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(54) **Process for decorating thermoplastic films using transfer printing and for joining said films to other objects**

(57) Using the "transfer" method, the dispersed colours printed on a paper base are transferred by pressure and heat on to a thermoplastic film; the film is then cooled and detached from the paper base, and is then used in various ways by joining to other components.

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Description

A system of decoration is known called the "transfer" system. By means of special dyes called "dispersed colours" applied to a paper base, the colours are transferred, by pressure and heat, from the said paper base to a product, generally a fabric, which is to be decorated.

The invention provides for the migration - by the "transfer" method - of dispersed colours, by means of pressure and heat, from the paper base (on which these colours are printed) on to a thermoplastic film which is at least partially transparent; the film, after cooling, is then detached from the said paper base and is used for decoration or joined to other components.

The decorated film may be joined to another film which is a protective film.

It is also possible to use in the process a paper base which has already been used for printing and on which remain residues of colours which, when transferred to the film, are sufficient to be used as decorations.

The decorated film (with the protective film, if any) may be applied, either directly or with the interposition of a supplementary film, to surfaces to be decorated. The decorated film may be applied by means of adhesive, such as a heat-seal or other suitable adhesive, and/or by thermal treatments.

The decorated film may be joined continuously to at least one other thermoplastic film by pressure and heating by means of a calender or equivalent equipment. A fabric to be decorated may also be joined by the same operation. In this case, a supplementary film may also be used for joining to the fabric.

The decorated film may be joined to a further film with foreign bodies interposed between them, these bodies being incorporated in the join for decorative purposes. These foreign bodies may also be continuous, such as a net, a loosely woven fabric, or the like.

The invention also relates to a product decorated with a film decorated using the procedure specified above.

At least the film decorated with the dispersed colours, or a film to which the said decorated film is joined, must be transparent or partially transparent to enable the decoration to be seen.

The drawing shows some solutions for the production of the decorated material and the material itself.

Figs. 1 and 2 are two diagrams of equipment for producing decorated materials;

Figs. 3 and 4 show a product with protective film and a diagram of equipment for its continuous production;

Figs. 5 and 6 show composite products which use the decorated film.

Fig. 1 shows a reel 10 which supplies a paper base 12 on to which the decoration D consisting of dispersed

colours is applied; this is the "transfer" paper base. A new base may be used, or a base from which one transfer operation has already been executed and which still offers the possibility of using a sufficient residual portion of the decoration for the purposes of the invention. The decoration D is transferred from the paper base 12 to a film P supplied from a reel 14; the transfer is effected by heat and pressure by means of a unit indicated as a whole by 16, which may advantageously be constructed to operate continuously. At the exit from the unit 16, the film P with the decoration D which has migrated on to it is separated from the paper base 12, which is collected for example on a reel 18 for disposal.

Fig. 2 shows another diagram of a calender installation. A heating cylinder 20 is rotating, and a continuous annular felt 22 run around pressure rollers 24 presses against it; the use of a felt protection paper 26, supplied from the reel 28 and wound on to the reel 30, may be specified. Both the "transfer" paper 112 (equivalent to 12) with the decoration D in dispersed colours, supplied from a reel 110, and the film P supplied from a reel 114, are made to pass between the cylinder 20 and the felt 22 (or the paper 26). The two combined continuous components 112 and P advance against the periphery of the cylinder 20 as a result of the rotation of the cylinder of the calender and between this cylinder and the felt 22 (or the protective paper 26), and are then sent to a cooling unit 40; they then pass to a separating unit 42 which separates the film P with the decoration D in the dispersed colours (transferred by migration from the paper base 112) from the residual paper 112, which is collected on a reel 44 or other equivalent element. The film P with the decoration D transferred on to it may be diverted by a roller 46 to be collected on a reel 48, or may be sent to a folding device 50 for collection in a form suitable for another operation, such as combination with another, protective and covering, film, as indicated in Figs. 3 and 4.

Fig. 2 also shows the possibility of joining the film P with the decoration D to a fabric T, either directly or by means of a joining film 120 taken from a reel 122; both the film 120 and the fabric T are inserted between the film P with the decoration D and the felt 22 (or the protective paper 26). Separation is again carried out by the unit 42.

According to Fig. 3, the film P with the decoration D transferred on to it may be joined to a protective film 130.

According to Fig. 4, the film P with the decoration D is fed from a collecting reel 50 (which may correspond to the reel 48) to a joining unit 51, which may operate by pressure and heating or by means of adhesive; the film 130, fed continuously from a reel 131, is also supplied to the said unit 51. The unit 51 joins the film 130 to the film P on the side with the decoration D.

In the product shown in Fig. 3, the film P decorated with the decoration D consisting of dispersed colours or the film 130 protecting the dye or both films P and 130 may be at least partially transparent, to enable the dec-

oration D to be seen. The product may also comprise further layers for reinforcement or for other functions or to provide other decorative effects; for example, a background colour may be provided by means of a uniform coloration of one of the films P or 130.

According to Fig. 5, a product such as that shown in Fig. 3 may be completed by the application of a film 136 joined to the film 130 (or to the film P) with the interposition of inserts 138, for example laminar inserts such as leaves, petals, or the like, which form decorations additional to the dispersed colour decoration D. This may be done by operations of incorporation by pressure and heat, and also with the aid of soft spacers (such as felt) to compensate for the presence of the thickness of the foreign bodies 138. The foreign bodies 138 may be separated from each other or in the form of a continuous structure such as a net, a loosely woven fabric, thread-like elements, or the like.

A film such as the film P with decorations D may also be joined to a rigid element 160, which is decorated in this way on its surface.

The single film P with the decoration D, or an assembly such as that shown in Fig. 3 or Fig. 5, may be used directly for transparent or semi-transparent screens, or may be used in clothing, in furnishing fabrics, or to decorate various objects made of glass, wood, metal, plastic laminate or other material.

Claims

1. Process of decoration by the migration, using the "transfer" method, of dispersed colours from a paper base on which these colours are printed, characterized in that the said colours are transferred on to a thermoplastic film by means of pressure and heat, and in that the film is cooled and then detached from the said paper base and is used for decoration or joined to other components.
2. Process according to Claim 1, characterized in that the decorated film is joined to another film which is a protective film.
3. Process according to Claim 1 or 2, characterized in that a paper base with residual colours from a preceding printing on fabric or other material is used.
4. Process according to Claim 1 or 2 or 3, characterized in that the protective film is applied, directly or with the interposition of a supplementary film, to surfaces to be decorated.
5. Process according to at least one of Claims 1 to 4, characterized in that the decorated film is applied by means of adhesive, such as a heat-seal or other suitable adhesive, and/or by thermal treatments.
6. Process according to at least one of the preceding claims, characterized in that the decorated film is joined continuously to at least one other thermoplastic film by pressure and heating by means of a calender or equivalent equipment, while a fabric to be decorated may also be joined by the same operation, optionally with the interposition of a supplementary film for joining to the fabric.
7. Process according to at least one of the preceding claims, characterized in that the decorated film is joined to a further film with foreign bodies interposed between them, these bodies being incorporated in the join for decorative purposes.
8. A product decorated with a film decorated using the process according to one of the preceding claims.

FIG. 1

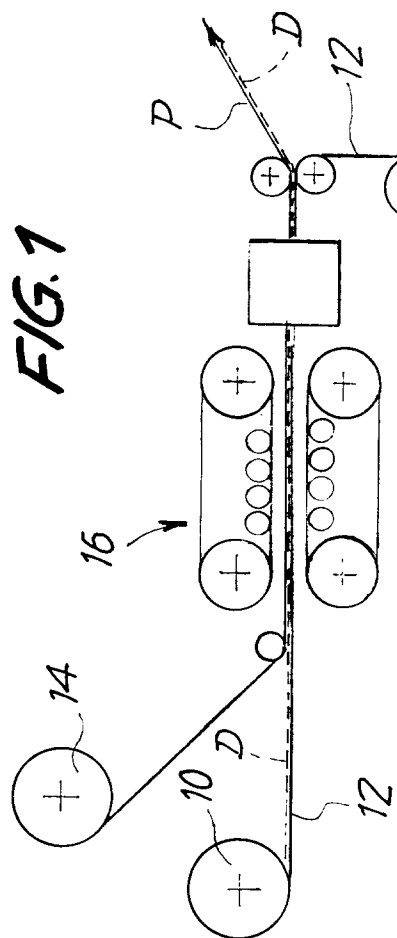


FIG. 2

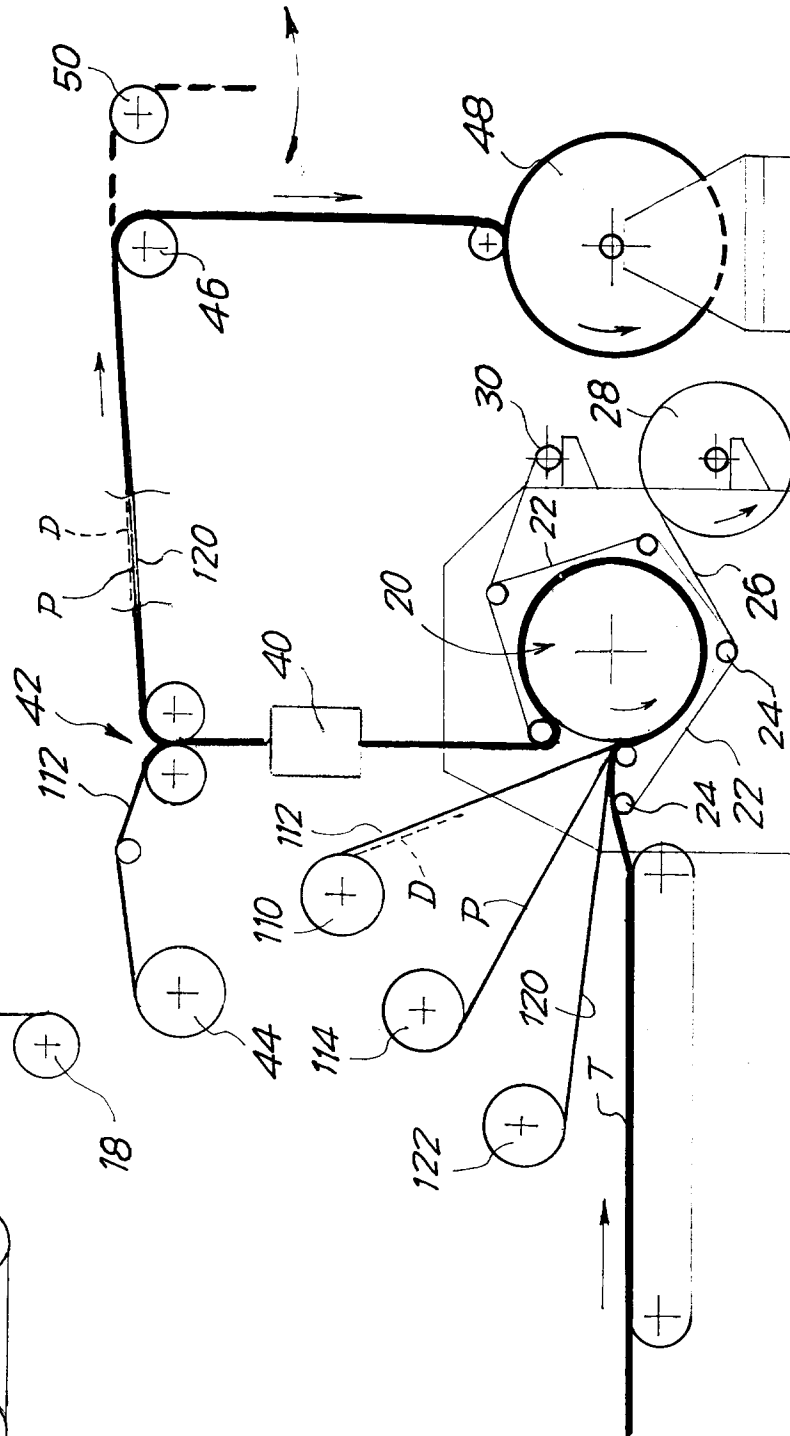


FIG. 3

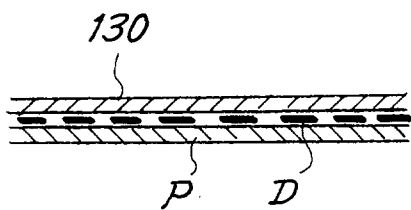


FIG. 4

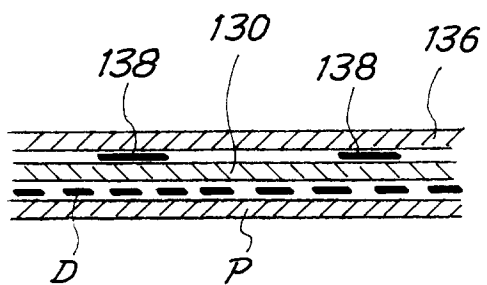
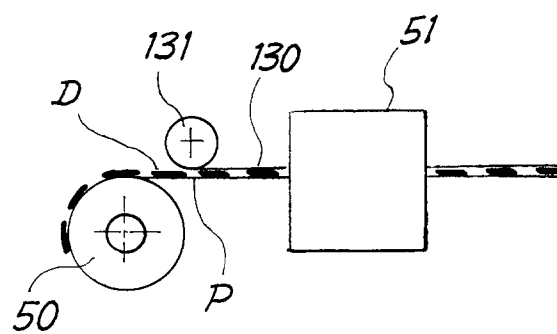


FIG. 5

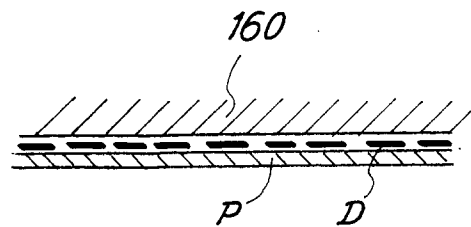


FIG. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 95 83 0042

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 625 433 (ILCAM SPA) * column 2, line 28 - column 6, line 33 * ---	1,2,4,5,8	B44C1/17 B41M5/035
X	WO-A-92 16369 (E. I. DU PONT DE NEMOURS AND COMPANY) * page 3, paragraph 3 - page 6, paragraph 3 * * page 13, paragraph 2 - page 14, paragraph 2; claims 1,12 * ---	1,4,5,8	
X	EP-A-0 455 849 (POLYTREND GESELLSCHAFT FÜR POLYMERE WERKSTOFFE & OBERFLÄCHENTECHNIK) * column 6, line 34 - column 9, line 25 * ---	1,4,5,8	
X	FR-A-2 620 974 (SALOMON S.A.) * page 2, line 29 - page 6, line 2 * -----	1,2,4,5,8	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B44C B41M
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 July 1995	Examiner Doolan, G
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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