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D E C I S I O N
of 14 December 1993

Case Number: T 0340/90 - 3.3.1

Application Number: 84306822.2

Publication Number: 0140603

IPC: C09J 7/02

Language of the proceedings: EN

Title of invention:
Repair system

Applicant:
Illinois Tool Works Inc.

Opponent:
-

Headword:
Repair system/ILLINOIS TOOL WORKS

Relevant legal norms:
EPC Art. 52, 56, 84

Keyword:
"Inventive step (main request - no; auxiliary request - yes)"
"Use of a known means (here: adhesive composition) in a known field of technology (here: repair patch system)"
"Non-obvious mode of application"

Decisions cited:
-

Catchword:
-

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Case Number: T 0340/90 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 14 December 1993

Appellant: Illinois Tool Works Inc.
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Representative: Perry, Robert Edward
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 27 November 1989 refusing European patent application No. 84 306 822.2 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: A. Jahn
Members: P. Krasa
E.M.C. Holtz

Summary of Facts and Submissions

I. On 23 January 1990, the Appellant (Applicant) lodged an appeal against the Examining Division's decision dated 27 November 1989, refusing application No. 84 306 822.2 (publication No. 0 140 603) relating to a repair system and paid the appeal fee on 24 January 1990.

The Examining Division held that the application did not meet the requirements of Article 84 EPC and of Article 56 EPC in view of Document (7) and, *inter alia*, Document (3):

(3) US-A-4 012 553
(7) US-A-3 890 407 (1975).

II. The Appellant, with his Grounds for Appeal, filed on 23 March 1990, submitted two sets of new claims as a main and an auxiliary request. He essentially argued that the Examining Division erroneously objected to a functional feature of the then pending Claim 1 and further submitted that the rejection under Article 56 EPC was based on a wrong assessment of Document (7), which relates to joining together two separate components and not to patch-repairing a single component.

III. The Rapporteur, in an communication dated 16 April 1993, introduced document:

(8) EP-A-0 142 923

as a possible anticipation under Article 54(4) and indicated that the subject-matter of the present patent application could be deemed obvious over documents (3) and (7).

IV. During oral proceedings, which took place on 14 December 1993, and after a discussion of novelty and inventiveness, the Appellant filed two new sets of 12 claims each as a main and an auxiliary request.

Claim 1 of the main request reads:

"A method for repairing a workpiece, comprising applying to the workpiece a porous, flexible, fibrous substrate impregnated with an adhesive for bonding the substrate to the workpiece, wherein the adhesive is acrylate-based and comprises a sulphur-bearing composition selected from chlorosulphonated polyethylene and a mixture of sulphonyl chloride with chlorinated polyethylene and curing the adhesive by applying an activator by brushing or spraying, either to the surface of the impregnated substrate after applying the substrate, or to the surface of the workpiece before applying the substrate, wherein the cured adhesive in the resultant patch has an impact strength of 0.32 to 1.6 J/mm (6 to 30 ft lb/in)."

Claim 1 of the auxiliary request differs from that of the main request by deletion of the word "either" and of the passage "or to the surface of the workpiece before applying the substrate,". In other words, the method according to Claim 1 of the auxiliary request is restricted to the first of the two alternatives of the activator application given in Claim 1 of the main request.

V. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of Claims 1 to 12 (main request) or 1 to 12 (auxiliary request), both as submitted in the oral proceedings.

At the end of the oral proceedings the Chairman announced the Board's decision to allow the auxiliary request.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The new Claims 1 of both requests are supported by the originally filed application documents. They result basically from a combination of original Claims 1 and 13 (defining the adhesive as acrylate based and its impact strength after curing and relating to the repair method), supplemented by features originally disclosed on page 5, lines 5 and 28 to 32 (porous, flexible and fibrous substrate); page 6, lines 5 to 7 (the substrate is impregnated with the adhesive; it is clear from the preceding discussion [page 5 line 33 to page 6, line 3] that the term "resin" in this context stands for adhesive and that the "fibreglass cloth" referred to exemplifies the substrate); page 5, lines 7 to 11 (defining the sulphur-bearing component); page 12, lines 4 to 7 (Example 1) and Claim 16 (application of the activator by brushing or by spraying); page 4, lines 24 to 25 (application of the activator to the impregnated substrate after its application); page 4, lines 22 to 24 (application of the activator to the workpiece before the substrate is supplied - only relevant for Claim 1 of the main request).

2.2 The dependent Claims 2 and 3 of both requests are supported by original Claim 4, and the dependent Claims 4 to 12 of both requests correspond to original Claims 5 to 6, 8 to 12, 14, and 16. Most of the amendments are of an editorial nature only, caused by the revision of the respective Claims 1. Only the following amendments require comment: The "metallic fibre structures" of Claims 2 are supported by original

page 5 lines 31 to 32, and Claim 12 is supported by the Examples 2 to 9 and 11 to 12.

Thus, all the claims of the main and of the auxiliary request comply with the requirements of Article 123(2) EPC.

3. *Clarity*

The Examining Division, in its decision, objected to the then pending claim as "... the characterizing portion of Claim 1 was formed of a result to be achieved". While there was no characterizing portion in that claim, which was not drafted in the two-part-form, it seems that this objection referred to the impact strength of the cured patch. This is still a technical feature of Claim 1 according to the main and the auxiliary request. This functionally defined technical feature having now been supplemented by the two newly incorporated structural features (acrylate based and sulphur-bearing) the objection of lack of clarity is no longer justified.

4. *The Technical Problem and the Solution*

4.1 The present application is concerned with a method of repairing surface defects of fibreglass, sheet metal or plastic structures (page 1, lines 1 to 6). Such methods, which apply patches impregnated with epoxy or polyester/styrene adhesive compositions to a defective surface, were already known in the state of the art (see page 1, lines 7 to 16) for which citation (3) is considered representative. These known methods have several drawbacks. Either they require accurate mix ratios of adhesive and hardener and prolonged periods of time for curing, resulting in composites with poor impact resistance (present application, page 1, line 1

to page 2, line 5), or the application of actinic radiation for curing (Document (3), Claim 1, column 6).

4.2 Thus, in view of Document (3), which the Board takes as the starting point for evaluation of inventive step, the technical problem to be solved can be defined as finding a repair method for defective surfaces by applying adhesive impregnated patches, which method does not require the use of actinic radiation and overcomes the other above mentioned shortcomings of the state of the art.

4.3 The present application suggests, as the solution of this problem, a method having the features of new Claim 1, either of the main request or of the auxiliary request. In view of the Examples 1 to 9 and 11 to 12, the Board, on the balance of probabilities, accepts that the above problem is plausibly solved. This holds also for the first of the two alternatives given in Claim 1 of the main request for applying the activator (the only method according to the auxiliary request). In achieving a fast curing and a high impact strength of the resulting composite both alternatives were put on the same footing (page 4, lines 3 to 25). According to original Claim 15, it was a feature of a preferred embodiment of the repairing method claimed in original Claim 13, to apply the activator after application of the impregnated substrate to the workpiece. Thus, the Board has, at present, no reason to doubt that this alternative also solves the above defined technical problem.

5. *Novelty*

5.1 According to page 5, lines 14 to 19 of the application in suit, Document (8), which is state of the art according to Article 54(3) EPC, discloses adhesive

compositions comprising an acrylate-based ester monomer and a chlorosulphonated polyethylene polymer, which are particularly preferred in the present patent application. Furthermore, Document (8) discloses a piece of fibreglass cloth wetted on both sides with such an adhesive composition for use as a repair product (page 56, lines 16 to 19, in combination with page 7, lines 5 to 13). The only information of how the activator is applied can be found on page 22, line 23 to page 23, line 1, where it is stated that plastic coupons were coated with the activator prior to the application of the adhesive.

5.2 The Board has severe doubts that there are other technically feasible modes of "coating" available to the skilled person than by "brushing or spraying" the activator to the respective surface as now claimed and that this feature really distinguishes the method according to Claim 1 of the main request from the technical teaching of Document (8). However, having no proof at hand that the skilled person with his common general knowledge would indeed understand the term coating in the present context only as brushing or spraying - which was contested by the Appellant - and as the main request fails for other reasons, it is not necessary to decide the issue of its novelty.

5.3 The mode of activator application according to the auxiliary request differs from that of citation (8) insofar as the activator is applied only after bringing the workpiece in contact with the adhesive. Therefore, the subject-matter of Claim 1 of the auxiliary request is novel.

6. *Inventive Step*

It remains to be decided whether the suggested solution is inventive.

6.1 Main Request

As already stated, repairing defective surfaces by applying adhesive impregnated patches was a known technology suffering, however, from various drawbacks due to the adhesive used (see point 3.1 above).

6.1.1 Document (7) discloses an adhesive, which can be applied together with a primer. The adhesive comprises a polymerisable vinyl monomer, which may be an acrylic monomer such as, *inter alia*, methyl methacrylate, and a sulphur bearing composition selected from chloro-sulphhonated polyethylene and a mixture of sulphonyl chloride with chlorinated polyethylene (column 1, lines 45 to 53, in combination with column 2, lines 19 to 38). Thus, the adhesive conforms to the definition of present Claim (1), as does the primer, which, as an accelerator, is an aldehyde-amine condensation product, and is applied to one or both surfaces which are to be joined together (column 4, lines 43 to 48, in combination with column 2, lines 11 to 16). Thus, by using this adhesive neither accurate mix ratios nor the application of actinic radiation are required. Furthermore, Document (7) discloses that the setting times for the said primer system to give bonds of high load strength were short and in the range of 0.5 to 5 minutes (column 4, lines 54 to 61). Therefore, in the Board's judgment, it was obvious to the skilled person for these reasons to replace the adhesives used according to the state of the art for patch repair purposes by the primer system disclosed in Document (7).

6.1.2 The possibility of applying the primer only to one of the surfaces to be joined together as disclosed in Document (7) (column 4, lines 43 to 44) parallels the second alternative given in present Claim 1 for applying the activator. As brushing or spraying are those operations which would immediately occur to the skilled person if he were to put the technical teaching of Document (7) into practice, the Board holds that this feature cannot render present Claim (1) inventive.

6.1.3 High impact strength was to be expected by the skilled person for the hardened patch, as Document (7) already promised a strong bond of the quickly curing adhesive (column 4, lines 7 to 9). The range of impact strength recited in Claim 1 is a simple and necessary consequence of using the adhesive known from Document (7) as the Appellant conceded in the course of the oral proceedings (see also page 9, second paragraph of the present application), and would have been immediately obvious to the skilled person as soon as he availed himself of the adhesive composition of citation (7) for the reasons given. Therefore, the feature "impact strength" cannot contribute to inventiveness either.

6.1.4 The Appellant put great emphasis on the fact that, according to Document (7), two workpieces were joined together while, according to his submission, there is only one workpiece in the present application onto which a patch is applied. Therefore, so it was argued, the teachings of documents (3) and (7) should not be combined.

This argument is not convincing. It has to be expected of a person skilled in the art of repair systems that he possesses knowledge in the field of adhesives. This includes the knowledge that the bonding strength of the parts to be bonded is predominantly and decisively

governed by the adhesive itself. Document (7) teaches that almost any material, including those with a porous surface, can be bonded by the adhesives disclosed there (column 5, lines 15 to 33), which are the same as those applied according to the present application. For the skilled person, such knowledge would have been a hint to adopt the claimed method, when he was searching for an alternative method for repairing workpieces achieving particularly high impact strength.

6.1.5 Furthermore, the Appellant submitted that pressure has to be applied to the two workpieces according to Document (7) so that the accelerator intimately contacts the adhesive and is pressed into the latter to achieve the desired bond. As, in contrast, no pressure has to be applied according to the present application, it would have been surprising if, nevertheless, thorough curing could be obtained.

It is true that pressure is applied in Examples 2, 14 and 17 to 19 of citation (7), which relate to the primer system. As, however, pressure is also applied in all the other Examples 1, 3 to 13, 15, and 16, where a pre-prepared intimate mixture of the adhesive with the activator is applied, the Appellant's conclusion is not sound that the pressure was required to achieve a proper mixing of these two components of the primer system. In the Board's opinion, the pressure serves to fill reliably the small interstice between the two test strips with the adhesive mixture. But even if the skilled person might have had some doubts that the adhesives disclosed in citation (7) would give the promised results in the absence of pressure, he, as a practitioner, would have established by simple routine experimentation whether or not such doubts were justified.

6.1.6 For these reasons the main request cannot be allowed as the subject-matter of its Claim 1 is not inventive.

6.2 *Auxiliary Request*

Claim 1 of the auxiliary request is restricted to brushing or spraying the activator on the surface of the impregnated patch after it has been applied to the workpiece. This mode of application of the activator is nowhere foreshadowed in the state of the art let alone its usefulness as a solution to the existing technical problem.

Therefore, the Board concludes that the subject-matter of Claim 1 of the auxiliary request is inventive. Claims 2 to 12, which relate to preferred embodiments of the method claimed in Claim 1, derive their patentability from that of Claim 1 and are likewise allowable.

7. The application is not yet ready for grant as it still requires adaptation to the claims of the auxiliary request. In the course of oral proceedings, the Appellant's representative indicated in particular his willingness to delete the following sentences from the description:

"The techniques ... original equipment." (page 1, lines 5 to 6);

"However ... required." (page 7, line 21 to page 8, line 3);

"Further, ... per sq. inch." (page 9, lines 18 to 21).

Such amendments will have to be taken into consideration when adapting the description to the claims according to the auxiliary request.

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 grant a patent with Claims 1 to 12 in accordance with the auxiliary request, and a description to be adapted thereto.

The Registrar: The Chairman:

E. Görgmaier A. Jahn