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Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 059 567

Bezeichnung der Erfindung: Method to measure yarn tension
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : B65H 59/40, G01L 5/10, G01H 13/00

ENTSCHEIDUNG / DECISION

vom / of / du 17 September 1987

Anmelder / Applicant / Demandeur : Milliken Research Corporation

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56

Kennwort / Keyword / Mot clé : Inventive step (no) - obvious transfer - time-argument - long-felt need not proved

Leitsatz / Headnote / Sommaire

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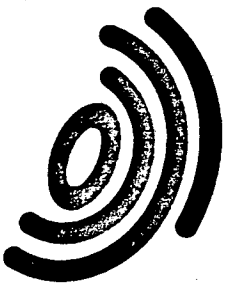

Case Number : T 395/86

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 17 September 1987

Appellant : Milliken Research Corporation
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Representative : Pacitti, Pierpaolo A.M.E.
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Decision under appeal : **Decision of Examining Division 84 of the European Patent Office dated 16 June 1986 refusing European patent application No 82 300 868.5 pursuant to Article 97(1) EPC**

Composition of the Board :

Chairman : P. Delbecque
Members : F. Gumbel
G. Paterson

Summary of Facts and Submissions

I. European patent application No 82 300 868.5, filed on 22 February 1982 and published on 8 September 1982 under publication number 0 059 567, was refused by a decision of the Examining Division of the European Patent Office dated 16 June 1986.

II. The decision was based on Claims 1 to 6 filed on 22 June 1984. It cites the documents DE-A-2 257 510, DE-A-2 553 859 and US-A-3 394 587. It comes to the conclusion that independent Claims 1 and 2 are not clear as required by Article 84 EPC and also offend against Article 123(2) EPC, and that the subject-matter of those claims does not involve an inventive step having regard to the documents mentioned above.

III. A notice of appeal against this decision was filed on 15 August 1986 by telex, and was confirmed by a letter received on 22 August 1986. The appeal fee was paid on 18 August 1986 and the Statement of Grounds was filed on 16 October 1986. The Appellants argue in this Statement that Claims 1 and 2 are clear and fairly based on the contents of the application as originally filed. They further contend that the subject-matter of those claims involves an inventive step. Subsidiarily, they request some amendments to Claims 1 and 2.

IV. In a communication of the Board of Appeal dated 20 March 1987, some objections against Claims 1 and 2 concerning Rule 29(1)(a) and Article 123(2) EPC were raised, and it was stated that Claims 1 and 2, both according to the main request and including the subsidiarily requested amendments, appear to involve no inventive subject-matter. Moreover, the document DE-A-2 619 998 was cited with

respect to the false twisting technique set out in the preamble of Claims 1 and 2.

V. In response to this communication the Appellants submitted new Claims 1 to 6 and some amendments to the description on 19 May 1987. In accompanying observations they submit that the subject-matter of new Claims 1 and 2 is not merely novel over the available prior art but also involves an inventive step, in the absence of any suggestion of combining the separately known vibration phenomenon and false twisting apparatus. They argue in particular that the person skilled in the art would not transfer a method of measuring the tension in a moving web to tension measurement with a thread or yarn in a false twisting machine due to existing differences in operating speeds and weights per length unit of the materials to be treated.

VI. Although there is no express statement in the Appellants' response, it is apparent by implication that the Appellants now request that the decision of the Examining Division be set aside and that a patent be granted on the basis of newly filed Claims 1 to 6, the description as amended and the original drawing.

VII. Consequently, independent Claims 1 and 2 now requested read as follows:

1. Method of manufacturing a false twisted continuous filament yarn comprising the steps of:-

supplying a running length of continuous filament yarn (19) from a yarn supply (20),

passing the yarn (19) in succession through a primary heater (24), a false twisting device (22), and a secondary heater (32), and

taking up the false twisted yarn (19) on a yarn take-up (30),

characterised in that

tension in the yarn (19) passing through the false twisting device (22) is measured by subjecting the yarn (19) before its passage through the false twisting device (22) to impingement by a jet of pressurised air (46) thereby to induce vibration of the yarn (19) at its fundamental frequency in a manner known per se, and measuring (48) the resultant vibrations of the yarn (19) to produce a control signal which is applied to control the tension of the yarn (19) during its passage through the false twisting device (22).

2. Apparatus to provide a false twisted continuous filament yarn comprising:-

a yarn supply (20),
a primary heater (24),
a false twisting heater (22),
a secondary heater (32), and
a yarn take-up (30),
characterised by
a yarn tension measuring device (10) located before the false twisting device (22), said tension measuring device (10) including an air jet (46) located to subject the yarn (19) to impingement by a jet of pressurised air thereby to induce vibration of the yarn (19) at its fundamental frequency in a manner known per se, said tension measuring device (10) also including a U-shaped detector (48) through

which the vibrating yarn (19) runs to have its vibrational frequency detected as a measure of the tension in the yarn (19) during its passage through the false twisting device (22).

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. Concerning the formal admissibility of Claims 1 and 2, it is observed that new Claims 1 and 2 are correctly divided into a preamble and a characterising part having regard to the prior art reflected by DE-A-2 619 998, and that they no longer contain the feature objected to under Article 123(2) EPC, that the yarn is vibrated "longitudinally". Since, in addition, the expression "fundamental frequency" used in new Claims 1 and 2 is synonymous with "first natural frequency" disclosed on page 4 of the original description, those claims are, in the Board's view, no longer open to formal objections either under Articles 84 or 123(2) EPC or under Rule 29 EPC.

3. As already stated in the official communication, the subject-matter of Claims 1 and 2 is clearly novel over the available prior art. There is no document disclosing a false twisting method or apparatus according to the preamble of Claims 1 and 2 in combination with a method or device for measuring the tension of the yarn by impingement by pressurised air, measuring the frequency of the vibrating yarn and producing a control signal responsive to this measurement. Since novelty has never been disputed, no detailed substantiation of this matter is required.

4. The examination of the question whether the subject-matter of Claims 1 and 2 involves an inventive step results in the following observations:

4.1 A method and an apparatus comprising the features indicated in the preamble of Claims 1 and 2, respectively, are known from DE-A-2 619 998. This document, however, does not reveal any means for measuring the tension in the yarn or thread running through the false twisting device. On the other hand, it is known with false twisting machines in general to measure the tension in the yarn passing through the device by deflecting the yarn and measuring the force which is necessary to achieve a certain deflection. Hence, this known measurement requires physical touching of the yarn, which may be detrimental, at least to delicate material.

4.2 Starting from a false twisting method and apparatus as indicated in the preamble of Claims 1 and 2, respectively, and as known from DE-A-2 610 998, the problem to be solved is that of measuring the tension and/or variations of the tension of a yarn running continuously through a false twisting apparatus, without physically touching the yarn.

4.3 The mere posing of this problem apparently did not require an inventive step, since it results immediately from difficulties encountered in practice with conventional measuring methods which involve the physical touching of the running yarn.

4.4 Hence, it remains to be examined whether the solution specified in the characterising clauses of Claims 1 and 2 involves an inventive step having regard to the available prior art.

4.5 From DE-A-2 257 510 it is known to measure the tension in a moving web, which may be textile, by subjecting the web, as it runs continuously over rolls, to impingement by a jet of pressurised air, thereby inducing the vibration of the web at its fundamental frequency. This frequency is measured and a control signal is applied to control the tension of the web during its passage through a machine (see Figure 4 and page 9, last paragraph, together with pages 1 and 2 and Claims 9, 11 and 12).

4.6 The man skilled in the art of textile engineering, and especially the man working in the field of treating textile material continuously running through machines, with which DE-A-2 257 751 is concerned, will immediately recognise that by the tension measuring means disclosed in DE-A-2 257 751, physical touching of the textile material to be treated is avoided. Since this is exactly what is aimed at according to the problem underlying the invention as claimed, the skilled man would certainly take this known technique into consideration. He would, moreover, learn from this document that the relationship between the tension of the web and its frequency of vibration as expressed in the formula on page 1 of DE-A-2 257 751 is not restricted to webs but, on the contrary, is also related to strings or the like. Hence, in the Board's view, he would be expected to try to make use of this known technique of tension measurement in order to achieve the same advantages. By doing so, he would directly arrive at the method as claimed in Claim 1 and -with the exception of the application of a U-shaped detector - at the apparatus specified in Claim 2.

4.7 For the reasons set out above the Board comes to the conclusion that the method specified in Claim 1 would be derived in an obvious manner from the available prior art.

Furthermore, since the use of a U-shaped detector is of a merely constructional nature not exceeding the design abilities of the skilled man, as has been pointed out in the Board's communication and was not disputed by the Appellants - the same conclusion applies to the apparatus according to Claim 2.

4.8 The arguments set forth by the Appellants to support their opinion according to which the subject-matter of Claims 1 and 2 is not merely novel but also involves an inventive step, are not convincing.

4.9 As has been shown under points 4.5 and 4.6 above there was, contrary to the Appellants' view, a direct lead to combine the teachings of the document DE-A-2 257 510 with a method or apparatus for manufacturing false twisted yarns, because of the similarity of the problems to be solved and the direct applicability of the same theoretical relationship which forms the basis of the known measuring method.

4.10 Although there may be considerable differences in the operation speeds and concerning the weights per length unit of the material to be treated between machines processing webs and false twisting machines, this cannot be considered as constituting an impediment to the skilled man which would prevent him from even making an attempt to transfer the known measuring method to false twisting machines. Nowhere in DE-A-2 257 510 is there a statement delimiting the measuring method disclosed therein to a specific range of operation speeds or to the weight of the material to be treated. The formula indicated on page 1 of that document, which constitutes the theoretical basis of this method, also does not comprise any parameter referring to the operation speed, and apparently is considered to be valid for any practicable value of the parameter "m" (mass per unit length).

4.11 The Appellants further argue that the mere fact that there has been no previous practical application of the said contactless tension measuring method with false twisting machines, although the phenomenon of air-flow-induced vibration of wires under tension has been known for an extremely long time, would demonstrate the existence of an inventive step. This view cannot be accepted by the Board.

The Appellants failed in this respect to furnish evidence of a long-felt need for this solution in the field of manufacturing false twisted yarns, which need could not be fulfilled in spite of continuous attempts by practitioners for a long time. Moreover, the knowledge about the existence of this phenomenon as such was not sufficient to give a decisive hint as to how one could make use of it in a technically feasible way for measuring the tension in a running string or the like. It was only after the knowledge of the disclosure of DE-A-2 257 510, which was published relatively shortly before the priority date of the present application, that such a hint existed.

4.12 From the foregoing it follows that the subject-matter of Claims 1 and 2 is lacking in inventive step, and, consequently, those claims are not allowable (Articles 56 and 52(1) EPC).

5. Since dependent claims can only be allowed if there is an allowable independent claim to which they are appended, and since this precondition is not given in the present case, Claims 3 to 6 are also not allowable. Furthermore, it is to be noted that the Board must decide on a request as a whole.

Order

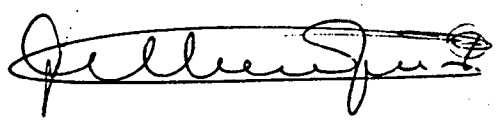
For these reasons, it is decided that:

The appeal is dismissed.

The Registrar

F. Klein

The Chairman



P. Delbecque