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**Datasheet for the decision
of 22 September 2006**

Case Number: T 0576/06 - 3.2.04

Application Number: 01971546.5

Publication Number: 1317312

IPC: A63F 9/10

Language of the proceedings: EN

Title of invention:

Jigsaw puzzle

Applicant:

Hasbro, Inc.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 52, 54, 56, 123(2)

Keyword:

"Novelty - yes (all requests)"

"Inventive step (no)"

"Problem-solution-approach"

Decisions cited:

T 0419/93, T 0246/91

Catchword:

-



Case Number: T 0576/06 - 3.2.04

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 22 September 2006

Appellant: Hasbro, Inc.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 17 November 2005
refusing European application No. 01971546.5
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: M. Ceyte
Members: A. De Vries
C. Heath

Summary of Facts and Submissions

I. The appellant lodged an appeal, received at the EPO on 23 January 2006, against the decision of the Examining Division notified by post on 17 November 2005, refusing the European patent application No. 01 971 546.5 filed as an international application PCT/CA01/01274 and published under the international publication number WO-A-02/20107. The fee for appeal was paid simultaneously and the written statement setting out the grounds of appeal was filed on 17 March 2006.

II. In its decision, the Examining Division held that the application did not meet the requirements of Articles 52, 54 and 56 EPC having regard to in particular the following documents:

D1: US-A-5 860 650

D2: US-A-5 791 647

D3: US-A-5 251 900

III. In a communication accompanying summons of 10 July 2006 to oral proceedings the Board expressed its provisional opinion that the claimed subject-matter lacked inventive step in view of document D1, and using text book knowledge of Edward M. Petrie: "Handbook of Adhesives and Sealant", 2nd ed., New York, McGraw-Hill, 1999-10-11 (referred to as "Petrie" hereinafter).

Oral proceedings were held on 22 September 2006, at which the Appellant requested that the decision under appeal be set aside and a patent be granted on, as main request, the claims forming the subject of the decision

according to the main request, or alternatively, the amended claims of first to third auxiliary requests filed with the grounds of appeal, or alternatively, as fourth request, an amended claim 1 as filed at the oral proceedings.

- IV. The wording of the independent claims of the requests are as follows:

Main Request

Claim 1.

A jigsaw puzzle comprising a plurality of pieces, each of said pieces having a main body made of foam with memory, each main body having a layer of glue extending thereover and a flexible sheet adhesively bonded thereto, the sheet bearing a portion of a picture of the puzzle, the main bodies of the pieces having complementary interlocking joints for detachably assembling the pieces to one another to form the picture of a two-dimensional jigsaw puzzle, each of the main bodies having a peripheral side surface with predetermined thickness such that, when the pieces are assembled to one another, the interlocking joints substantially hold the pieces together by friction contact between the peripheral side surfaces of the main bodies,
characterized in that:
the glue is of a type which remains substantially flexible after setting thereof.

Claim 9.

A method for producing a jigsaw puzzle, said method comprising the steps of:

a) providing a sheet of foam with memory, having a layer of glue extending thereover and a main flexible sheet adhesively bonded thereto, the main flexible sheet comprising a picture of the puzzle; and

b) die cutting said sheet of foam with memory into a plurality of pieces each having a main body, the main bodies of the pieces being cut so as to have complementary interlocking joints for detachably assembling the pieces to one another to form the picture of a two-dimensional jigsaw puzzle, each of the main bodies having a peripheral side surface with predetermined thickness such that, when the pieces are assembled to one another, the interlocking joints substantially hold the pieces together by friction contact between the peripheral side surfaces of the main bodies;

the method is characterized in that:

in step a), the glue is of a type which remains substantially flexible after setting thereof.

1st Auxiliary Request

Claims 1 and 9 are as in the main request but for the deletion of the wording "substantially" from the final feature in both claims.

2nd Auxiliary Request

Claims 1 and 9 are as in the main request but for the final feature which is amended by way of addition to read: "... the glue is of a type which remains substantially flexible after setting thereof, *thereby permitting non-coplanar distortions of the puzzle*

without cracking of the glue" (italics indicate text added).

3rd Auxiliary Request

Claims 1 and 8 are identical to claims 1 and 9 respectively of the main request but for the final feature which is amended by way of addition to read (italics indicate added text):

Claim 1: "... , *and wherein the predetermined thickness is at least 3mm*"

Claim 8: "... , *and the sheet of foam has a predetermined thickness of at least 3 mm*".

4th Auxiliary Request

Claims 1 and 8 are as in the 3rd Auxiliary request but for the deletion of the wording "at least" in the final feature, which thus reads (italics indicate added text):

Claim 1: "... *the predetermined thickness is 3 mm*",

Claim 8: "... *a predetermined thickness of 3 mm*"

- V. The Appellant's arguments are summarized as follows:
As regards novelty, the claimed features are not directly and unequivocally derivable from document D1, which is entirely silent on type of glue used. The term "substantially flexible" refers to a sufficiently clear and important quality in glues.
Regarding inventive step, the application is concerned with two-dimensional puzzles, and the problem it

addresses must be formulated within this specific context: constructing a two-dimensional puzzle which is capable of bending without pieces detaching themselves from the puzzle. In this context flexibility of the puzzle as a whole is a central concern; the claimed solution strives to introduce more flexibility. The three-dimensional puzzles of D1 to D3, on the other hand, are self-standing, necessarily rigid structures, and the skilled person would therefore not consider increasing their flexibility by using flexible set glues. Therefore, while D1 to D3 might be considered relevant from a legal point of view for assessing novelty, they are much less so when it comes to assessing inventive step. Even if D1 to D3 were to be considered as the nearest prior art, the problem formulated by the Board incorrectly uses hindsight. Moreover, the use of flexible glue is key to the bendability of the puzzle, and is a significant departure from D1 to D3, which use conventional puzzle lamination techniques based on hard setting glue. Finally, the person skilled in the relevant field of puzzle making will have only general, superficial knowledge of lamination and adhesives, not the specialist knowledge taught by Petrie. As regards the 4th auxiliary request, the value of 3mm, which is significantly lower than customary values for thickness, is, as a surprising effect, made possible by the specific use of flexible, set glues.

Reasons for the Decision

1. The appeal is admissible.
2. *Allowability of the Amendments (all requests)*
 - 2.1 Main request: the independent claims have been redrafted in two part form with respect to the claims as originally filed. Such a delimitation against the prior art does not affect the extent of disclosure, and this amendment therefore does not contravene Article 123(2) EPC.
 - 2.2 1st Auxiliary Request: the qualification "substantially" must be read in its recognized sense as meaning: "*in essentials; to all intents and purposes; in the main*" (Oxford English Dictionary) and serves to merely highlight flexibility as the main or essential property in the context of the claimed invention. Thus "substantially flexible" and "flexible" are understood by the skilled person to signify the same quality of the adhesive and in the same measure, in particular when read in the overall context of the application. The deletion of "substantially" (from claims 1 and 9) therefore does not alter the content of disclosure, and therefore does not contravene Article 123(2) EPC.
 - 2.3 2nd Auxiliary Request: the addition of the functional qualification "*thereby permitting non-coplanar distortions of the puzzle without cracking of the glue*" in the final feature of claims 1 and 9 is based on page 8, lines 1-11, read in conjunction with further lines 16-17 and page 9, lines 1-2. This amendment therefore does not contravene Article 123(2) EPC.

2.4 3rd Auxiliary Request: claims 1 and 8 combine the features of originally filed claim 1 with those of its appendent claim 4, and those of claim 9 with those of its appendent claim 13 respectively. These amendments therefore do not contravene Article 123(2) EPC.

2.5 4th Auxiliary Request: claims 1 and 8 are limited to the sole value of 3mm for the predetermined thickness. This sole value is specifically mentioned in originally filed claims 4 and 13, and in the original description, page 6, line 22, and page 8, line 31. These amendments therefore do not contravene Article 123(2) EPC.

3. *Novelty (all requests)*

3.1 D1, see for example at column 4, lines 8 to 59, and figures 3-5, discloses a jigsaw puzzle with each of its interlocking pieces 16a, 16b, 16c, 16d, 26 comprising a main body (or backing) made of memory foam (polyethylene foam as in the present application) on to which an image bearing flexible sheet (in the form of a lithographic sheet) is laminated, i.e. bonded by means of an implicit layer of glue. The joints allow detachable assembly of the pieces to form pictures within two-dimensional jigsaw puzzle elements of a larger self-standing three dimensional structure.

Similar jigsaw puzzles are disclosed in D2 and D3. In D2, see figure 1 and column 2, lines 33 to 59, individual pieces are formed of "a polymeric foam core faced with flexible sheet material such as paper". In one example, the foam is polyethylene foam, as in the present application, and paper is bonded on one side.

As shown in figure 1 and 2, the pieces join to form image bearing two-dimensional puzzle sections 2, which are then connected via rods 6 to form a self-supporting three-dimensional display.

In D3, see figures 5,9 and column 4, lines 23 to 46, pieces are made of a backing 38 of compressible, resilient foam with an additional film layer 40, 42 glued to at least one of its faces. Again, the pieces interlock to form pictures on two-dimensional jigsaw puzzle segments.

3.2 D1, D2 and D3 are each silent as to the particular type of glue used to bond its covering sheet to the underlying foam body, or as to its properties. Thus, the feature, which appears in the independent claims of all the requests, that "*the glue is of a type which remains substantially flexible after setting*" is not explicitly mentioned in any of the above documents.

3.2.1 For the purpose of assessing novelty it is first necessary to construe the proper meaning of in particular the wording "*substantially flexible after setting*", having regard to the particular technical field and the content of the description. In the present instance the skilled person is a specialist in the field of puzzle making and is familiar with lamination and adhesives. In the context of adhesives, flexibility is a well-recognized property of glues, denoting a glue's ability (once set) to bend without breaking, cf. Petrie, Section 10.2, first paragraph (page 343). This property is also implicit in the function of the glue described on page 9, lines 1-2 of

the description, namely that "[it] does not harden so as to prevent cracking".

The qualification by the term "substantially" (a term frequently used in patent claims), which must be read in its normal, recognized sense as meaning: "*in essentials; to all intents and purposes; in the main*" (Oxford English Dictionary), serves to underscore flexibility as the main or essential property in the context of the claimed invention.

Concluding, the Board is satisfied that, contrary to the finding of the Examining Division in its decision, the expression "substantially flexible after setting" represents a limitation which is technically meaningful to the skilled person, and which instructs him or her, when reading the independent claims, to exclude all glues from consideration, which, when set, are non-flexible or brittle, i.e. crack when bent.

- 3.2.2 Having found that the above feature represents a clear limitation, which is not explicitly mentioned in D1, D2 or D3, the Board must decide whether this feature can be directly and unequivocally inferred from the prior art.

In its decision the Examining Division, in reference to the embodiment of D1 of figures 3b, 4b, 6 and 7, see also columns 4 to 6, pertaining to foldable corner pieces 26 respectively 26', argues that the flexible property of the set glue follows from the flexibility of the pieces themselves. These folding pieces have a polyethylene backing with either a V-shaped groove or a die-cut score to the depth of the flexible lithographic

sheet laminated onto the backing (see figures 3b, 4b, 6, 7; columns 4-6) thereby forming hinges. As indicated in column 6, lines 16 to 29, the folding action is "by reason of the nature of the lithographic sheets", that is, by virtue of its flexibility. No mention of the glue or its role is made in this context, and as convincingly argued by the Appellant, the set glue need not be flexible to enable such folding action. Thus, a brittle glue which cracks along the fold line when the piece is folded, or a rigid glue applied in a spot pattern are equally valid ways of realizing D1's teaching. Consequently, flexibility of the pieces, in particular of the folding pieces 26, 26' of D1, does not imply that the set glue need be flexible.

As D1, D2 or D3 include no further information on type of function of the glue - other than its bonding function - the Board concludes that that the feature of its flexibility when set is not directly and unequivocally derivable from these documents.

3.2.3 In conclusion, the subject-matter of the independent claims of all requests is novel over any of D1, D2 or D3 (Article 54 EPC).

4. *Inventive Step*

4.1 Main Request

4.1.1 Closest prior art

The closest prior art for assessing inventive step is normally determined to be a prior art document disclosing subject-matter conceived for the same

purpose or aiming at the same objective as the claimed invention and having the most relevant features in common, i.e. requiring the minimum of structural modifications.

In the present instance the Board considers any of D1, D2 or D3 to disclose the closest prior art. These documents relate to three-dimensional puzzles which form self-standing or self-supporting structures, that is structures which do not collapse, by failure of the interlocking engagement of the puzzle pieces, under their own weight. This is closely related to the present invention's purpose and objective as stated on page 3, lines 29-31, namely preventing detachment of individual pieces, i.e. preventing failure of the engagement of the pieces, when bending a two-dimensional puzzle. Both the prior art and the present invention require a tight, stable fit of the pieces for this purpose, which is achieved in both instances by the use of memory foam of appropriate thickness as backing for a flexible sheet, cf. page 8, 2nd and 3rd paragraphs of the description; column 4, lines 10-16 of D1; and column 2, lines 47-53 of D2. Thus, contrary to the Appellant's arguments, the underlying concerns in the prior art and the present invention, as well as their solutions are closely related. This view finds confirmation in the fact that D2 and D3 are cited as pertinent prior art in the published application, while D1 is almost identical in content to further relevant US-A-6,086,067 also cited in the published application.

4.1.2 The objective technical problem

In the practice developed by the Boards of appeal (see e.g. the Case Law of the Boards of Appeal of the EPO, 4th edition 2001, section I.D.4.3, page 107, and in particular the cited decisions T 246/91 and T 419/93) an objective definition of the technical problem to be solved should normally start from the technical problem that is described in the patent in suit. Only if it turns out that an incorrect state of the art was used to define the technical problem or that the technical problem disclosed has in fact not been solved, can an inquiry be made as to which other technical problem objectively existed (T 246/91, point 4.4 of the reasons). When determining the problem, the statements relating thereto in the application should be examined for correctness with regard to the prior art and for their de facto relevance to the claimed features of the solution. Only if the problem described in the application was not justified by the prior art and/or was not solved in accordance with the features of the invention should it be adapted to the prior art and/or the actual technical success (T 419/93, headnote).

It is thus necessary to consider the factual technical contribution of the features of the claimed solution, individually and in combination, in terms of their technical effect over and above corresponding features of the prior art, drawing primarily on the information included in the application and, in second instance, on that of the prior art, using the skilled person's common general knowledge. In the case at hand, the sole distinguishing feature of claims 1 and 9 with respect to D1, D2 or D3 is the feature that the glue remains

substantially flexible after setting. Page 3, lines 29-31 of the description identifies the associated technical problem as *providing a two-dimensional jigsaw puzzle which is capable of being bent without any of its pieces detaching themselves.*

From page 8, lines 15-20, of the description the Board infers that the above stated problem is in fact solved by a constellation of features, which include, besides that of the type of glue, the use of sufficiently thick memory foam as a backing for a flexible covering sheet. Other passages in the description - page 7, lines 27 to 32, and page 9, 3rd and 4th paragraphs - stress the role of the memory foam and its dimensions in achieving the desired ability of bending of the assembled puzzle. However, these key factors to the solution of the stated problem are already known from D1, D2 or D3, as is also acknowledged by their presence in the preamble of the independent claims. Further consideration of the specific effects and contribution of the sole distinction is therefore necessary. The Appellant has argued that the flexibility of the set glue plays a "vital role", implying that the desired flexibility of the puzzle as a whole would not be achieved without this feature. However, no support for this argument can be found in the original disclosure. The only indication of a technical effect that can be associated with this type of glue appears on page 9, lines 1-3, detailing the only specific example of such a glue and its properties: ". . . glue 7, which does not dry completely, and which does not harden so as to prevent cracking". In conjunction with the preceding first two paragraphs of page 8, this passage is interpreted by the Board as identifying the main effect of flexible

when set glues: these do not crack upon bending, i.e. when the puzzle pieces are bent. This effect is related to the stated problem, but in a subsidiary rather than a causal manner. The Board therefore finds it necessary to reformulate the problem addressed by the present invention, using the above sole effect, as follows: *providing an adhesive bond which does not deteriorate under repeated bending of the joint when the puzzle pieces are bent.*

4.1.3 The skilled person

The skilled person in the present field of puzzle manufacture is regarded to be an engineer or technician who specializes in puzzle manufacture. As a large number of puzzles are fabricated as laminates, he will also be familiar with lamination techniques, pertaining to adhesion of sheet materials. He possesses this knowledge either himself, or, alternatively, acquires it through consultation of the relevant skilled person. Such knowledge includes textbook knowledge of adhesives, e.g. general principles and common concerns in using and selecting glue. The Board recognizes, as argued by the Appellant, that his knowledge may be tailored to the needs in the present field: it will extend only to those glues which may be of interest for puzzle making, based on well known principles and concerns in the field of glues. The Board however finds no evidence to support the Appellant's argument that such glues are limited only to brittle glues.

4.1.4 Known solution to a known problem

A common concern or consideration in glue use is detailed in Petrie, which represents textbook knowledge in the field of lamination. Chapter 11 pertains to critical considerations involved in adhesive selection, which include e.g. the aspect of "joint design" mentioned on page 416. This aspect is discussed in detail in section 11.5 on page 437 onwards. The 2nd paragraph of section 11.5.1, states in particular that "flexible materials, such as rubbers or thin metal, plastic films, etc. are often subject to flexure in service and should not be bonded with rigid, brittle adhesives. A rigid bond may crack and cause a reduction of bond strength." The objective technical problem identified in the present application is thus a well recognized, textbook problem in the field of lamination.

The solution to this textbook problem is detailed in the final paragraph of section 11.5.1: "soft mastic adhesives" should be used, while a number of examples of adhesives are provided, as long as these "can cure to a flexible joint". For the case of the memory foam polyethylene specifically mentioned in D1, D2 and D3 and corresponding to the example mentioned in the present application (see claim 2) table 11.1 on pages 426 to 428 of Petrie suggests, by cross references 11, 29, 30 to further table 11.5 (pages 442 to 443), the use of either epoxy cured with polyamide, polyisobutylene or nitrile as suitable adhesives. The first is described in subsection 10.3.1.2 as a flexible epoxy glue, the latter two, see subsections 10.4.1.7 and 10.4.1.8, as examples of elastomeric resins (heading of section 10.4.1), i.e. non-structural glues

of high flexibility. The use of flexible glues for lamination of polyethylene foam is thus clearly a textbook solution.

Departing from the prior art of any of documents D1, D2 or D3 where the materials to be bonded are polyethylene foam and a flexible sheet, both deformable materials, the skilled person recognizes a textbook problem in adhesives, and will apply in straightforward manner and without using inventive skills the known and recommended textbook solution, thereby arriving at the subject-matter as claimed in claims 1 and 9 without the exercise of inventive skills. Consequently, the subject-matter of these claims lacks inventive step over the prior art, contrary to the requirements of Article 52(1) in combination with Article 56 EPC.

4.2 1st and 2nd Auxiliary Requests

The independent claims of auxiliary requests 1 and 2 are not substantially different in scope with respect to the corresponding independent claims of the main request. The 1st auxiliary request merely removes from the claims the qualification "substantially". The 2nd auxiliary request adds the type of bending to which the puzzle piece is subjected: this addition does not constitute any apparent limitation of the glue used or the puzzle piece itself. As the subject-matter of the independent claims is unchanged, the above reasons also hold for these requests. Thus, the subject-matter of the independent claims of the 1st and 2nd auxiliary requests lack inventive step. These claims thus also fail to meet the requirements of Article 52(1) in combination with Article 56 EPC.

4.3 3rd Auxiliary Request

The claimed range of thickness values, of at least 3mm, which has been added to the independent claims vis-à-vis those of the main request, includes values consistent with common puzzle pieces thickness values. D2, column 2, lines 53-56, e.g. refers to a backing thickness of one quarter inch, i.e. 6-7mm. Consequently, for the reasons given above in section 4.1, the subject-matter of these claims lacks inventive step over the prior art of D1, D2 or D3, and these claims thus also fail to meet the requirements of Article 52(1) in combination with Article 56 EPC.

4.4 4th Auxiliary Request

None of the cited prior art specifically mentions the predetermined thickness value of 3mm, which feature has been added to the independent claims of the main request. However, in the original disclosure no special significance is given to this particular value, nor is an associated advantage or technical effect apparent from the original disclosure considered in the light of the prior art. In particular, it is not apparent from the originally filed application documents, that this specific value is surprisingly lower than customary values, and that this is specifically connected to the use of a flexible set glue, as argued by the Appellant. As this feature cannot be associated with a particular technical effect or technical problem to be solved, the Board cannot take it into consideration when assessing inventive step. Consequently, the independent claims of this request also fail to meet the requirements of

Article 52(1) in combination with Article 56 EPC for the reasons given under section 4.1 above.

4.5 In conclusion, none of the requests are seen to relate to subject-matter which meet all the requirements of the EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

G. Magouliotis

M. Ceyte