(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 April 2014 (17.04.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/057451 A2

(51) International Patent Classification:
B29D 7/00 (2006.01) *B32B 27/30* (2006.01)
B32B 27/20 (2006.01) *B29D 99/00* (2010.01)

(21) International Application Number:
PCT/IB2013/059263

(22) International Filing Date:
10 October 2013 (10.10.2013)

(25) Filing Language: Dutch

(26) Publication Language: English

(30) Priority Data:
2009605 10 October 2012 (10.10.2012) NL
2009904 29 November 2012 (29.11.2012) NL

(71) Applicant: **CLIMATE INVEST B.V.** [MT/MT]; 33, St. Barbara Bastion, 1961 Valetta (MT).

(72) Inventor: **VAN MERKSTEIJN, Jacobus Lambertus**; Staldenstrasse 121, CH-3920 Zermat (CH).

(74) Agent: **SLIKKER, Wilhelmina Johanna**; Sweelinckplein 1, NL-The Hague 2517 GK (NL).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) Title: METHOD FOR MANUFACTURING AN ANTI-SLIP FILM AND AN ANTI-SLIP FILM OBTAINED BY PERFORMING THE METHOD

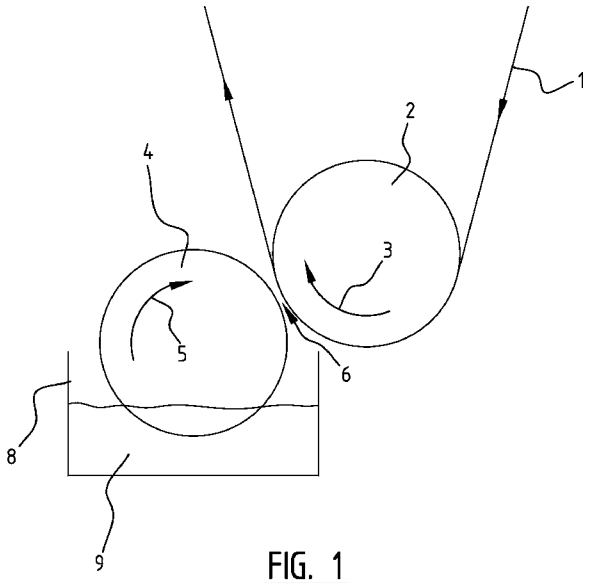

FIG. 1

(57) Abstract: The invention relates to a method for manufacturing an anti-slip film, comprising the following steps, to be performed in a suitable sequence, of: a) providing a film; b) providing an adhesive comprising an evaporable solvent; c) mixing the adhesive with fine particles; d) applying to the film a layer of the mixture of adhesive and fine particles obtained in step c); and e) allowing the mixture to cure, wherein the solvent evaporates at least partially out of the adhesive such that the fine particles protrude on a surface of the adhesive remote from the film and a rough surface is formed. The invention also relates to an anti-slip film obtained by performing the method according to the invention.

WO 2014/057451 A2

METHOD FOR MANUFACTURING AN ANTI-SLIP FILM AND AN ANTI-SLIP FILM OBTAINED BY PERFORMING THE METHOD

The invention relates to a method for manufacturing an anti-slip film, comprising the following steps, to be performed in a suitable sequence, of:

a) providing a film;

b) providing an adhesive comprising an evaporable solvent;

c) mixing the adhesive with fine particles;

d) applying to the film a layer of the mixture of adhesive and fine particles obtained in step c); and

e) allowing the mixture to cure, wherein the solvent evaporates at least partially out of the adhesive such that the fine particles protrude on a surface of the adhesive remote from the film and a rough surface is formed.

During curing of the mixture the solvent in the adhesive at least partially evaporates so that the thickness of the layer of adhesive on the film decreases. A part of at least a number of the fine particles hereby protrudes from the surface remote from the film, which protruding parts of the fine particles impart a rough surface to the film and whereby the film acquires its anti-slip function. With their non-protruding part the particles are firmly anchored in the layer of adhesive on the film. An anti-slip film can in this way be manufactured easily and/or quickly and/or inexpensively with the method according to the invention.

The film is for instance manufactured from a plastic. The film is more particularly manufactured from PVC.

In an embodiment of the method according to the invention the adhesive is chosen from the group comprising paint, glue and plastisol.

Plastisol, a suspension of PVC particles in a plasticizer, is a particularly suitable adhesive for the present method.

In another embodiment of the method according to the invention the fine particles are selected from the group comprising silicon dioxide and broken glass particles.

Particularly a combination of plastisol and broken glass particles provides a suitable anti-slip film.

The size of the fine particles lies for instance between 20 and 200 μm.

The adhesive preferably comprises a quantity of solvent such that the adhesive has a volume retention lying between 30 and 50%.

With such an adhesive the volume of the layer decreases by 70-50% during curing.

The adhesive comprises for instance between 40-90% by volume, or for instance between 45-80% by volume, or for instance between 50-70% by volume solvent. The adhesive particularly

comprises a minimum of 50% by volume solvent and a maximum of 70, 75, 80, 85 or 90% by volume solvent.

The quantity of solvent can be selected here in accordance with the quantity of solvent which evaporates and the desired volume retention, which lies between for instance 30-50%.

The mixture can be applied to the film in practical manner using rotating rollers, wherein the film is arranged on a first rotating roller and the mixture of adhesive and fine particles obtained in step c) is applied to a second rotating roller. Such rollers are per se known and are also used for instance to apply glue to a base material. According to the invention such per se known rollers can be advantageously applied for the purpose of performing at least a number of steps of the method according to the invention. The rollers can rotate in opposite directions as well as in the same direction, this also being referred to as opposite application or same-direction application. A nip or squeegee can be provided for the purpose of applying the mixture to the film. The rollers are for instance disposed close together with a predetermined interspacing such that the mixture is applied to the film with a layer thickness substantially corresponding to the dimensions of the interspacing. A third roller and a fourth roller can optionally be provided, wherein the mixture is applied to the second roller using the third and fourth rollers such that the quantity of the mixture applied to the second roller can be adjusted. Less mixture is in this way lost.

The invention also relates to an anti-slip film, which anti-slip film is obtained by performing the method according to the invention as described above, the method comprising the following steps, to be performed in a suitable sequence, of:

a) providing a film;

b) providing an adhesive comprising an evaporable solvent;

c) mixing the adhesive with fine particles;

d) applying to the film a layer of the mixture of adhesive and fine particles obtained in step c); and

e) allowing the mixture to cure, wherein the solvent evaporates at least partially out of the adhesive such that the fine particles protrude on a surface of the adhesive remote from the film and a rough surface is formed.

The anti-slip film made with the method according to the invention has for instance a thickness lying between about 200 μm and about 300 μm.

The invention will be further elucidated with reference to the figure shown in a drawing.

The figure shows a method for manufacturing an anti-slip film. A film 1 is arranged on a first roller 2. First roller 2 rotates in a first direction 3 and thereby transports film 1. A second roller 4, which is disposed with a determined interspacing 6 close to first roller 1, rotates in a second direction 5 opposite to first direction 3. Disposed below second roller 4 is a container 8 having therein a mixture 9 of an evaporable solvent comprising plastisol and broken glass particles. When second

roller 4 rotates in the second direction 5, second roller 4 carries a part of the mixture 9 out of container 8 in the direction of first roller 2 and transfers the mixture 9 to film 1. The layer thickness of the mixture is substantially equal here to the dimension of interspace 6 and lies for instance between about 100 μm and 200 μm. After application of mixture 9 to film 1, film 1 with mixture 9 is exposed to a temperature of about 100°C so that the solvent in mixture 9 evaporates and the volume of the layer of mixture 9 decreases by about 70-50%. The plasticizer dissolves in the PVC particles at this temperature. Mixture 9 then cools, thus forming a flexible layer of plastisol with glass particles adhered therein. The decrease in the volume of the layer causes a part of the volume of the broken glass particles to become exposed so that they protrude from the surface of the plastisol remote from film 1 and thus form a rough surface. The non-exposed part of the periphery of the glass particles adheres firmly in the plastisol. The total thickness of the anti-slip film manufactured with the method according to the invention lies between about 200 μm and about 300 μm.

It is noted that the invention is not limited to the shown embodiments but also extends to variants within the scope of the appended claims.

It will thus be apparent to the skilled person that another adhesive, for instance paint or glue, can be chosen instead of plastisol. Other fine particles, for instance silicon dioxide, can also be chosen instead of broken glass particles.

The figure shows only a possible, per se known device which is used according to the invention to make the anti-slip film according to the invention. It will be apparent to the skilled person that other devices which are suitable and configured to perform the steps of the method according to the invention can also be applied.

Claims

1. Method for manufacturing an anti-slip film, comprising the following steps, to be performed in a suitable sequence, of:

a) providing a film;

b) providing an adhesive comprising an evaporable solvent;

c) mixing the adhesive with fine particles;

d) applying to the film a layer of the mixture of adhesive and fine particles obtained in step c); and

e) allowing the mixture to cure, wherein the solvent evaporates at least partially out of the adhesive such that the fine particles protrude on a surface of the adhesive remote from the film and a rough surface is formed.

2. Method as claimed in claim 1, wherein the adhesive is chosen from the group comprising paint, glue and plastisol.

3. Method as claimed in claim 2, wherein the adhesive is plastisol and the solvent is a plasticizer.

4. Method as claimed in any of the foregoing claims, wherein the fine particles are selected from the group comprising silicon dioxide and broken glass particles.

5. Method as claimed in any of the foregoing claims, wherein the size of the fine particles lies between 50 and 100 μm.

6. Method as claimed in any of the foregoing claims, wherein the adhesive comprises a quantity of solvent such that the adhesive has a volume retention lying between 30 and 50%.

7. Method as claimed in any of the foregoing claims, wherein the adhesive comprises for instance between 40-90% by volume, or for instance between 45-80% by volume, or for instance between 50-70% by volume solvent.

8. Anti-slip film, which anti-slip film is obtained by performing the method as claimed in any of the claims 1-7, the method comprising the following steps, to be performed in a suitable sequence, of:

a) providing a film;

b) providing an adhesive comprising an evaporable solvent;

c) mixing the adhesive with fine particles;

d) applying to the film a layer of the mixture of adhesive and fine particles obtained in step c); and

e) allowing the mixture to cure, wherein the solvent evaporates at least partially out of the adhesive such that the fine particles protrude on a surface of the adhesive remote from the film and a rough surface is formed.

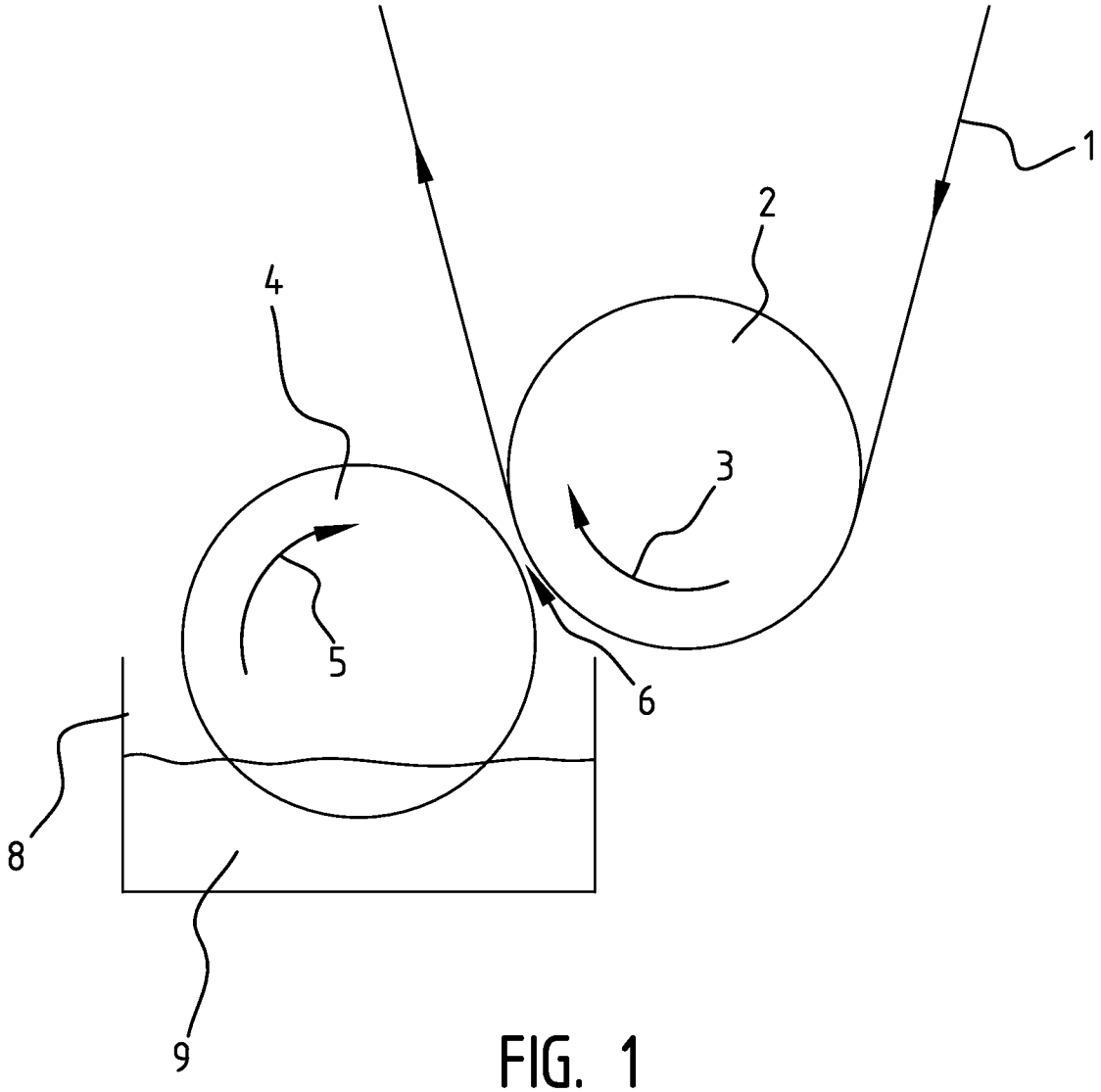

FIG. 1