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D E C I S I O N
of 13 September 2001

Case Number: T 0634/98 - 3.2.5

Application Number: 88304575.9

Publication Number: 0342286

IPC: B41N 10/04

Language of the proceedings: EN

Title of invention:
Method of curing a compressible printing blanket and a compressible printing blanket produced thereby

Patentee:
Day International Inc.

Opponent:
Reeves Brothers Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 123(2) and (3), 83, 54, 56

Keyword:
"Allowability of amendments (yes)"
"Sufficiency of disclosure (yes)"
"Novelty (main request, no; first auxiliary request, yes)"
"Inventive step (first auxiliary request, yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0634/98 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 13 September 2001

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 7 April 1998 concerning maintenance of European patent No. 0 342 286 in amended form.**

Composition of the Board:

Chairman: W. Moser
Members: P. E. Michel
W. R. Zellhuber

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining the patent No. 0 342 286 in amended form.

In the decision under appeal, it was held that the grounds of opposition submitted by the appellant under Article 100(a) and (b) EPC (lack of novelty and inventive step and insufficiency of disclosure) did not prejudice the maintenance of the patent as amended.

The following documents were referred to in the appeal proceedings:

D1 AU-A-49304/72

D4 GB-A-1 327 758

D15 US-A-3 856 721

D21 "New developments in offset blankets", Chamberlain, Professional Printer, Volume 22, Number 6, pages 2 to 7

WWE5 US-A-4 042 743

II. Oral Proceedings were held before the Board of Appeal on 13 September 2001.

(i) The appellant requested that the decision under appeal be set aside and the patent be revoked.

(ii) The respondent (patentee) requested that the decision under appeal be set aside and that the

patent be maintained on the basis of the following documents:

(a) claims 1 to 11 submitted as main request during oral proceedings; or

(b) claims 1 to 11 submitted as first auxiliary request during oral proceedings; or

(c) as second, third or fourth auxiliary requests: claims 1 to 11 respectively filed as first, second and third auxiliary requests on 26 February 1999.

III. The main request includes two independent claims, which read as follows:

"1. A method of making a laminated printing blanket construction comprising the steps of:
providing at least one fabric substrate layer (26),
forming an intermediate compressible layer (24) of an elastomeric material on said substrate layer (26) said intermediate compressible layer having a substantially uniform thickness and having microcapsules incorporated therein, said microcapsules being substantially uniformly distributed throughout said intermediate compressible layer,
providing a surface layer (20) over said intermediate compressible layer to form a printing blanket construction, and
vulcanizing said construction to cure said layers,
characterized in that, before a step of finally

vulcanizing said construction, the elastomeric material of the intermediate compressible layer is partially vulcanized at a temperature below the melting point of said microcapsules for a time sufficient to cause said elastomeric material to crosslink to a degree sufficient to substantially fix the positions of said microcapsules within said intermediate compressible layer, thereby providing said intermediate layer (24) with substantially uniformly distributed voids of substantially uniform size."

"9. A laminated printing blanket construction (10), made by a method according to any preceding claim, comprising at least one substrate layer (26), a surface layer (20), and an intermediate compressible layer (24) comprising an elastomeric material having a cellular structure with a plurality of closed cells forming voids, said intermediate layer (24) having a substantially uniform thickness, said voids being of substantially uniform size and being substantially uniformly distributed throughout said intermediate compressible layer, said voids not being interconnected."

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that

(i) the term "vulcanizing said construction to cure said layers" is amended to read "finally vulcanizing said construction, at a temperature higher than that at which said microcapsules melt, to cure said layers"; and

(ii) the term "characterized in that" is replaced by "wherein".

Claim 9 of the first auxiliary request is identical to claim 9 of the main request.

IV. In the written and oral procedure, the appellant argued essentially as follows:

As regards the main request, the objections under Articles 123(2) and 84 EPC raised against the previous main request, but now withdrawn by the respondent, are withdrawn, it being accepted that the term "before a step of finally vulcanizing said construction" is clear.

Claims 1 and 9 are excessively broad and encompass matter which goes beyond the teaching of the patent in suit, so that the requirements of Article 83 EPC are not met. In particular, with respect to the expression in claim 1, "the elastomeric material of the intermediate compressible layer is partially vulcanized at a temperature below the melting point of said microcapsules for a time sufficient to cause said elastomeric material to crosslink to a degree sufficient to substantially fix the positions of said microcapsules within said intermediate compressible layer", there is no teaching of how to achieve the claimed result outside the temperature range (43 to 77°C) and duration (1 to 12 hours) specified in the description.

It is disputed that the person skilled in the art could determine a suitable temperature range and duration for the partial vulcanization step without undue

difficulty. It would be impossible to know if the microcapsules had been successfully fixed in place as required by claim 1. The terms "substantially uniformly distributed voids" and "of substantially uniform size" are merely relative. The photomicrographs submitted by the respondent do not form part of the disclosure of the patent in suit.

The decisions of the Boards of Appeal T 409/91 and T 435/91 both confirm that it is necessary for the subject-matter of the claims to be supported over the whole claimed range. The decision T 68/85 deals with an issue under Article 84 EPC and is not relevant to the question of sufficient disclosure.

Claim 1 lacks novelty in view of the disclosure of document D4. According to the sentence at column 7, line 36 to column 8, line 4 of the patent in suit, the first vulcanization step can involve "substantially complete" vulcanization of the elastomeric layer. The subsequent step of vulcanization of the construction may thus only concern vulcanization of the outer layers and not of the elastomeric layer. In this case, there is a one step vulcanization of the elastomeric layer.

Document D4 proposes the use of glass and phenolic resin microcapsules, so that the vulcanization step at the disclosed temperature of 140°C is carried out below the melting point of the microcapsules. This is confirmed in the case of phenolic resins by the disclosure of document WWE 5 (column 4, lines 7 to 12).

The subject-matter of claim 9 lacks novelty for the same reasons as claim 1.

As regards the first auxiliary request, all objections are withdrawn.

V. In the written and oral procedure, the respondent argued essentially as follows:

The patent in suit bears a priority date fifteen years after the publication of document D1. Curing of printing blankets containing microcapsules in the elastomeric layer had become a well known technology at the priority date of the patent in suit, curing profiles being available, so that the person skilled in the art would know how long a complete cure would take. It is quite conceivable that microcapsules capable of resisting higher temperatures will become available, enabling higher temperatures to be used in the partial vulcanization step.

According to decision T 68/85, it is permissible to use functional features to define a technical result, if it is not possible to provide a more precise definition.

Claim 1 specifies that "the intermediate compressible layer is partially vulcanized at a temperature below the melting point of said microcapsules", that is, at a lower temperature than the final vulcanization step. A single vulcanization at a single temperature would not address the problem as specified in the patent in suit. It is not the intention to cover microcapsules which do not melt at all.

Claim 9 is directed to a novel printing blanket construction as demonstrated by the photomicrographs on file. The reference to "substantially uniformly distributed voids of substantially uniform size" means

a greater degree of uniformity than that obtained in the prior art, obtained as a consequence of the initial fixing step specified in claim 1. The fact that a greater degree of uniformity is achieved may be seen from the photomicrographs accompanying the affidavit from Mr. Easley.

There is no appreciation in the prior art of the problems arising from the melting of the microcapsules, leading to agglomeration of the voids and hence a lack of uniformity. The evaporation step proposed in document D1 does not involve heating to a temperature at which any significant vulcanization occurs.

The declaration of Mr. Shrimpton to the effect that he was aware before the priority date of the fact that partial vulcanization at low temperature is necessary to achieve even void distribution does not constitute prior public knowledge. In view of his employment by Dunlop, he would be expected to keep any such knowledge confidential. The allegation that this was common general knowledge is not supported by any documentation. The step of festooning printing blankets prior to vulcanization was carried out merely to evaporate solvent, as is the case in the method of document D1. Vulcanization temperatures are not reached during such a step, owing to solvent evaporation and the heat capacity of the blanket.

Claim 1 of the first auxiliary request complies with the requirements of Article 123(2) EPC, a basis for the amendment being found in the published application at column 3, lines 16 to 19 and at column 8, lines 55 to 57.

Reasons for the Decision

Main request

1. *Allowability of amendments*

In place of the wording "before final vulcanization of said construction" as contained in claim 1 as granted, the wording "before a step of finally vulcanizing said construction" was introduced. Reference is made to such a final vulcanization step in the published version of the application as filed at column 8, lines 30 and 50. These passages refer to the step being carried out on the printing blanket construction, that is, the assembly of the fabric substrate, the elastomeric layer and the surface layer. In addition, the amendment does not result in any matter being claimed which was not claimed in claim 1 as granted. The amendment thus complies with the requirements of Article 123 (2) and (3) EPC.

2. *Clarity*

The term "before a step of finally vulcanizing said construction" as used in claim 1 is also clear and, indeed, the appellant did not raise any objection of lack of clarity to this wording.

3. *Sufficiency of disclosure*

It is alleged by the appellant that claims 1 and 9 encompass matter which goes beyond the teaching of the patent in suit, so that the requirements of Article 83 EPC are not met. In particular, with respect to the

expression in claim 1, "the elastomeric material of the intermediate compressible layer is partially vulcanized at a temperature below the melting point of said microcapsules for a time sufficient to cause said elastomeric material to crosslink to a degree sufficient to substantially fix the positions of said microcapsules within said intermediate compressible layer", it is alleged that there is no teaching of how to achieve the claimed result outside the temperature range and duration specified in the description, that is, 43 to 77°C for 1 to 12 hours and that the person skilled in the art is not in a position to carry out the invention outside these ranges.

In the opinion of the Board, the person skilled in the art could determine a suitable temperature range and duration for the partial vulcanization step without undue difficulty. Whilst the temperature range and duration taught in the patent in suit may be regarded as a guideline, the person skilled in the art would be aware that, for example, it may be possible to use temperatures higher than 77°C, if the material of the microcapsules had a melting point above this temperature. Such higher temperatures would enable a shorter time to be used. It would be possible to know if the microcapsules had been successfully fixed in place as required by claim 1 by examination of the final product. The terms "substantially uniformly distributed voids" and "of substantially uniform size" must be construed in the context of a printing blanket construction and in the light of the object of the invention. The voids must be such as to result in a printing blanket having a compressible layer which responds evenly to compression at right angles to its surface, thus giving rise to a consistent printing

quality over the surface of the blanket.

There is thus no serious doubt that the person skilled in the art is in the position to perform the invention also outside the ranges of temperature and duration specified in the description without undue burden, so that the requirements of Article 83 EPC are satisfied.

4. *Novelty*

4.1 Document D4 discloses a method of making a laminated printing blanket construction comprising the following steps, as specified in the pre-characterising portion of claim 1:

providing at least one fabric substrate layer (strengthening layer A),

forming an intermediate compressible layer (B) of an elastomeric material on said substrate layer (A), said intermediate compressible layer having a substantially uniform thickness and having microcapsules incorporated therein, said microcapsules being substantially uniformly distributed throughout said intermediate compressible layer,

providing a surface layer (C,D) over said intermediate compressible layer to form a printing blanket construction, and

vulcanizing said construction to cure said layers (page 4, lines 20 to 23).

This was not disputed between the parties.

4.2 In addition, in the opinion of the Board, the features of the characterising portion of claim 1 do not serve to distinguish the subject-matter of the claim from the disclosure of document D4.

Document D4 suggests the use of microcapsules of glass, phenolic resin, carbon or thermoplastic material. In the case of glass, phenolic resin and carbon microcapsules, the vulcanization temperature (exemplified at page 4, lines 20 and 21 of document D4 as being 140°C) is below the melting point of said microcapsules.

Document D4 further teaches that the cells formed by the microcapsules are substantially uniformly distributed in the polymer (page 2, lines 5 to 9 and claim 8). It cannot be accepted that the term "uniformly" must be construed as meaning "more uniformly than in the prior art". The term is construed as set out in paragraph 3 above.

In addition, according to document D4, vulcanization is carried out "before or after assembly of the compressible layer with the other blanket layers" (page 2, lines 56 to 59). In the case in which vulcanization is carried out after assembly of the three layers, document D4 thus discloses a single vulcanization step, carried out at a temperature below the melting point of the microcapsules. It was alleged on behalf of the respondent that the claim specifies a two step vulcanizing procedure: a first, low temperature vulcanizing step carried out to fix the positions of said microcapsules within said intermediate compressible layer; followed by a final vulcanizing step carried out at a higher temperature. This cannot, however, be derived from the language of claim 1, since the claim does not specify the temperature at which the final vulcanization step is to be carried out, nor that the partial and final vulcanization steps are not carried out consecutively.

It is thus considered that a single vulcanization step, carried out at a temperature below the melting point of the microcapsules on the printing blanket construction would satisfy the requirements of the claim. Such a step would inevitably have the effect of passing the point at which the elastomeric material is caused to "crosslink to a degree sufficient to substantially fix the positions of said microcapsules within said intermediate compressible layer" at some point during the curing procedure.

The subject-matter of claim 1 thus lacks novelty in view of the disclosure of document D4, so that the main request of the respondent is not allowable.

First auxiliary request

5. *Allowability of amendments*

The feature introduced into claim 1 as compared with claim 1 of the main request, of "finally vulcanizing said construction, at a temperature higher than that at which said microcapsules melt, to cure said layers", is disclosed in the published version of the application as filed at column 8, lines 55 to 57.

In addition, the amendment restricts the scope of the claim. The amendment thus complies with the requirements of Article 123 (2) and (3) EPC.

6. *Sufficiency of Disclosure*

The claim also complies with the requirements of Article 83 EPC for the same reasons as given above with respect to the main request (cf. paragraph 3 above).

7. *Novelty*

None of the cited prior art documents discloses a method of making a laminated printing blanket construction in which the construction undergoes a two step vulcanization, comprising a partial vulcanization step carried out at a temperature below the melting point of the microcapsules and a final vulcanization step carried out at a temperature above the melting point of the microcapsules.

As discussed above, document D4 teaches a single vulcanization step, carried out either before or after assembly of the compressible layer with the remaining blanket layers.

Document D1 similarly teaches a single vulcanization step, carried out after assembly of the compressible layer with the remaining blanket layers (page 6, lines 1 to 5).

The only disclosure of a two step vulcanization is in document D15. This document does not, however, relate to printing blankets, but to syntactic foam materials for use in buoyancy devices.

The declaration by Mr. Shrimpton does not suggest that any knowledge which he, or other employees of Dunlop, may have possessed before the priority date of the patent in suit of the necessity of a preliminary, low temperature, partial vulcanization step was made available to the public.

The subject-matter of claim 1 is thus new.

Claim 9 is directed to a laminated printing blanket construction made by a method as claimed in any of claims 1 to 8. Owing to the low temperature partial vulcanizing step, the voids are substantially uniformly distributed throughout said intermediate compressible layer and are not interconnected. Owing to the subsequent step of vulcanizing the construction at a temperature higher than that at which the microcapsules melt, the blanket will exhibit cells in the compressible layer in which the material of the microcapsules has been melted and either reformed to form a coating on the walls of the voids, or interacted with the elastomer to form a new coating substance (see patent in suit, column 8, lines 45 to 56). The blanket as claimed in claim 9 thus has a novel structure as compared with the structures obtained following the methods of the prior art, in which either microcapsules having a high melting point are used, in which case, the microcapsules retain their original structure in the finished product; or low melting point microcapsules are used, which results in agglomeration and hence interconnected voids.

The subject-matter of claim 9 is thus also new.

8. *Inventive step*

8.1 Closest prior art

Document D1 represents the closest prior art and discloses a method of making a laminated printing blanket construction comprising not only the features set out at paragraph 4.1 above in connection with the disclosure of document D4, but also a vulcanization step carried out at a temperature higher than that at

which said microcapsules melt (page 9, lines 22 to page 10, line 1).

It was suggested on behalf of the appellant that document D4 could equally be regarded as the closest prior art. This cannot be accepted in view of the fact that this document does not disclose a vulcanization step carried out at a temperature higher than that at which said microcapsules melt.

8.2 Object of the invention

The object of the invention is to provide a method of making a laminated printing blanket construction having improved compressibility characteristics.

8.3 Solution

According to claim 1, the above object is achieved by a two step vulcanization, comprising a partial vulcanization step carried out at a temperature below the melting point of the microcapsules and a final vulcanization step carried out at a temperature above the melting point of the microcapsules.

As stated above in paragraph 7, the only disclosure in the cited prior art of a two step vulcanization is in document D15, which does not relate to printing blankets, but to syntactic foam materials for use in buoyancy devices. The problem facing the inventors of document D15 was to avoid charring of the polymeric material caused by build-up of heat during vulcanization of comparatively large sections. Such a problem does not arise in the manufacture of printing blankets and there is no indication in document D15

that a two stage vulcanization could improve the compressibility characteristics of printing blankets.

The subject-matter of claim 1 thus involves an inventive step. Claims 2 to 8 are directed to preferred embodiments of the method according to claim 1. These claims thus similarly involve an inventive step. Claim 9 is directed to a laminated printing blanket construction made by a method as claimed in any of claims 1 to 8 and, accordingly, the subject-matter of claim 9, as well as claims 10 and 11 which are appendant thereto, also involves an inventive step.

The first auxiliary request of the respondent is thus allowable, and it is not necessary to consider the remaining auxiliary requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

   (a) claims 1 to 11 submitted as first auxiliary request during oral proceedings; and

(b) pages 3, 4 and 5, submitted during oral proceedings, and pages 2 and 6 as granted; and

(c) drawings, Figures 1 and 2, as granted.

The Registrar: The Chairman:

M. Dainese W. Moser