

AUSTRALIA

Patents Act 1990

658583

PATENT REQUEST : STANDARD PATENT

I/We, being the person/s identified below as the Applicant, request the grant of a patent to the person/s indicated below as the Nominated Person/s, for an invention described in the accompanying standard complete specification.

Full application details follow.

[71] [70] Applicant/s and Nominated Person/s:  
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[54] Invention Title:  
Process for printing by marking a substrate based on glass fibers  
and novel substrate obtained

[72] Name/s of actual inventor/s: (optional)  
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BASIC CONVENTION APPLICATION/S DETAILS:

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FR

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Societe Anonyme : Hexcel-Genin  
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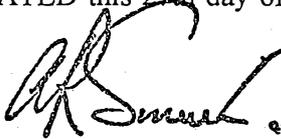
**NOTICE OF ENTITLEMENT**

We, **SOCIETE ANONYME: HEXCEL - GENIN**, the Applicant/Nominated person(s) in respect of Australian Application No. 86714/91 state the following:

The Nominated Person is entitled to the grant of a patent in respect of the application because the said Nominated Person derives title to the invention from the actual inventor ROGER GUY FORIN by assignment.

The Nominated Person is entitled to claim priority from the basic application listed on the patent request because the Nominated Person is the applicant and because the basic application was the first application made in a Convention country in respect of the invention.

DATED this 27th day of September, 1994



**SOCIETE ANONYME: HEXCEL-GENIN**  
By Its Patent Attorneys,  
DAVIES COLLISON CAVE



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**(12) PATENT ABRIDGMENT**    **(11) Document No. AU-B-86714/91**  
**(19) AUSTRALIAN PATENT OFFICE**    **(10) Acceptance No. 658583**

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(54) Title  
**PRINTING PROCESS**

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(56) Prior Art Documents  
**US 4395263**  
**DE 3436065**  
**FR 1482151**

(57) Claim

1. A process for printing on a face of a substrate which includes glass fibres, comprising the steps of coating at least in part at least one of the faces of said substrate with a film of heat-fusible material, and applying heat and pressure via a marking tool to a location on the surface of said film whereby to form imprints in said heat-fusible material.

Our Ref: 411187

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Regulation 3:2

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ORIGINAL  
COMPLETE SPECIFICATION  
STANDARD PATENT

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Invention Title:

Process for printing by marking a substrate based  
on glass fibers and novel substrate obtained

The following statement is a full description of this invention, including the  
best method of performing it known to me:-

### FIELD OF THE INVENTION

The present invention relates to a process for printing on a face of a substrate.

5           The invention concerns more specifically, by way of preferred but non-limiting application, substrates in the form of a textile web more or less translucent by the nature of the material, its internal coloration or its texture, on which decorative prints are to be applied as a function of their future applications by way of light screen, attenuation, diffusion or decorative coating.

10

Substrates of the above type are frequently used in the form of sheets, webs or bands to constitute screens, curtains or light-diffusing or -attenuating panels or decorative coatings.

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With a view to breaking up the uniformity presented by such products, it has been envisaged to colour them in uniform shades. Such coloration cannot be considered as contributing a decorative print which is particularly sought-after.

20

In order to overcome this drawback, it has been recommended to weave these textile webs so as to show either weaves or patterns resulting from a particular, localized, specific interlacing of certain fibers or strands.

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A large variety of patterns have thus been obtained, but the aesthetic and decorative appearance procured does not appear certain, clear, distinct and in any case the possible patterns are limited by the technicality of interlacing of the strands, filaments or fibers.

30

In order to obtain varied patterns, such problems of technicality in production, and feasibility, is translated by a considerable increase in the cost price per surface unit or length.

It is an object of the present invention to overcome the above drawbacks by proposing a novel process for printing substrates, the novel process making it possible to



obtain, at an advantageous cost price, a considerable richness and variety of patterns or prints, decoration, identifications or personalizations capable of presenting, in addition, a certain aesthetic and decorative appearance.

5

#### SUMMARY OF THE INVENTION

In accordance with the present invention there is provided a process for printing on a face of a substrate, comprising the steps of coating at least in part at least one of the faces of said substrate with a film of heat-fusible material, and applying heat and pressure via a marking tool to a location on the surface of said film whereby to form imprints in  
10 said heat-fusible material.

Preferably the substrate includes glass fibres.

Preferably the imprints have a smooth matt surface.

15

In another aspect there is provided a substrate having on at least part of at least one of its faces, a film of heat-fusible material having imprints on the surface thereof.

The process of the invention is described hereinafter in its preferred, non-binding  
20 application to the printing of substrates in the form of a textile web made from glass fibers, in accordance with a known technique which does not form part of the invention. Such textile webs present, generally by the choice of the constituent material or the weave, a more or less great translucen-



cy, with a view to being used principally as light-diffusing or -attenuating panel or screen.

It goes without saying that the object of the invention can be implemented for any other type of substrate, at least in part based on glass fibers, whether it be supple, flexible, compact, of small or large thickness.

The process according to the invention consists in coating, at least in part, at least one of the faces of the substrate with a film of heat-fusible material, <sup>that is preferably</sup> of transparent, translucent or slightly coloured nature. The film is deposited in any suitable manner compatible with the nature of the substrate.

A particularly suitable process in the case of substrates in the form of a supple or relatively supple textile web is the deposit by coating, by continuously advancing passage in a coating bath or vat containing a liquid solution of the heat-fusible material chosen. Deposit by lining may also be envisaged. Among the numerous possibilities offered by the technique of plastics materials, a particularly suitable material for coating or for constituting the film is polyvinyl chloride, although an acrylic material may also be satisfactorily employed.

The addition or deposit of the film of heat-fusible material is effected at a rate of at least 6% by weight of dry extracts of said material with respect to the weight of the substrate, and preferably from 8 to 35%.

Deposit of the film is effected according to the conventional conditions for the film to adhere firmly and in resistant manner to the substrate on which it is fixed by polymerization or hardening, generally by heat.

After the above preparatory phase has been accomplished, the substrate is subjected to hot marking



so as to produce marks, on the surface of the film, at least by localized hot creeping of the heat-fusible material which, after cooling, leaves smooth, matt im-  
prints apparent, corresponding exactly in shapes and  
5 contours to the positive impression or impressions of the marking tool used which, of course, may be plane or of revolution.

Hot marking is effected by temporarily applying a temperature of between ~~60~~<sup>60°C.</sup> and 200°C and by exerting, by the marking tool, a pressure close to  $5 \cdot 10^5 \text{ Pa}$  on  
10 the film of heat-fusible material.

The hot marking operation may be carried out via a press or by a process of continuous advance of the substrate between a heating marker cylinder and a support cylinder whose periphery is in that case advantageously provided with a compressible coating such as elastomer presenting a Shore hardness of 60 to 90. In such a case, the cylinders are driven synchro-  
nously in opposite rotations so as to cause the  
15 substrate to advance at a speed which may be included between 2 and 20 metres per minute. In such a case, the pressure exerted on the substrate by the two cylinders is adjusted so that about 5 to 15 tons intervene over the axial length of contact between the genera-  
trices of the cylinders.  
20

In all cases, the operational conditions of pressure and of temperature are retained as a function of the heat-fusible material constituting the film, so that hot marking produces, by the impression of the marking tool, at least a softening of the surface of the heat-fusible material, promoting at least a surface creeping, translated, after cooling, by the indelible existence of a mark, generally of opacifying character, presenting a smooth surface state which  
25  
30  
35 may thus be easily appreciated visually with respect



to the general state of the film, whether the latter be visually perceptible directly or indirectly, by reason of its translucency, its small thickness or the absence of contrasts that it presents with respect to the glass fibers constituting the subjacent substrate.

The imprints thus made are visually perceptible directly and even more so by the effect of transparency when the substrate, preferably of the type retained hereinbefore, is interposed between an observer and a source of light.

Experiments carried out have enabled very good results to be obtained on webs of coloured, woven textile fabric worked for the purpose of constituting light-diffusing or attenuating screens, implementing the parameters set forth hereinbelow.

EXAMPLE 1

A substrate of the textile sheet type, based on glass fibers of 165 g/m<sup>2</sup> woven in a cloth weave, was coated on at least one of its faces with a film of polyvinyl chloride, at a rate of 30% by weight of dry extracts with respect to the weight of the substrate.

Such a substrate was treated by continuously advancing between support and heating/printing cylinders rotating in opposite directions at synchronous speeds, at 10 metres per minute.

The heating marker cylinder was maintained at a temperature equal to 130°C and exerted on the substrate a pressure of 10 tons over 160 centimetres of axial length of cylinder.

Long-lasting imprints of continuous and/or discontinuous patterns were obtained on the surface of the film without altering the latter nor distorting or degrading the substrate, such imprints being characterized by a smooth surface and a partial localized

opacification limited exactly to the contours of the imprint or imprints of the heating marker cylinder.

EXAMPLE 2

The same substrate was treated as in Example  
5 1, but employing a temperature of 80°C, the same pressure and a speed of 5.5 metres per minute.

In both cases, imprints of generally matt appearance comprising a smooth surface and a generally opacifying character were made precisely, in extremely  
10 varied patterns, presenting a resistance to ageing without any alteration of the film or of the substrate having been considered or ascertained.

The invention also relates to the novel product obtained which is characterized by a substrate based  
15 on glass fibers whether it be compact, supple or flexible or made in the form of a textile fabric, of any weave, whose texture gives a more or less accentuated character of transparency. Such a novel product is characterized by the existence on the surface,  
20 on at least one of the faces of the substrate, of imprints resulting from a hot marking having modified the state of the heat-fusible material, to the point of showing smooth, matt marks of opacifying character in the more particular case of employing a heat-fusible  
25 material of translucent character added to a substrate of transparent character.

The invention is not limited to the examples described, as various modifications may be made thereto without departing from its scope.

The Claims defining the invention are as follows:

1. A process for printing on a face of a substrate which includes glass fibres,  
5 comprising the steps of coating at least in part at least one of the faces of said substrate with a film of heat-fusible material, and applying heat and pressure via a marking tool to a location on the surface of said film whereby to form imprints in said heat-fusible material.
- 10 2. The process of Claim 1, wherein the film of heat fusible material is formed from a dry extract which weighs at least 6% by weight of the substrate.
3. The process of Claim 1 or 2, wherein the film of heat-fusible material is translucent and the imprints formed by the marking tool are opacified.
- 15 4. The process of Claim 1 or 3, wherein the imprints are made during application of a temperature of between 60°C and 200°C.
5. The process of Claim 4, wherein a pressure of approximately  $5 \times 10^5$  Pa is applied  
20 to the marking tool during application of the tool to the surface of said film.
6. The process of one of Claims 1 to 5, wherein the marking tool is in the form of a heated cylinder and the imprints are made by continuously advancing the substrate between the cylinder and a support cylinder and the cylinders are driven synchronously  
25 in opposite directions to cause the substrate to advance at a speed of between 2 to 20 metres per minute.
7. The process of Claim 6, wherein the cylinders exert on the substrate a pressure of between 5 and 15 tons applied over an axial length of cylinder in the order of 160  
30 centimetres.

~~8. A process as claimed in any one of the preceding claims wherein the substrate includes glass fibres.~~



8. A process as claimed in any one of the preceding claims wherein the imprints have a smooth matt surface.

9. A process as claimed in any one of the preceding claims wherein the imprints are  
5 at least partially formed by a process of hot creeping.

10. A substrate including glass fibers and having on at least part of at least one of its faces, a film of heat-fusible material having imprints on the surface thereof formed by application to the heat-fusible material of heat and pressure via a marking tool.  
10

11. The substrate of Claim 10, wherein the film of heat-fusible material is at least partially translucent.

12. The substrate of Claim 10 or 11, wherein the substrate itself is constituted by a  
15 textile fabric of translucent character, and the imprints are in the form of localized opacifying matt imprints.

13. A printing process substantially as herein described with reference to any one of the Examples.

20 14. A substrate substantially as herein described with reference to any one of the Examples.

DATED this 13th day of February 1995

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ABSTRACT OF THE DISCLOSURE

This invention relates to the marking of substrates based on glass fibers. The process consists in coating at least in part at least one of the faces of said substrate with a film of heat-fusible material and in making matt imprints on the surface of said film at least by localized hot creeping of said heat-fusible material. The invention is more particularly applicable to webs of textile cloth used as light-diffusing and/or attenuating screens.