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(54) **Transfers, labels and the like.**

(57) A marking element comprises a pre-formed film (5) of a linear thermoplastic resin, preferably polyurethane, which is non-tacky at room temperature, the surface of the element which is exposed in use being printed or coated with a compatible ink composition (9). The element is applied to a garment by application of heat and pressure to soften the thermoplastic film (5) and fuse the element to the garment, the element being subsequently removable by means of a solvent.

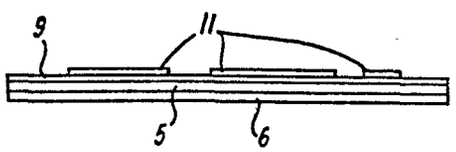

FIG.2

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Transfers, Labels and the Like

This invention relates to transfers, labels and the like which may be used, for example, for marking or labelling textile articles, for the production of identification tapes or badges and for patching or repairing garments or other articles. Such products are referred to hereafter and in the appended claims as "marking elements".

Marking elements are known which comprise a substrate of woven cotton fabric or similar flexible material, one face of which carries information to be displayed when the element is attached to a garment or other surface, and the other face of which is coated with a heat activated adhesive film. The element is applied to a garment or the like by placing it in position and applying heat which activates the adhesive and fuses the substrate to the garment. Removal of such marking elements may be effected using suitable solvents.

Marking elements are also known which comprise film-forming resin compositions and do not require a fabric or similar substrate. However, hitherto the chemical composition of such elements has been such that they cannot be subsequently removed and this is a substantial disadvantage of marking elements of this kind. Moreover it has been necessary to apply such marking elements face down to the surface on which they are to be applied using a removable backing and hence it has not been possible to

add identification markings to such elements by hand before the elements are applied to the surface, since such markings would require to be in reverse or mirror-image. Thus such identification markings have to be applied after the marking element has been heat sealed to the garment and have to be subsequently heat sealed to the marking element itself.

We have now found that it is possible to produce a marking element which does not utilise a fabric substrate, which will securely adhere to textile articles such as clothing and withstand repeated laundering or cleaning operations, and which may be subsequently removed from the article when required. This is achieved by utilising a coherent film of a heat sensitive adhesive composition of a kind previously used as a backing for fabric labels or transfers.

Thus according to the invention there is provided a marking element consisting of a printed or coated linear thermo-plastic resin film.

The invention also provides a marking element comprising a film of a linear thermoplastic resin which is non-tacky at room temperature, the surface of the element which is exposed in use being printed or coated with a compatible ink composition, whereby the element may be applied in face-up relation to a garment or other support and adhered thereto by application of heat and pressure, the label being subsequently removable by means of a solvent.

Preferably the resin film comprises a linear polyurethane resin. The thickness of the film may be of the order of

2 - 15 thousandths of an inch and preferably 5 - 7 thousandths of an inch.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Fig. 1 is a diagrammatic cross-section through one form of apparatus for the production of marking elements according to the invention; and

Fig. 2 is a cross-section through a marking element.

Referring to Fig. 1, a pre-formed film 5 of a suitable linear thermoplastic polyurethane which is non-tacky at room temperature is transported on a suitable carrier 6 supported on rollers 7 past a coating station 8 at which an overall surface coating 9 of printing ink is applied to the upper surface of the film by a roller 10. The film 5 may be temporarily attached to the carrier 6 by a pressure sensitive adhesive or other suitable means. The coated film then passes to a printing station at which a printed pattern such as an emblem or printed information indicated at 11 is applied to the coated surface by a printing roller 12 and after drying of the coating the film is cut to form individual transfers or marking elements as shown in Fig. 2. The support on which the film is carried during the coating and/or printing operations may also be cut to form a temporary protective sheet as shown in Fig. 2 which may be peeled from the marking element before use. Alternatively the film may be removed from the supporting surface prior to cutting to form individual marking elements.

In an alternative arrangement a pre-formed film of a linear thermoplastic polyurethane which is non-tacky at room temperature and incorporates a white or other pigment is transported on a suitable carrier, to which it may be temporarily attached by a pressure sensitive adhesive or other suitable means, past a printing station at which a printed pattern such as an emblem or printed information is applied directly to the surface of the film and after drying the film is cut to form individual transfers or marking elements.

Printing of the film may be effected using any inks which will withstand laundering or other operations to which the marking element will be subjected when attached to a garment or the like in use and are compatible with the marking element. Vinyl or urethane inks have been found to be particularly suitable for this purpose. However certain commercially available thermoplastic polyurethane films incorporate an "anti-blocking" composition serving to prevent curling or deformation of the film during production and in use. This can inhibit the application of printing to the outer surface of the film and where such a composition is present it must first be removed using suitable solvents or a compatible ink and printing process utilized. It has been found that fatty acid ester blocking agents do not substantially impair printing.

In use of the marking element it is applied to the surface of a garment or other article to which it is to be adhered in a "face-up" orientation, that is with the printed

surface upper-most and is then subjected to heat and pressure to activate the adhesive film which softens and bonds the marking element to the surface of the article. The temperature and pressure applied may be varied within wide limits but typically temperatures of the order of 190 - 230°C and preferably 200 - 220°C and pressures of the order of 20 - 45lbs/sq. in typically around 35 - 37lbs/sq.in are employed. The time of application may vary dependent on the temperature, pressure and other factors but is generally in the region of 5 - 15 seconds and preferably 7 - 10 seconds.

Additional markings may be applied to the element before attachment to the garment if desired and fuse into the element on heating to form indelible markings which, together with the printed markings previously applied, will withstand laundering and cleaning operations to which the garment may be subjected. It has also been found that additional markings may be applied by laundry marking pen shortly after bonding of the marking element to the garment but before the thermoplastic film has re-hardened. Such markings become embedded in the film and after cooling and hardening of the marking element have been found to be indelible in the same manner as markings applied prior to fixing of the marking element to the garment without requiring any further heating.

In cases where the surface of the polyurethane film is provided with an overall ink coating prior to printing, it

has been found that some printing inks used to form the coating crack and flake under certain circumstances. In order to improve the adherence of the coating to the surface of the film in such circumstances the coated film may be heated, for example by infra-red or ultra-violet heaters, or by means of heated rollers to seal the surface coating to the film. This prevents cracking or flaking and provides a coherent background surface on which designs or printed information may be subsequently applied.

In an alternative technique the surface of the film may be textured prior to application of an overall coating, texturing being effected by mechanical means or by chemical etching. Alternatively a suitable solvent for etching the surface may be incorporated with the coating ink composition.

If it is subsequently desired to remove the marking element this may be effected by application of a suitable solvent, for example using the technique described in our co-pending British Patent application No. 8041585.

By virtue of the fact that the marking element comprises a thermoplastic film alone, no fabric support of the kind previously required in the production of such marking elements is necessary, thereby increasing the elasticity and flexibility of the marking element compared with previously proposed elements incorporating fabric supports. Moreover while reference has been made herein to the use of a temporary carrier for the film, such a carrier can

be dispensed with in certain circumstances, particularly in the case of pigmented film. Where a carrier is utilized this may be cut to form individual elements as described above or may remain as a roll for cutting by the user. Alternatively the film may be cut to form individual elements leaving the backing intact to act as a continuous carrier for the elements until they are removed for use.

Since the marking element relies on thermo-plasticity to effect adherence to the surface to which it is to be applied in use rather than a chemical bonding action, it is possible to employ a pre-formed film on to which information can be directly printed face up rather than in inverted or mirror-image fashion. Consequently it is also possible to add additional information to the outer surface of the element prior to application to a garment or the like by laundry or other suitable marking pen, following which the element can be adhered by a single operation involving application of heat and pressure without deforming or otherwise interfering with the printed information. This compares favourably with previous transfers comprising film forming resins which have hitherto been of a thermo-setting type relying on chemical bonding to secure the element to a garment or the like. This prevents the use of a pre-formed sheet or film and has required that the elements be applied face-down to the garment so that they must initially be printed in reverse or mirror image. Consequently additional markings cannot readily be applied by laundry marking pen until after the element has been adhered to the garment and further heat-sealing is then required. Moreover due

to the chemical nature of the bond between the element and the garment it has not hitherto been possible to remove such labels or marking elements after application.

The invention may be used in connection with a wide variety of marking elements including badges, emblems, identification tapes and labels of various kinds, but in addition, elements according to the invention may be used for repairing tears or other damage in garments or fabrics. For this purpose an element having an overall surface coating of an ink medium coloured to correspond to the colour of the article to be repaired is applied over the torn or damaged area and heat sealed into position so as to bridge the tear and form a repair in the nature of a patch which will be largely indistinguishable due to its relatively thin form and the fact that it may be coloured to correspond to the background colour of the article being repaired. Colouring of the patch may be effected by application of an overall surface coating of a coloured ink composition selected to match the garment to be repaired or by incorporation of a pigment or dye of a suitable colour in the polyurethane film.

Various modifications may be made without departing from the invention. For example while the preferred thermoplastic film is polyurethane film, other thermoplastic film forming resins having similar properties may be used.

PATENT CLAIMS

1. A marking element characterised in that it comprises a printed or coated thermoplastic resin film (5).

2. A marking element characterised in that it comprises a pre-formed film (5) of a linear thermoplastic resin which is non-tacky at room temperature, the surface of the element which is exposed in use being printed or coated with a compatible ink composition (11), whereby the element may be applied in face-up relation to a garment or other support and adhered thereto by application of heat and pressure, the element being subsequently removable by means of a solvent.

3. A marking element according to claim 1 or 2 characterised in that the exposed surface of the element is receptive to markings applied thereto by marking pen either before or after heat treatment to produce indelible markings which will withstand laundering operations.

4. A marking element according to any preceding claim characterised in that the outer surface of said film is provided with an overall coating (9) of an ink composition prior to printing thereof.

5. A marking element according to any preceding claim characterised in that said thermoplastic resin film (5) incorporates a non-silicone anti-blocking agent.

6. A marking element according to claim 5 characterised in that said anti-blocking agent comprises a fatty acid ester.

7. A marking element according to any preceding claim characterised in that said thermoplastic resin film (5) comprises a linear polyurethane.

8. A marking element according to any preceding claim characterised in that said film (5) has a thickness of 2-15 thousandths of an inch.

9. A marking element according to any preceding claim characterised in that the undersurface of said film (5) is temporarily supported on a carrier sheet (6).

10. A marking element according to claim 9 characterised in that said film (5) is temporarily attached to said carrier sheet (6) by a pressure sensitive adhesive.

11. A marking element according to any preceding claim characterised in that said ink composition is selected from vinyl and urethane inks.

12. A marking element according to any preceding claim characterised in that said printing is applied by a hot foil technique.

13. A marking element according to any preceding claim characterised in that the element may be removed by application of a solvent.

14. A marking element according to any preceding claim characterised in that the exposed surface of said film (5) is textured prior to application of said printing or coating thereto.

15. A marking element according to claim 14 characterised in that said surface of the film (5) is chemically etched.

16. A marking element according to claim 15 characterised in that said ink composition incorporates a solvent for etching said surface of the film (5).

17. A marking element according to any preceding claim characterised in that it comprises a badge or emblem.

18. A marking element according to any of claims 1 to 16 characterised in that it comprises an identification tape or label.

19. A marking element according to any of claims 1 to 16 characterised in that it comprises a patch for repairing damage to garments or fabrics.

20. A marking element according to claim 19 characterised in that it is coloured to correspond to a garment or fabric to be repaired.

21. A method of attaching a marking element according to any preceding claim to a garment, characterised by locating the marking element in the desired position on the garment and simultaneously applying heat and pressure thereto to soften said thermoplastic film and fuse the element to the garment.

22. A method according to claim 21 characterised in that a marking is applied to the element by marking pen prior to adherence of the element to the garment.

23. A method according to claim 21 or 22 characterised in that a marking is applied to the element after application of the element to the garment.

24. A method according to claim 23 characterised in that said marking is applied before resolidification of said film (5).

25. A method according to any of claims 21 to 24 characterised in that said element is heated to a temperature of 190°C to 230°C for between 5 and 15 seconds.

26. A method according to any of claims 21 to 25 characterised in that said element is subjected to a pressure of 20-45 lbs/sq.in.

27. A method of producing a marking element characterised by providing a pre-formed film (5) of a linear thermoplastic polyurethane resin and directly printing or coating the exposed surface of the film with a compatible ink medium (9 and/or 11) using a suitable printing process.

28. A method according to claim 27 characterised in that the film incorporates an anti-blocking agent comprising a fatty acid ester.

29. A method according to claim 27 or 28 characterised in that said printing process comprises a hot-foil process.

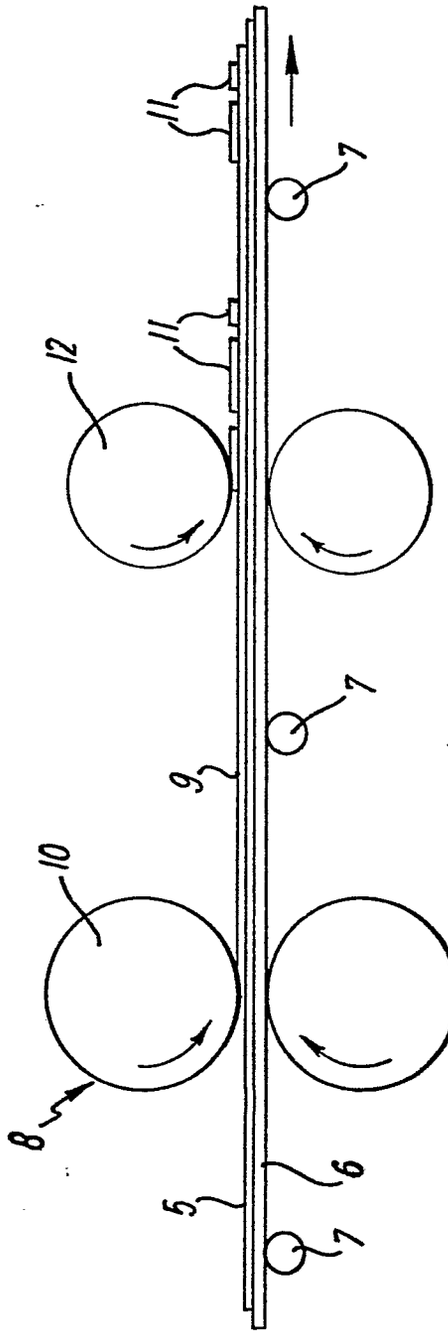

FIG.1

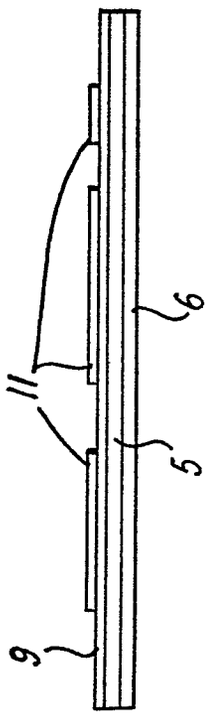

FIG.2

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EUROPEAN SEARCH REPORT

Application number

EP 81 30 6124.9

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
Y	US - A - 2 446 414 (R.A. FARRELL et al.) * whole document * --	1-6, 9,10,14, 17,18, 21,27, 28
Y	GB - A - 1 320 842 (LETRASET INTERNATIONAL LTD.) * whole document * --	1-5,9, 14-18, 21, 25-27
A	GB - A - 1 447 049 (P.P. PAYNE LTD.) * whole document * --	2-4,7, 9-11, 14-18, 21,25, 26
A	GB - A - 1 451 338 (MINNESOTA MINING AND MANUFACTURING CO.) * claims * ----	1,2

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

G 09 F 3/04
B 41 M 3/12

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 41 M 3/12
B 41 M 5/26
D 06 H 1/04
G 09 F 3/00
G 09 F 3/02
G 09 F 3/04
G 09 F 3/10

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

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	25-02-1982	BOTTERILL