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Bezeichnung der Erfindung: Apparatus for screening paper fiber stock
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : D21D 5/16, D21D 5/02

ENTSCHEIDUNG / DECISION
vom / of / du 30 May 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet : The Black Clawson Company

Einsprechender / Opponent / Opposant : Hermann Finckh Maschinenfabrik GmbH & Co.

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Art. 56

Schlagwort / Keyword / Mot clé : "Inventive step (yes)"

Leitsatz / Headnote / Sommaire

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Case Number : T 31/88 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 30 May 1990

Appellant : (Opponent)
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Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 24 November 1987 rejecting the opposition filed against European patent No. 0 042 742 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : G. Szabo
Members : P. Dropmann
O. Bossung

Summary of Facts and Submissions

I. European patent No. 0 042 742 comprising nine claims was granted on 25 September 1985 on the basis of European patent application No. 81 302 773.7 filed on 19 June 1981.

II. Claim 1, the only independent claim, is worded as follows:

"Screening apparatus for paper making stock comprising, a pressure housing (10), a stationary cylindrical screening member (15) dividing the interior of said housing into an inlet chamber (12) and an accepts chamber (17) and having multiple screening perforations (40,54-55) therethrough, and a rotor (30) mounted for rotation in said inlet chamber and including vane means (35) arranged and adapted, in operation, upon rotation of the rotor (30), to sweep around the cylindrical surface (41,51) of the screening member (15) in the stock in the inlet chamber (12) to establish a differential between the flow of stock around said cylindrical surface (41,51) past the perforations (40,54-55) and the rate of flow through those perforations, and simultaneously to generate alternating positive and negative pressure waves in the stock at the inlet ends of the perforations, the positive pressure waves urging the stock through the perforations towards the accepts chamber (17) and the negative pressure waves sucking back from the perforations material in the stock in the inlet chamber (12) too large to pass through the perforations, thereby to prevent plugging of said perforations, characterized by the fact that said perforations are of greater flow area on the surface (41,51) of said screening member facing said inlet chamber than on the accepts side (42,52) of said screening member."

III. The patent was opposed on the grounds of lack of novelty and inventive step in the light of the prior art disclosed in the documents US-A-3 849 302 (Seifert), US-A-3 581 903 (Holz I), SE-A-7 211 272 and its corresponding Canadian patent CA-A-972 322, DE-A-2 750 499 (Holz II) and DE-U-1 820 653. During the opposition procedure, the Opponent also argued that the subject-matter of Claim 1 was not an invention but a mere discovery and that the European patent did not disclose the invention in a manner sufficiently complete for it to be carried out by a person skilled in the art.

IV. The Opposition Division rejected the opposition in a decision dated 24 November 1987. It was stated that the subject-matter of Claim 1 was novel and involved an inventive step. It was further established that the subject-matter was not to be regarded as a discovery and that the disclosure in the patent was sufficient.

V. The Appellant (Opponent) lodged an appeal against this decision on 12 January 1988, paying the appeal fee at the same time. In the Statement of Grounds filed on 24 March 1988, the Appellant argued that the subject-matter of Claim 1 as granted did not involve an inventive step in view of the document US-A-3 849 302 (Seifert), which had been used to formulate the preamble of Claim 1, in combination with either of the documents CA-A-972 322 or DE-U-1 820 653. In addition, the Appellant alleged that the subject-matter of Claim 1 of the patent was made available to the public by use prior to the priority date of the patent and that the inventor of the patent was aware of this use before the priority date.

VI. In his observations dated 20 July 1988, the Respondent (Proprietor of the patent) contested the arguments brought forward by the Appellant and submitted an affidavit by Mr Donald F. Lehman, the inventor.

VII. In a Communication dated 1 August 1989, the Board set out its provisional opinion that it would not appear obvious to the person skilled in the art to combine the teaching of US-A-3 849 302 (Seifert) with that of CA-A-972 322 or DE-U-1 820 653. As to the alleged public prior use, the Board pointed out that so far no sufficient evidence had been provided by the Appellant.

VIII. In a reply dated 29 September 1989 to the Communication, the Appellant drew the attention of the Board to the document US-A-4 155 841 (Chupka) cited in the specification of the patent in suit, according to which document a field of high intensity fine scale turbulence was created adjacent the inner face of the screen. The Appellant argued that, in view of this disclosure and the reasons explained by the Board vis-à-vis the Seifert citation, it was obvious to apply the teaching of CA-A-972 322 or DE-U-1 820 653 to a screen cylinder as known from US-A-4 155 841 (Chupka), as the most relevant state of the art.

Further evidence concerning the alleged public prior use was not filed by the Appellant.

The Respondent contested the Appellant's arguments in a letter dated 6 February 1990.

IX. In a second Communication dated 23 February 1990 accompanying the summons to oral proceedings requested by the Appellant, the Board made further comments concerning the alleged public prior use and its lack of evidence. It also pointed out that it was not yet clear whether document US-A-3 849 302 (Seifert) or US-A-4 155 841 (Chupka) was the more relevant document for assessing the inventive step.

X. Submissions in reply to the Board's second Communication were filed by the Respondent with letter of 26 April 1990, accompanied by Affidavits of Mr McKela and Mr Seifert, and letter of 17 May 1990, and by the Appellant with letters of 30 April 1990, 21 May 1990 and 28 May 1990. In the letter dated 21 May 1990 reference was made to DE-A-2 750 499 (Holz II) already cited during the opposition procedure.

XI. Oral proceedings were held on 30 May 1990.

In the oral proceedings, the Appellant's arguments were basically as follows:

- No witnesses could be presented to establish the alleged public prior use. The Appellant therefore relied on the prior art documents.

- US-A-4 155 841 (Chupka) was closer to the patent in suit than US-A-3 849 302 (Seifert), in particular because it was expressly stated in the Chupka patent that turbulence had to be created whilst the Seifert document suggested the opposite. The general teaching of the Chupka patent as disclosed in Claims 1 and 5 was not limited to a particular shape of slots or to bars as turbulence generating means. The Chupka patent disclosed all of the features of the prior art portion of Claim 1 of the patent in suit.

- The Respondent's argument that prior to the present invention all experts of the art were of the opinion that the screening perforations in the screening cylinder of a pressure screen had to be relieved on the outlet side of the cylinder in order to avoid plugging of the perforations (cf. column 1, line 61 to column 2, line 30 of the present patent), was not justified. In

the middle seventies, the perforations were already considered to have relief portions on the inlet side of the screening cylinder mainly because of the higher amount of waste paper and consequently higher amount of impurities. In this respect, the Appellant made reference to DE-A-2 750 499 (Holz II), in particular to the paragraph bridging pages 4 and 5, Claim 1 and Figures 1, 2, 4 and 5. This contradicted the Respondent's position that nobody thought of having the relieved portion on the inlet side.

- CA-A-972 322 clearly disclosed a screening cylinder (cf. page 1, line 13) and countersinks on the inlet side of the screen (cf. Figure 3a) which, in the Appellant's view, would produce turbulence, since according to page 4, lines 20 and 21, such a screen would prevent clogging.

- The Chupka patent called for turbulence and the Canadian patent showed sieves with the greater flow area on the inlet side in order to prevent clogging. No reason could therefore be seen why it should not be obvious to combine the teachings of the Chupka and the Canadian patents. The wording of Claim 1 of the patent in suit would also cover slots with the shape of the countersinks according to the Canadian patent.

- The Appellant further argued that it was also obvious to combine the teaching of the Chupka patent and that of the document DE-U-1 820 653. This document was not limited to rotating filter elements and screening plates. It rather disclosed screening cylinders (cf. page 3, line 2) and that the perforations could have reliefs on the inlet side in order to prevent plugging (cf. page 2, last but one paragraph).

- Questioned by the Chairman, the Appellant stated that the objective technical problem to be solved over the closest prior art as known from the Chupka patent was to be seen in the simplification of the screen structure depicted in Figure 4 of the Chupka patent without impairing its efficiency. In this respect, reference was made to decision T 232/87 (dated 13 February 1990, unreported) emphasising that only those problems are relevant which have not yet been solved by the most relevant prior art.

In contesting the Appellant's arguments, the Respondent made the following points:

- The invention was based on the discovery that better screening results could be achieved when the wider portions of the screening perforations were on the inlet side of the screening cylinder. This was a simple concept, but nevertheless it involved an inventive step. It was the widely held opinion that relief should be provided on the outlet side of the perforations rather than on the inlet side. Ex post facto arguments should be avoided.

- The problem to be solved by the invention was to eliminate plugging of the screening apertures and to provide greater capacity. The correct starting document for considering inventive step was the Seifert rather than the Chupka patent, because Chupka only disclosed a construction with elongated slots and did not suggest any form of structure other than the bars (56) for producing turbulence.

- The Canadian patent was directed to a totally different problem, because it was concerned with the object of preventing particular shivers from passing through the apertures by locating the downstream edges of the apertures in a plane lower than are the upstream edges of the apertures in relation to the surface of the screen. There would be minimal turbulence in the vicinity of the inlet ends of the screening apertures, because the stock would flow past the apertures and there would be minimum tendency for any part of the flow to impinge on the downstream portion of the wall defining the inlet end of each aperture.

  In contrast, the Chupka patent was concerned with the generation of a field of high intensity, fine scale turbulence and with narrow slots and it was hard to consider that the ends of such slots, if there were any, could be considered as upstream and downstream edges in the sense of the Canadian patent. Therefore, a person skilled in the art would not combine the Chupka and the Canadian patents.

- DE-U-1 820 653 was considered by the person skilled in the art as a trivial and obscure document. It was dated from 1960 when many patents were filed solely on the basis that plastics could be used to provide known parts of appliances. This document wanted to cover all various alternatives and did not give any hint to reverse the tapered apertures depicted in Figure 2.

- As to DE-A-2 750 499 (Holz II), the Respondent pointed out that the apertures on the inlet and outlet side were of the same size (Figure 3) and thus did not teach or suggest the features of the characterising portion of Claim 1 of the contested patent.

XII. The Appellant requests that the decision under appeal be set aside and the patent be revoked.

The Respondent requests that the appeal be dismissed and the patent be maintained as granted.

Reasons for the Decision

1. The appeal is admissible.

2. Alleged public prior use

The Appellant failed to file evidence concerning the alleged public prior use. Therefore, it could not be considered by the Board.

3. Novelty

The subject-matter of Claim 1 is novel over the prior art documents mentioned during the proceedings. None of the documents discloses a screening apparatus of the type specified in the prior art portion of Claim 1 and having perforations which are of greater flow area on the surface of the stationary cylindrical screening member facing the inlet chamber than on the accepts side of the screening member.

4. Closest state of the art

The Board is of the opinion that it may be justified to consider document US-A-4 155 841 (Chupka) as the prior art document which is closer to the subject-matter of the contested patent than US-A-3 849 302 (Seifert). Insofar the Board can share the Appellant's opinion. Indeed, the Chupka patent teaching the necessity of turbulence

adjacent to the inlet side of the screen is, in its broadest aspect as specified in Claims 1 and 5, not restricted to any particular shape of slots or to bars as the only means for generating the turbulence. Moreover, turbulence was also created in the vicinity of the inlet end of each screening perforation of the apparatus according to the patent in suit (cf. point 5 of the Lehman Affidavit).

5. **Problem and solution**

Considering the Chupka patent as the starting point for the invention when assessing the inventive step, the remaining objective technical problem to be solved over the closest prior art as known from the Chupka patent can be formulated in accordance with the cited decision T 232/87 and is, in agreement with the Appellant's statement (cf. point XI above), to be seen in the simplification of the design of the screen structure depicted in Figure 4 of the Chupka patent without impairing its efficiency.

The problem is solved by the feature that the perforations of the screening apparatus of the type as specified in the preamble of Claim 1 are of greater flow area on the surface of the screening member facing the inlet chamber than on the accepts side of the screening member. This enables the elimination of special means to generate extra turbulence before the accepts side, e.g. extra bars in Figure 4 in the Chupka disclosure.

6. **Inventive step**

6.1 The primary question to be considered by the Board is whether, as contended by the Appellant, it was obvious to a person skilled in the art to combine the teachings of

the documents US-A-4 155 841 (Chupka) and CA-A-972 322 and to arrive at the subject-matter of Claim 1 of the impugned patent. In this respect, the following is observed.

6.1.1 The Chupka patent discloses in its Claim 5 a pressurised paper making stock screen comprising means for generating in the paper making pulp immediately adjacent to the inlet side of the screen a field of high intensity, fine scale turbulence. Column 3, lines 6-11 gives a definition of what is to be understood by a field of high intensity, fine scale turbulence: "That is, a field of turbulence in which the velocity of the particles of the suspension is rapid but of very small 'amplitude' (i.e. curvature). Thus, rather than the large eddies associated with more generalized turbulent flow, high intensity, fine scale turbulence exhibits very small eddies, but of a very violent nature."

It is further stated in the Chupka patent (cf. column 3, lines 12-20) that "while the mechanism involved is not entirely understood at this point, it is believed that the generation of a field of high intensity, fine scale turbulence adjacent the inlet face of a screen provided with very narrow slots disposed normally to the screen axis ensures that any solids within the suspension that have a dimension less than the slot width will pass through the slots, so that a true particle size separation is achieved, contrary to the operation of prior art screens of this general type."

In column 5, lines 27-33 of the Chupka patent it is pointed out that the disclosure is not limited to the particular embodiment as shown in Figures 1 and 3, including bars and foils as means for producing the field of high intensity, fine scale turbulence. Rather, other

means of creating such turbulence can be utilised to the same effect.

6.1.2 In view of the preceding statement that other means of creating such turbulence can be utilised, the question arises whether the person skilled in the art and faced with the problem set out under Point 5 above, would consider the teaching of the Canadian patent at all, let alone transfer it to the disclosure of the Chupka patent.

This question has to be denied for the following reasons.

6.1.3 The Canadian patent discloses an apertured strainer for preventing, from a stream of a suspension of particles moving over the strainer, the passage through said apertures of particles which have a greater stiffness and a smaller surface area per unit of weight and a greater length than those which are to pass through the apertures of the strainer. These apertures have upstream edges and opposed downstream edges seen in the flow direction of said stream, the downstream edges of the apertures being located in a plane lower than are the upstream edges of the apertures in relation to the surface of the strainer.

This situation is represented in Figure 3a which shows that, due to the provision of the downstream edges of the apertures by shallow countersinks, the shiver A having a size such that it could, in view of its size, pass through the aperture, but is nevertheless prevented from passing through by the shape of the countersink.

The Canadian patent thus teaches that the countersinks, which are provided on the inlet side of the strainer at the downstream edges of the apertures and cause the inlet ends of the apertures to have larger areas than the outlet ends, have the effect of preventing the passage through

the apertures of particular particles having a dimension which would otherwise allow them to pass through. No true particle size separation is therefore achieved as is the case in the Chupka patent (cf. point 6.1.1 above, second paragraph). Moreover, it follows from the fact that certain small particles having cross-sections smaller than the apertures may pass over rather than through the apertures, that the countersinks as shown in Figure 3a of the Canadian patent, although having a certain influence on the stream of suspension, do not have such an effect of producing such a turbulence that said small particles are directed through the apertures.

6.1.4 Hence, the person skilled in the art and being familiar with the teaching of the Canadian patent would not recognise that the particular countersinks disclosed in Figure 3a of this patent could create a field of high intensity, fine scale turbulence of the nature exactly as indicated in the Chupka patent (cf. point 6.1.1 above, first paragraph). The person skilled in the art would therefore not take the Canadian patent into account when looking for alternative means or arrangements for creating the required field of turbulence other than by the specific means disclosed as a particular embodiment in the Chupka patent (cf. point 6.1.1 above, final paragraph).

Thus, contrary to the Appellant's opinion, it cannot be considered as being obvious to combine the teachings of the Chupka and the Canadian patents in order to solve the problem indicated in point 5 above.

6.1.5 The Board is of the opinion that the statements on page 4, lines 19-27 of the Canadian patent would not render such combination obvious. The said passage cannot be interpreted in the sense as done by the Appellant that clogging is automatically prevented by a strainer plate

according to the Canadian patent. This is, as taught by the Canadian patent, prevented "by making the apertures of such a strainer plate larger than was heretofore possible". Moreover, the statement that the strainer plate according to the Canadian patent "can be applied to all known strainers of the kind here referred to" just relates to known strainers which are intended to separate, from a particle suspension, such particles as have a higher stiffness and a smaller surface per unit of weight, and possibly a greater length, than the particles allowed to pass through the apertures of the strainer plate.

6.2 The Appellant further contended that, having regard to the state of the art as disclosed in the Chupka patent and in the German utility model DE-U-1 820 653, the subject-matter of Claim 1 of the patent in suit was obvious to a person skilled in the art.

It is true that the German utility model discloses screen plates for use in screens for paper making stock. In particular, rotating filter elements are mentioned. It is further taught that, in order to enable better cleaning and prevent plugging of the screen, the perforations of the screen plate can be conical, i.e., depending on the task specified, the walls of the perforations can diverge either from the inlet ends to the outlet ends or vice versa. Thus the disclosure of the German utility model also comprises perforations being of greater flow area on the inlet side than on the accepts side of the screening member.

Nevertheless, these statements must be understood in the context of the disclosure of the utility model which is primarily concerned with the idea of introducing perforated polymers for strainers. In view of the general applicability of this idea, the shape of the apertures had

to be described very broadly, since depending on the purpose, e.g. cleaning or prevention of clogging, and operation conditions, the shape of the perforations had to be selected in accordance with specific requirements.

The German utility model does not give any hint in the direction that perforations having a greater flow area on the inlet side than on the outlet side would create the special field of high intensity, fine scale turbulence which is required in the Chupka patent. Thus, a combination of the teachings of the Chupka patent and the German utility model would not be contemplated when faced with the problem mentioned under point 5 above.

6.3 In view of the disclosure of the document DE-A-2 750 499 (Holz II), the Appellant's statement appears to be justified that it was not true that, prior to the present invention, nobody thought of having the relieved portion of the perforations on the inlet side. In fact, the Holz II document generally states that the apertures are relieved on the inlet side as well as on the outlet side. However, as shown by Figure 3, the apertures on the inlet and outlet sides are of same size in the specific embodiment. Therefore, the Holz II document does not suggest the feature of the characterising portion of Claim 1 that the screening apertures must be larger at their inlet ends than at their discharge ends.

6.4 As to the argument that a combination of the teaching of US-A-3 849 302 (Seifert) with that of the Canadian patent would be obvious, which argument was not pursued by the Appellant, reference is made to the statement in column 4, lines 1-6 of the Seifert patent. According to this statement, it is important to the practice of the screening apparatus in accordance with the Seifert patent to assure minimum disturbance of the shear field in the

tubular layer of stock between the path of the rotor vanes and the inlet side of the slotted screen member, for example, by constructing the screen member with the surface of its inlet side **smooth and free of protrusions.** In view of this teaching, it would not appear obvious to provide the inlet ends of the perforations of the prior art screening member, on the downstream edge of each inlet end, with shallow countersinks as known from the Canadian patent, since such countersinks would render the inlet side of the screening member unsmooth and this should be avoided according to the above-mentioned statement.

6.5 For the above reasons, the Board comes to the conclusion that the subject-matter of Claim 1 is considered as involving an inventive step within the meaning of Art. 56 EPC.

7. It follows that Claim 1 is to be maintained in its granted form.

8. Claims 2 to 9 contain preferred embodiments of the subject-matter of Claim 1 and can likewise be maintained by virtue of their dependency on allowable independent Claim 1.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: **The Chairman:**

S. Fabiani G. Szabo

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