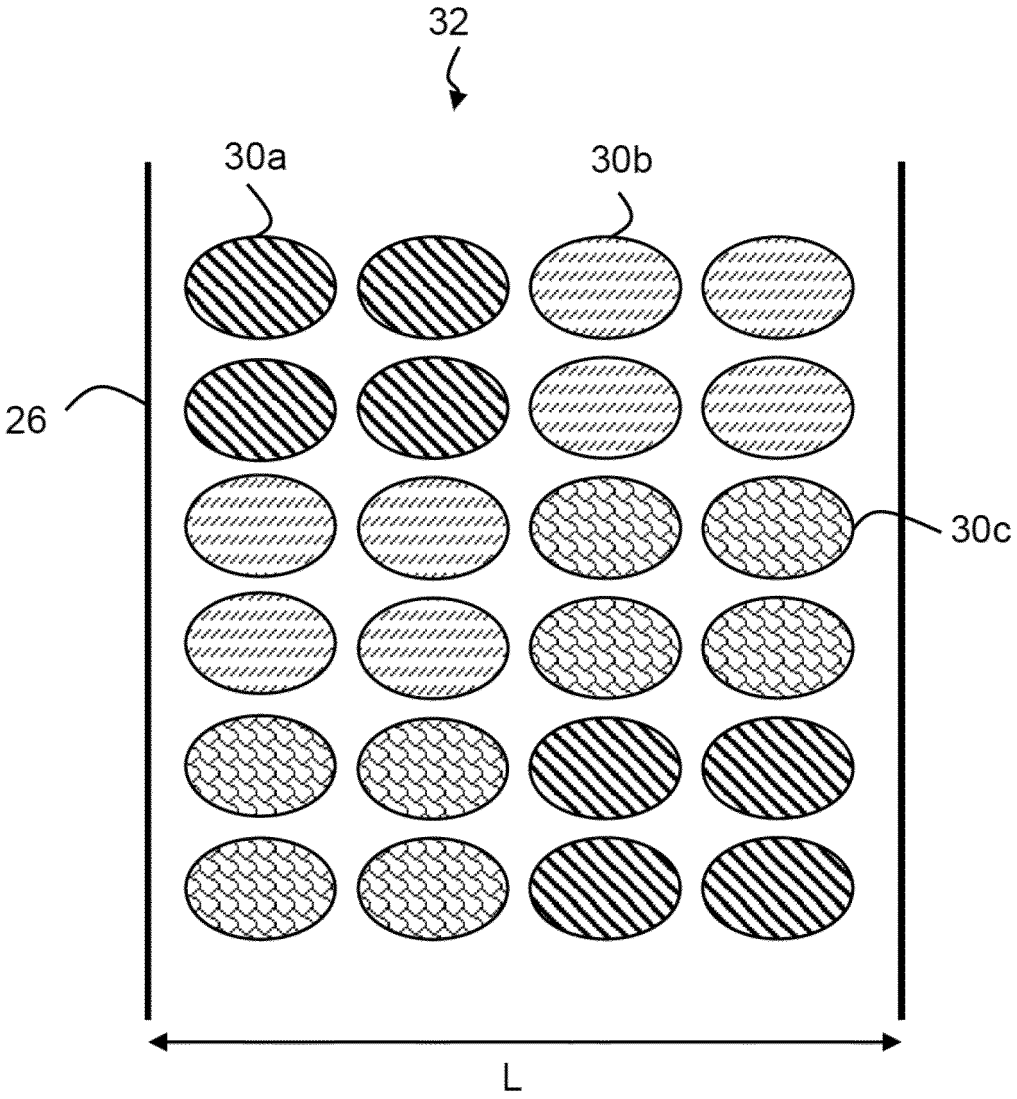
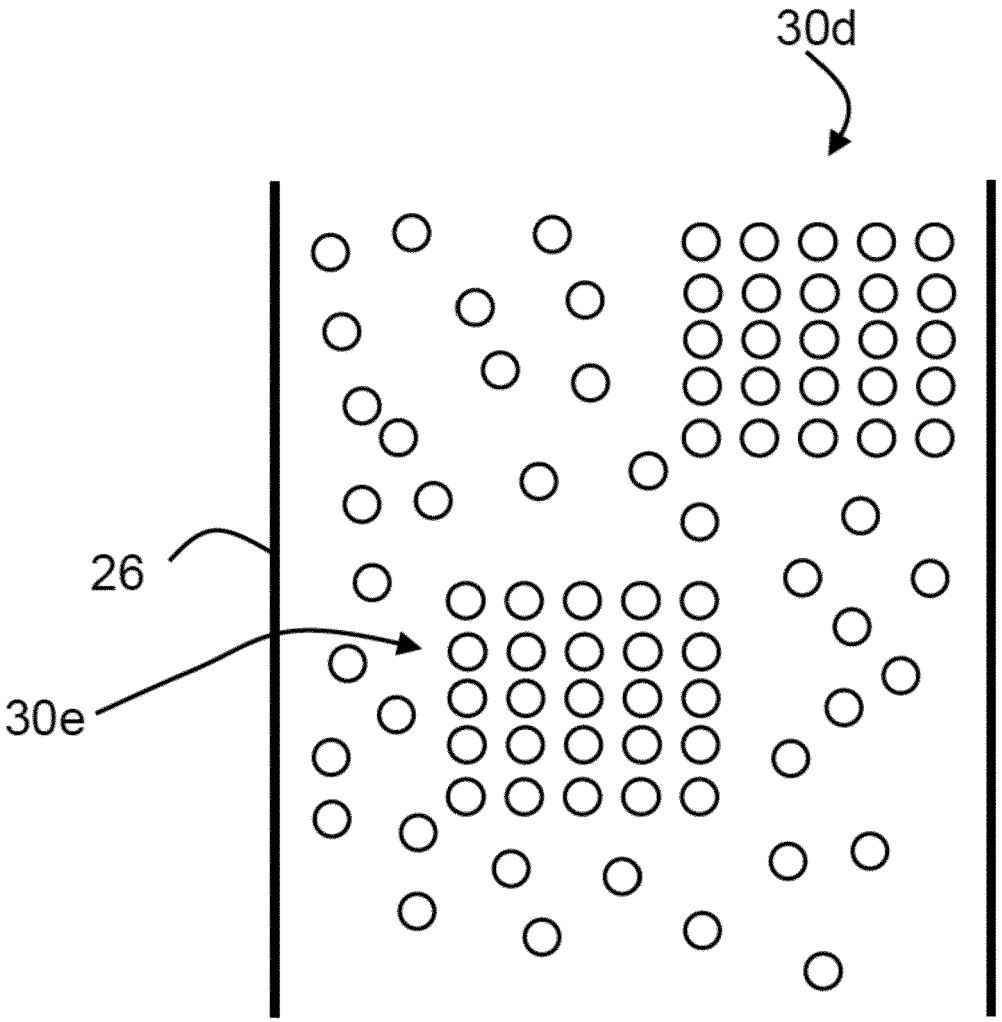


Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 17 18 1426

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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	20 December 2017	Björklund, Sofie

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