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(54) Process for Manufacturing a Self-Adhesive Plastics Product

(57) A moving web e.g. of silicone-treated kraft paper 1,2 has an adhesive layer 3 to which a plastics layer 4 from an extruder 8 is applied. The layer 4 may be applied when molten; alternatively immediately prior to its application it may be cooled by means of a cooling roller (10) and/or an air brush (9) until semi-solid or solid. Adhesion and/or spreading of the plastics material is effected by means of rollers 6,7. The process may also include application of a net or fabric (16) to the web 1,2 prior to the plastics layer 4, or of a net, fabric or aluminium foil to the newly-applied semi-solid layer 4, to which it adheres without any adhesive. A resulting self-adhesive foil tape may be useful in insulation.

In-situ production of the plastics layer 4 can give a thinner layer and a cheaper product than use of preformed film.

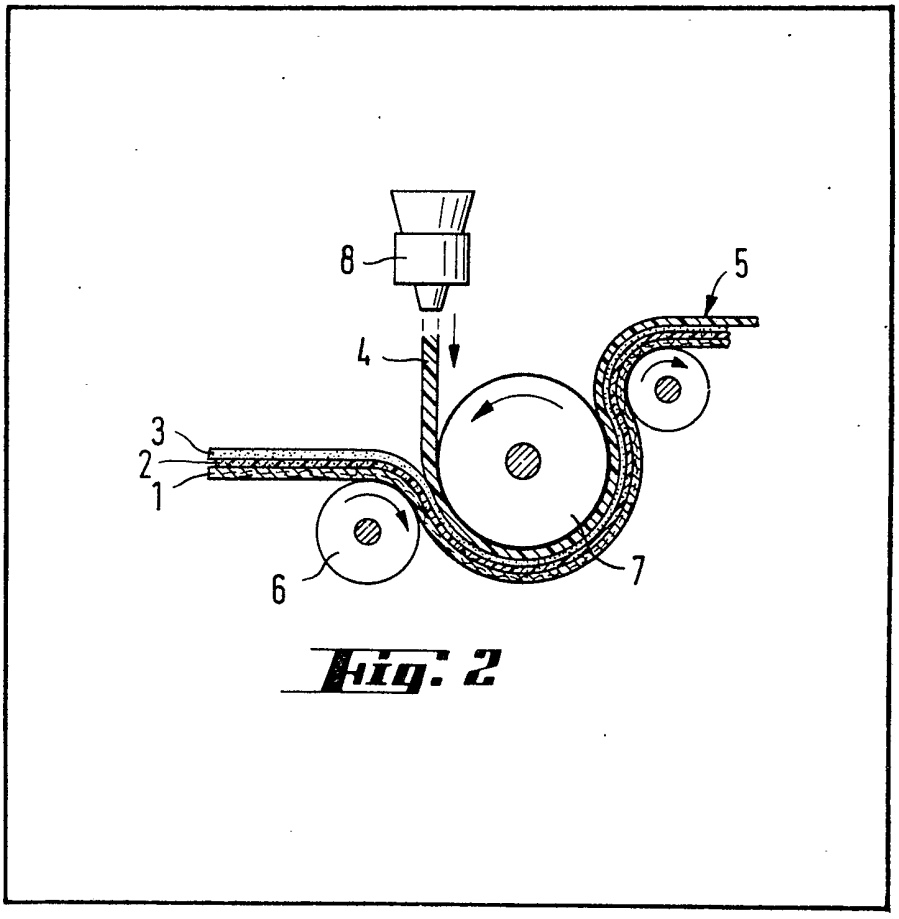

Fig. 2

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy

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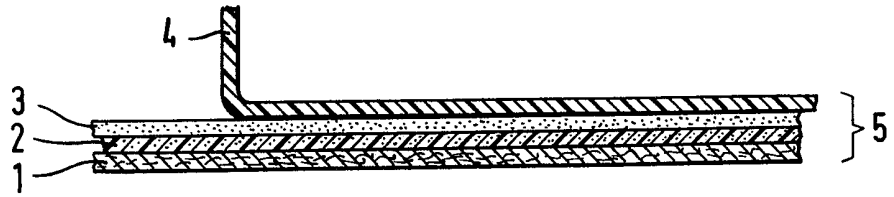

Fig. 1

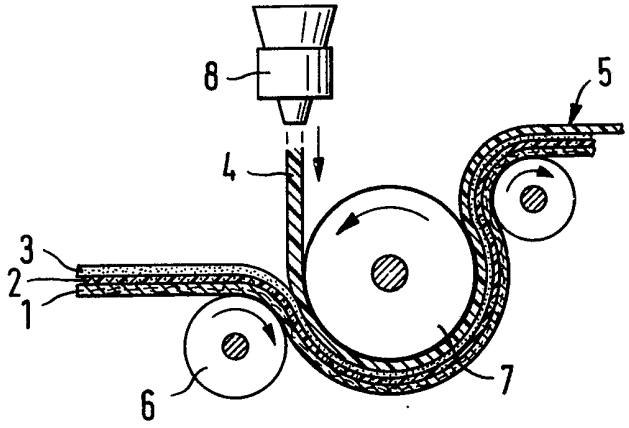

Fig. 2

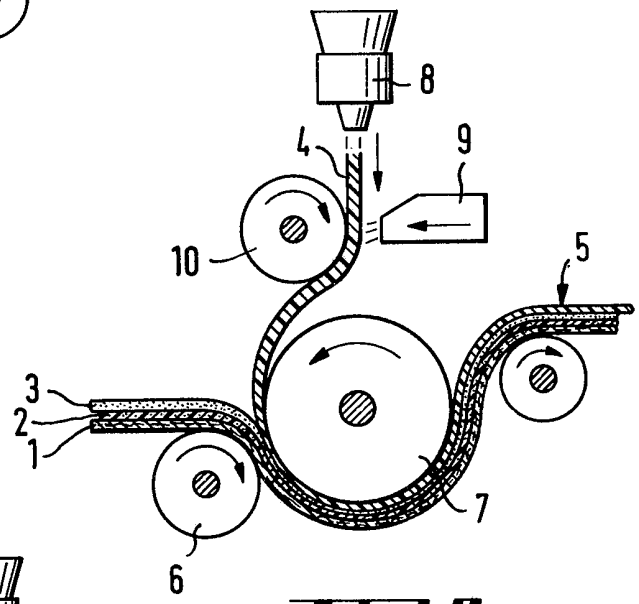

Fig. 3

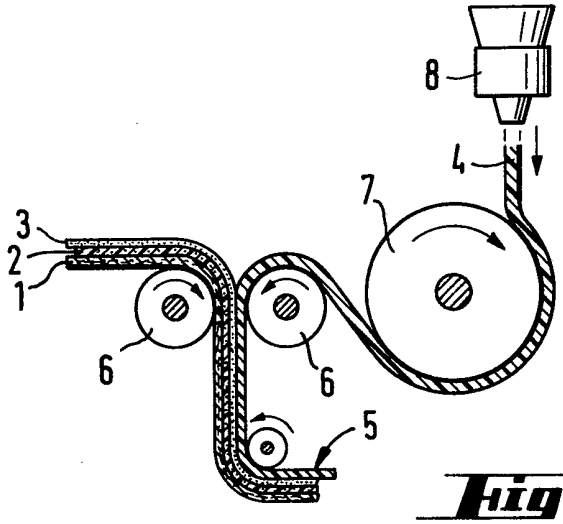

Fig. 4

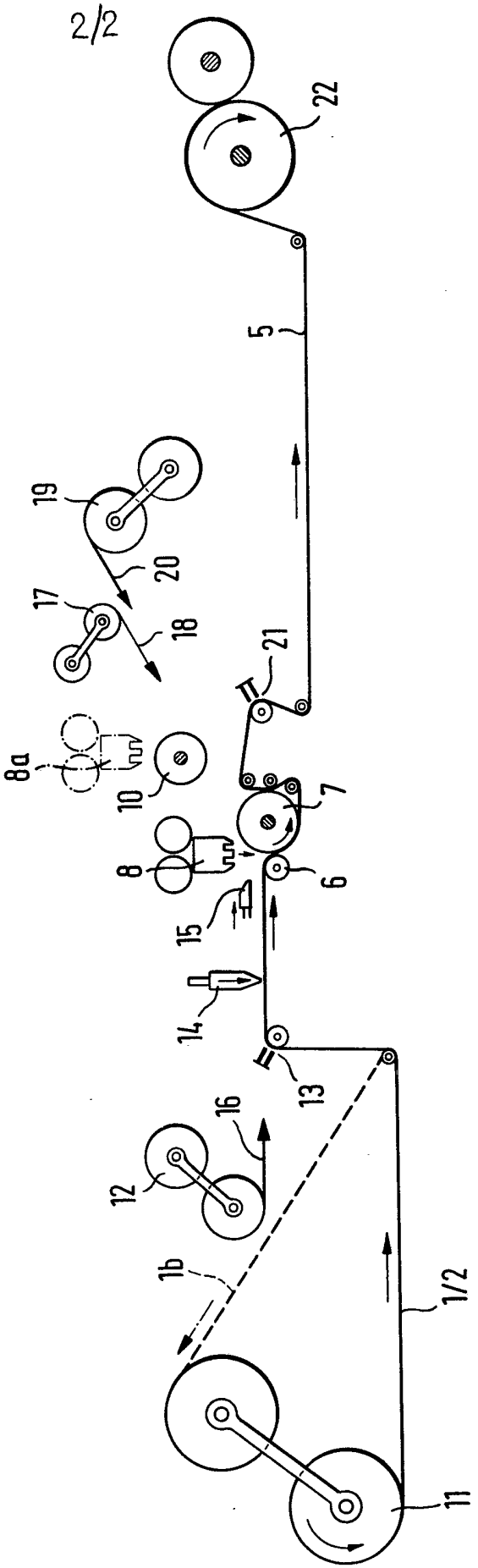

Fig. 5

SPECIFICATION

Process for Manufacturing a Self-Adhesive Plastic Product

The present invention relates to a process for manufacturing a self-adhesive plastic or plastics product which comprises a base material and a plastic or plastics film, as well as an adhesive layer therebetween, wherein the adhesive is or has been initially applied as an even layer to the base material and the plastic is subsequently introduced onto the adhesive layer.

In such a self-adhesive plastic product the idea is that the base material is easily detachable from the adhesive so that, when the plastic film is being detached from the base, the adhesive comes with it and a plastic film with an adhesive layer is obtained which can be used for the manufacture of, for example, stickers for decorative or advertising purposes, for protecting books and other products from humidity and wear, as well as for insulation purposes.

The base material used is generally silicone-coated kraft or craft-paper, which easily is detached from the adhesive layer owing to the silicone coating. According to a known manufacturing method, a ready-made base material and a ready-made plastic film are introduced from separate rolls and are brought together by pressing them together, for example, between two rollers. The adhesive can be applied to the base material immediately before the plastic film is introduced or it can be applied in advance to the base material, with a protective paper on top of it, this being detached and reeled away just before the plastic film is attached to the product.

This known method has a disadvantage in that the continuous unreeling of the plastic film and introducing of it, in a perfectly even and wrinkle-free layer, onto the base material is relatively difficult and easily results in process disturbances and leads to a rather high percentage of rejects. These handling problems also limit the production rate and because of them the weight of the plastic can hardly go under approx. 100g/m^2, which for its part has an adverse effect on the raw material costs.

The coating or saturating of paper with plastic so that plastic is spread in molten state, for example by extrusion, in a continuous process directly onto the paper is previously known. Reference is here made to, for example, British Patent 1,200,624, wherein the problem is how to spread the plastic layer evenly also at the edges. In spite of the fact that this paper coating technique has long been known, a completely different technique has always been applied in the production of several-layer self-adhesive plastic products, namely, as was described above, the plastic film has been produced separately and then fed from the storage roll to the manufacturing line for the self-adhesive product. One reason for the application of different methods may be that the coating of paper is a process decisively more simple and the film thickness is clearly smaller; further more, the extrusion of molten plastic has obviously been considered foreign to the lamination process or the idea has not been developed to this extent.

Consequently, the present method comprises the surprising invention that, even in the production of self-adhesive products the spreading of molten plastic on top of an adhesive layer can be used in connection with the production line for the entire product. This makes it possible both to reduce the cost of raw material and to increase the production rate. The invention is characterized in that the production of plastic film from molten plastic takes place within the same continuous process as does the production of the final adhesive plastic product and without an intermediate reeling of the plastic film, by not allowing the molten plastic to solidify until it is on top of the adhesive layer of the base material or immediately before this.

Thus, according to the invention the plastic film is produced from molten plastic within the same process as the final product, in which case no problems of handling the plastic film are caused and an even film, which may also be a thin one, can be caused to form on the adhesive layer of the base material. The plastic film is produced advantageously in a manner known *per se* by extrusion, and the extrusion can take place directly onto the passing base material or via a cooling roller in between. The essential point is, however, that the plastic film is not formed before the final product or at soonest immediately prior to it.

By the process according to the invention, the weight of the plastic film can, when necessary, be decreased to as low as 50 g/m^2, and the production rate can be increased without operational disturbances in the process. The raw material costs are considerably reduced, not only because of the reduced total consumption but also because the plastic is purchased in granular form and not as a ready-made reeled film.

It is evident that in the process according to the invention, in addition to the production of the plastic film, also the applying of the adhesive and, depending on the conditions, the production of the base material, i.e. the coating of the base paper with silicone, can take place within one and the same process.

It is also evident that within the same process it is possible to laminate a net or fabric into the self-adhesive product in order to reinforce it, and/or an aluminium foil or the like in order to improve its insulating properties when it is intended for insulation purposes, etc.

The invention is described below in more detail in the form of examples and with reference to the accompanying drawings, wherein

Figure 1 depicts a cross section of a self-adhesive plastic product produced according to the invention,

Figures 2—4 depict schematically three slightly different alternative machines for the

realization of processes according to the invention, and

Figure 5 depicts the entire production line for the realization of a process according to the invention.

The self-adhesive plastic product is shown in Figure 1. The base material of the product comprises a base paper 1, which has been coated with a non-adhesive silicone layer 2. On top of the silicone coating there is an adhesive layer 3, and on top of it, a plastic film 4 (i.e. a film of plastics material). When the plastic film 4 is detached from the completed product 5, the adhesive layer 3 comes with it so that a self-adhesive plastic film is obtained which can be used, for example, for protecting books, acrylic sheets, wood products, etc., or for the manufacture of decorative films and advertising stickers, etc.

Since the production of the base material, as well as the production of the adhesive layer, are well known per se, these processes are not described here in detail. As regards the adhesive, it can, however, be noted that the adhesive can be applied by extruding or by means of rollers immediately before the formation of the plastic film, or it can be applied in advance and protected by a paper layer, which is reeled off.

In Figures 2—4, numeral 6 indicates a roller over which a base material 1, 2, provided with an adhesive 3, is brought to the final manufacturing point of the product. The roller 7 is a cooling roller for the plastic. In Figure 2, the plastic 4 is extruded as a thin film in molten state (approx. 200—300°C) by means of an extruder 8 onto the passing material 1—3, and the plastic does not solidify until it is on top of the adhesive, under the effect of the roller 7.

Figure 3 depicts an alternative embodiment, wherein the plastic 4 is already semi-solid when it meets the adhesive 3. This has been achieved by means of an auxiliary cooling roller 10 and, when necessary, an air brush 9.

Finally, in Figure 4 the plastic film is already completed when it reaches the adhesive 3 between rollers 6, 6. In this case, the film is produced by a known process by means of a cooling roller 7, but the essential characteristic of the invention is that this point is immediately prior to the final manufacturing point of the product. Compared with Figure 2, this embodiment has an advantage in that the completed product does not tend to crinkle owing to the shrinking of the plastic.

As pointed out above, the base material can in general be, for example, silicone-coated craft-paper. The plastic can be polyester, polyethene, ethyl vinyl acetate, polypropene or some other suitable plastic compound, in which case the process for the production of the plastic film is always one suitable for the compound in question.

Figure 5 depicts an entire production line applying a process according to the invention.

The base paper 1 provided with a silicone coating 2 is unreeled from a roller 11. When necessary, a net or fabric 16 can also be fed from a roller at a point 13, which indicates a normal electric tool for improving adhesion; this net or fabric serves as a reinforcement in the product. Numeral 14 indicates a so-called hot-melt unit, which applies adhesive from above to the silicone coating 2 of the base paper. Alternatively and since adhesives which are sufficiently clear for all purposes are not obtained by the hot-melt principle, a base material which has been covered with an adhesive in advance can be used. In this case, the base material is protected with a paper layer, which is reeled off in the manner indicated by the dotted lines 1b, and in this case the adhesive unit 14 is, of course, unnecessary.

The plastic extruder (or co-extruder) is, as in Figures 1—4 indicated by 8, and numerals 6, 7, and 10 also indicate rollers similar to those in Figures 1—4. Numeral 15 indicates an air brush, which can be used as aid when the extruded plastic screen is contacted with the cooling roller 7.

The rollers 17 and 19 can be used for adding not only a net or fabric material (e.g. 18) but also (or altenatively) an aluminum foil 20 to the self-adhesive product; aluminum foil is used in particular in self-adhesive tapes intended for insulation purposes. In the context of the present invention this embodiment is especially advantageous because the still semi-solidified hot plastic layer adheres automatically to the fabric or foil without an adhesive layer between them. An alternative position 8a has been arranged for the extruder for the production of those qualities which require pre-cooling before pressing to an adhesive laminate at point 6.

Numeral 21 indicates a high-voltage electric tool which improves the printability and adhesion of the product. The completed product 5 is finally reeled onto a roll 22.

Claims

1. A process for the manufacture of a self-adhesive plastics material product comprising a base material and a plastics material film, and an adhesive layer therebetween, wherein the adhesive is or has been initially applied as an even layer to the base material and the plastics material is subsequently introduced on top of the adhesive layer, wherein the production of the plastics film from molten plastics material is carried out without an intermediate reeling of the plastics film, in such a manner that the molten plastics material is not allowed to solidify until it is on top of the adhesive layer on the base material or immediately prior thereto.

2. A process according to claim 1, wherein the molten plastics material is extruded directly onto the adhesive layer on the base material.

3. A process according to claim 1, wherein the plastics material film is produced by extruding molten plastics material onto the surface of a cooling roller, and after it has solidified or partly solidified on the roller directing it immediately

after the roller to meet the adhesive-coated base material.

4. A process according to any one of the preceding claims, wherein the adhesive and the plastics material are applied during a continuous process in which the entire self-adhesive plastics material product is produced.

5. A process according to any one of the preceding claims, wherein the adhesive and the plastics material are applied in a process which also includes continuous production of the base material.

6. A process according to any one of the preceding claims wherein the base material is a kraft paper coated with silicone and the plastics material is polyester, polyethylene, ethyl vinyl acetate or polypropene.

7. A process according to any one of the preceding claims wherein a reinforcing net or fabric is laminated onto or under the plastics material film.

8. A process according to any one of the preceding claims wherein an aluminium foil is laminated onto the plastics material layer.

9. A process for the manufacture of a self-adhesive plastics material product substantially as described herein with reference to and as illustrated in Figure 5 and/or in any of Figures 1 to 4.

10. A self-adhesive plastics material product when produced by a process according to any one of the preceding claims.

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