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**D E C I S I O N**  
**of 14 March 1997**

**Case Number:** T 1018/93 - 3.2.5

**Application Number:** 83302408.6

**Publication Number:** 0093585

**IPC:** D04H 1/72

**Language of the proceedings:** EN

**Title of invention:**

Process and apparatus for producing uniform fibrous web at high rate of speed

**Patentee:**

CHICOPEE

**Opponent:**

Firma Carl Freudenberg  
Mölnlycke AB

**Headword:**

Highly uniform web of fibers/CHICOPEE

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Main request: inventive step (yes)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 1018/93 - 3.2.5

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.5  
of 14 March 1997

**Appellant:**  
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**Decision under appeal:**                  Decision of the Opposition Division of the  
   European Patent Office posted 9 November 1993  
   rejecting the opposition filed against European  
   patent No. 0 093 585 pursuant to Article 102(2)  
   EPC.

**Composition of the Board:**

**Chairman:**     C. O. J. Gall  
**Members:**     C. G. F. Biggio  
                           W. D. Weiß

## Summary of Facts and Submissions

I. The opponent I (appellant) filed an appeal against the decision of the opposition division of 9 November 1993, by which its opposition and that of opponent II (party to appeal proceedings as of right); both concerning European patent No. 0 093 585 and based on Article 100(a) EPC in conjunction with Article 56 EPC (lack of inventive step), had been rejected, and requested that the decision under appeal be set aside and the patent revoked in its entirety.

The appellant requested the decision under appeal be set aside and the patent revoked.

The party as of right (opponent II) did not participate in the oral proceedings.

II. The proprietor (respondent) requested as its main request the appeal to be dismissed.

III. The independent claims 1, 2 and 6 of the patent at issue read as follows:

"1. A process for producing a highly uniform web of fibers at high rates of speed, said method comprising the steps of:

- (1) feeding an array of fibers to a rotating toothed roll adapted for opening fibers, to open the fibers;
- (2) feeding the opened fibers from said rotating toothed roll to the surface of a rotating toothed cylinder at a first position;

- (3) carrying the fibers around the periphery of said cylinder from said first position to a second position spaced a predetermined distance around said periphery from said first position, wherein during at least a portion of said predetermined distance said fibers are brought into operative contact with combing means to individualize said fibers;
- (4) substantially uniformly dispersing the individualized fibers from the rotating toothed cylinder at said second position into an air stream that is flowing past the periphery of the rotating cylinder at said second position, said air stream being characterized by:
  - (a) a velocity at said second position that is sufficient to maintain a substantially uniform dispersion of the fibers in the air stream;
  - (b) being substantially tangential to the periphery of said cylinder at said second position; and
  - (c) being concurrent with the direction of rotation of said cylinder at said second position;
- (5) carrying the dispersed fibers in said air stream under tension until the fibers contact moving foraminous condensing means; and
- (6) allowing the air to pass through said condensing means while collecting the fibers on said condensing means in the form of a web of fibers.

2. A process for producing a highly uniform web of fibers at high rates of speed, said method comprising the steps of:

- (1) feeding an array of fibers to a rotating toothed roll adapted for opening fibers to open the fibers;
- (2) feeding the opened fibers from said rotating toothed roll to the surface of a rotating toothed cylinder at a first position;
- (3) carrying the fibers around the periphery of said cylinder from said first position to a second position spaced a predetermined distance around said periphery from said first position, wherein during at least a portion of said predetermined distance said fibers are brought into operative contact with combing means to individualize said fibers;
- (4) substantially uniformly dispersing the individualized fibers from the rotating toothed cylinder at said second position into an air stream that is flowing past the periphery of the rotating cylinder at said second position with a velocity greater than the peripheral speed of the rotating toothed cylinder, said air stream being characterized by:
  - (a) a velocity at said second position that is sufficient to maintain a substantially uniform dispersion of the fibers in the air stream;
  - (b) being substantially tangential to the periphery of said cylinder at said second position; and
  - (c) being concurrent with the direction of rotation of said cylinder at said second position;

- (5) carrying the dispersed fibers in said air stream until the fibers contact moving foraminous condensing means; and
  - (6) allowing the air to pass through said condensing means while collecting the fibers on said condensing means in the form of a web of fibers.
6. An apparatus for producing a highly uniform web of fibers at high rates of speed, said apparatus comprising, in combination:

(a) a rotatably mounted cylinder having a toothed peripheral surface and first and second positions on said surface separated by an arc;

(b) means for rotating said cylinder in a predetermined direction from said first to said second position at a predetermined rotational velocity;

(c) combing means in proximity to said peripheral surface along at least a portion of said arc;

(d) feed means including a rotatably mounted toothed roll adapted for opening fibers, for feeding opened fibers to said peripheral surface at said first position;

said cylinder and said combing means being arranged and constructed so that when said opened fibers are fed to the peripheral surface of said cylinder at said first position, and said cylinder is rotated in said predetermined direction such

that said fibers are carried on said peripheral surface from said first position past said combing means, the combing means and said toothed peripheral surface cooperate to individualize said fibers;

(e) air flow means for generating and directing a flow of air substantially tangentially to the peripheral surface of said cylinder at said second position on said peripheral surface, said flow of air being substantially concurrent with said predetermined direction at said second position, and the velocity of said flow of air being sufficient to maintain a substantially uniform dispersion of the fibers under tension in said flow of air;

said air flow means and said cylinder being arranged and constructed such that said fibers are dispersed in said flow of air at said second position;

(f) moving fiber condensing means located in said flow of air downstream from said second position;

whereby a web of fibers is produced on said fiber condensing means."

- IV. During oral proceedings which were held on 14 March 1997, the issue of inventive step was discussed on the basis of the following documents which were cited by the appellant and the party as of right:

D1: US-A-3 797 074  
D3: GB-B-1 384 246  
D4: US-A-3 373 461  
D6: US-A-3 256 569  
D7: Chemiefasern/Textil-Industrie 24/76, S. 209 - 216  
D8: US-A-4 097 965  
D18: US-A-4 130 915

V. At oral proceedings, the respondent agreed with the conclusion presented by the Board, in its communication accompanying the summons to oral proceedings, that the two independent method claims 1 and 2 had to be taken as two attempts to express the same technical subject-matter with different words and that this interpretation implied that an objection affecting novelty or inventive step of one of these two claims necessarily did the same to the other.

VI. The appellant made the following submissions:

The appealed decision was based on the problem indicated in the description, i.e. to provide a process and an apparatus that can produce very light webs, of excellent uniformity at extremely high rates of speed. Document D18 however, does also indicate weights as well as high production speeds. This document related to a further development of D8, which was, relating to the claimed device, not treated in the decision. The closest prior art as to the process was considered to be described in D1, in comparison with which the principal difference of the claimed invention lied in the use of a rotating toothed roll preceding the rotating cylinder, to open the fibres. The skilled man knew (also from document D7) that the amount of opening the fibres was important for the throughput rate. Apart from the fact that the claims were unclear in relation to the exact location of the toothed roll, such a roll was known also from document D4.

The throughput data were not contained in the independent claims 1, 2 and 6. From documents D1 and D7 it was known to the skilled person to fix given targets. Therefore the existence of inventive step had to be denied.

VII. The respondent made the following submissions:

The invention allowed to achieve very high throughput rates as well as a better quality of the produced web with the same throughput as achieved by prior art processes. The documents cited by the two opponents related on one hand to devices for opening fibres, and on the other hand, to the use of relatively high velocity air streams to doff fibres from the surface of a toothed cylinder. Document D7 did not give any hint how to achieve rates of throughput which were some three times higher than those of the known equipment. The further cited document D1 did not disclose the features of the independent claims 1, 2 and 6, since the known feed rolls did not serve to open the fibre batt, but to compress it. Also a combination of documents D1 and D4, as alleged by the Appellant in its opposition, did not lead to the invention, because D4 did not suggest that greatly improved rates of throughput could be obtained by combining the features claimed in the opposed patent. In the statement of grounds, the Appellant cited a new document, D18. This was less relevant than it was document D8, since the feed rolls 14 and 16 of D18 do not serve to open the fibres. Further, D18 did not disclose an air stream having a velocity greater than the peripheral speed of the toothed cylinder. The appellant was wrong in saying that the claims should have included features relating to the improved throughput figures, and that the achievement of these values had not been specified. The two possible results of the invention (higher throughput with conventional quality of the webs, or

the same throughput with a better quality achieved) were described in the description, where also the fact of the achievement of the of a higher throughput was stated. There was no proof that according to document D1 such rates had been obtained.

### Reasons for the Decision

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

2. *Novelty*

The novelty of the claimed subject-matter is not disputed.

3. *Problem and solution*

3.1 Document D1 is preferred to document D18, relied upon by the appellant in this respect, to represent the closest prior art, because the principle of the doffing function disclosed therein comprises the same features as those defined in the independent claims of the patent in suit. The open release zone disclosed in document D18, and in document D8, respectively, function in quite a different manner.

3.2 The subject-matter of the independent claims differs from the process and apparatus disclosed in the closest prior art in that it comprises a rotating toothed roll adapted for opening the fibres and in that the fibres are in operative contact with combing means, when carried around the periphery of the toothed cylinder from a first position to a second position.

3.3 The problem to be solved, when starting from the closest prior art, consists in intensifying the individualization of the fibres and improving the uniformity the final web produced.

3.4 This problem is solved by the differentiating features defined above.

4. *Inventive Step*

4.1 Among all the documents cited, only document D3 discloses a carding process and apparatus comprising the measures of opening of the fibres by a rotating toothed feeding roll and of individualising the fibres by bringing them into operative contact with combing means. Although appearing seductive at a first glance, the idea of transferring these two features disclosed in document D3 to the teaching of document D1 and thus arriving at the subject-matter of the patent in suit does not stand up to a thorough examination but turns out to be ruled by inadmissible hindsight. According to document D1 (see e.g. column 3, lines 48 to 54; column 4, lines 8 to 20; column 8, lines 51 to 58), the disperser plate and the disperser roll have to be designed to closely cooperate with the subsequent doffing conduit and to create a flow of a thin fibre stream in an air stream of uniform velocity and low turbulence. A clearance of less than 0.125 inch, preferably between 0.01 and 0.03 inch, between the face of the disperser plate and the teeth of the disperser plate is considered to be essential to achieve this goal.

4.2 Consequently, there is simply no space, in the apparatus according to document D1, to arrange a combing means at the face of the disperser roll and

this would mean to modify the principle of the technical solution there presented, if it were nevertheless done. Also document D3 does not deliver any technical motivation which would justify such an action.

- 4.3 The same arguments apply to the other documents discussed in the course of the appeal proceedings.

D4 relates to carding textile fibers, to improve the uniform distribution of long and short fibers in the web, as well as to reduce waste material during carding. However, there is no hint to individualize the fibers by combing means.

D6 in that respect only shows the depositing of fibrous materials as a web on the surface of a perforate condensing cylinder surface.

D7 relates to used systems of aerodynamic forming of a fibrous web. However, the quality of such webs depends principally on the degree of opening of the fibers in the starting material. This document mentions that the opening capacity of conventional systems using a feed roll and a disperser roll, is limited. Therefore the starting material should comprise pre-opened fibers, or additional devices for the opening of the fibers should be foreseen.

D8 describes a method and an apparatus for forming a fibrous structure where the fibers are individualized in a working section. However, no pre-opening step for the fibers is described.

5. Hence, the contested invention is neither known nor suggested by the considered prior art. It therefore meets the requirements of Article 52(1) in conjunction with Articles 54(1) and 56(1) EPC.

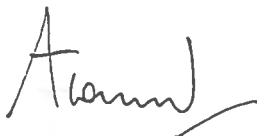
6. The auxiliary request needs therefore not be considered.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:



A. Townend



The Chairman:

  
G. Gall

Glaubig/Certified  
certifiée conforme:  
München/Munich

Geschäftsstelle  
Registry/Greffe  
3 1. JULI 1997



W. D. W.

