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Veröffentlichung im Amtsblatt Ja/Nein
Publication in the Official Journal Yes/No
Publication au Journal Officiel Oui/Non

Aktenzeichen / Case Number / N° du recours : T217/83

Anmeldenummer / Filing No / N° de la demande : 79 900 406.4

Veröffentlichungs-Nr. / Publication No / N° de la publication : WO79/00934

Bezeichnung der Erfindung:
Title of invention: Apparatus for analysing flowing media
Titre de l'invention :

Klassifikation / Classification / Classement : GOIN 1/10, 23/223, 31/00

ENTSCHEIDUNG / DECISION
vom / of / du 19 August 1985

Anmelder / Applicant / Demandeur : Boliden AB

~~Patentinhaber / Proprietor of the patent~~
~~Einsprechender / Opponent~~:

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Articles 56, 52(1)
"Inventive step"

Leitsatz / Headnote / Sommaire

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Case Number: T 217 / 83

DECISION

of the Technical Board of Appeal 3.4.1

of 19 August 1985

Appellant: Boliden AB
Box 5508
S-114 85 Stockholm
Sweden

Representative:

Decision under appeal: Decision of Examining Division 061 of the European Patent Office dated 22 July 1983 refusing European patent application No 79 900 406.4 pursuant to Article 97(1) EPC

Composition of the Board:

Chairman: O. Huber
Member: J. Roscoe
Member: P. Ford

SUMMARY OF FACTS AND SUBMISSIONS

I. European patent application No. 79 900 406.4 filed under the Patent Cooperation Treaty on 11 April 1979 under the international application number PCT/SE 79/00 088, published on 15 November 1979 (international publication number WO 79/00 934) and claiming priority of 14 April 1978 from a previous application in Sweden (SE 7 804 262) was refused by a decision of the Examining Division 061 dated 22 July 1983. The decision was based on Claims 1 and 2 received on 16 October 1982 and Claims 3 and 4 as originally filed.

The reason given for the refusal was that the subject-matter of Claim 1 did not involve an inventive step within the meaning of Article 56 EPC having regard to FR-A-1 336 990 and US-A-3 817 630.

II. On 12 September 1983 the appellant lodged an appeal against the decision. The appeal fee and the statement setting out the grounds of appeal were received in due time.

III. The appellant requested that the decision be cancelled and the application accepted with the claims referred to in I, consisting of independent Claim 1 and appendant Claims 2 to 4 (main request) or alternatively with these claims amended in a manner generally indicated in the statement of grounds. Following a telephoned request from the rapporteur, a new alternative set of claims (auxiliary request) consisting of four claims thus amended was filed on 18 August 1984.

In a reply to a communication, issued by the rapporteur pursuant to Article 110(2) EPC, raising objections against both sets of claims, the appellant contested the objections and maintained his requests unaltered. The suggestion by the appellant of an unofficial meeting with the rapporteur was not taken up since the rapporteur felt unable to propose claims which would in his opinion have been allowable.

IV. In the grounds of appeal the appellant argues that in the supply lines of the apparatus of FR-A-1 366 990 turbulence and other flow

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irregularities are highly likely to occur, due to the sharp transitions in the lines shown in figure 3. Since that patent specification and the problem of flow irregularities are both old, if extending the lines in the manner taught by the invention could overcome the problem of turbulence, the proprietors of the French patent would probably have done so then or later. In the later communication referred to in III on the other hand it is contended that the rapporteur's assumption that the flow problems when feeding the analysis cells with pulp were commonly known is unjustified, and that it was first in conjunction with the advent of the present analysis apparatus that the problems associated with uneven flow were discovered.

The appellant further submits that US-A-3 817 630 is not concerned with the problem solved by the invention and that a combination of its teaching with that of the French patent specification would not result in the arrangement claimed because the US patent specification lacks essential features of that arrangement.

V. The appellant requests cancellation of the decision and grant of a patent on the basis of the claims referred to in I above (main request), or alternatively (auxiliary request) on the basis of Claims 1 to 4 filed on 18 August 1984.

VI. The text of Claim 1 of the main request, in which the letters (a) to (d) have been inserted by the Board for ready identification of the characterising features in the ensuing discussion, is as follows:

1. An apparatus for use in the analysis of flowing media, and in particular for the analysis of pulp-flows taken from different locations in at least one flotation plant, in which apparatus analysis cells (22) through each of which a respective one of said media flows, are brought one at a time into a respective position for co-operation with an analysis instrument (20), particularly an X-ray analyser, which includes supply lines (48) by which the analysis cells can be connected to associated media sources; a stationary means (12,19) for carrying said instrument; a movable means (21) for carrying said cells (22);

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means (35,36) for setting the movable carrying means relative to the stationary means such that the cells are placed relative to the analysis instrument; and means (66,67,68) for collecting the media departing from said cells, characterized in that (a) the movable carrier means (21) is rotatable about a substantially vertical axis (24) and carries the cells (22) adjacent to one another along a substantially horizontal circular-arcuate line which is concentrical with said axis; (b) that in an area located at a distance above the level of said cells the supply lines (48) extending from the sources of said media to said analysis cells comprise an elastomeric material and are joined to form a collected bunch (49) of lines comprising substantially vertically extending line-sections and arranged concentrically relative to said axis, (c) from which bunch said lines extend obliquely downwardly and outwardly to respective associated analysis cells (22) and (d) that each of the analysis cells (22) is connected to a respective discharge line (66,67,68), said discharge lines extending downwardly.

Claim 1 of the auxiliary request differs from the above only by the insertion at the end of characterising feature (c) (after "analysis cells (22)") of the following passage:

"; that the transitions between the vertically extending line-sections and the outwardly and obliquely downwardly extending sections are so gentle as to avoid non-uniform flowing media therethrough".

The remaining Claims 2 to 4, which are common to both requests, are appendant to the respective Claims 1.

VII. For the original claims and description reference is made to the printed PCT application, publication No. WO 79/00 934.

Reasons for the Decision

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

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2. The claims of the main request are supported by the original documents.

3. An apparatus having all the features of the precharacterising part of Claim 1 of the main request is described in FR-A-1 336 990, hereafter document A, (see figures 1 and 3, page 1, column 2, line 33 to page 2, column 1, line 22 and page 2, column 2, lines 4-32). It has in addition features (a) and (d) of the characterising part of the claim (for (a) see carrier 10 and cells 14 and for (b) the short discharge lines (or tubes) 20).

The supply lines 19, only parts of which are shown, are however neither said to be elastomeric nor arranged as required by features (b) and (c) of the characterising part of Claim 1.

US-A-3 817 630 (hereafter document B) relates to apparatus for optical evaluation of simultaneously obtained liquid specimens. A plurality of analysis cells (5) are spaced along the edge of a circular rotor (4,10) rotatable about its vertical axis by a mechanism to bring the cells in turn into registry with a stationary analysis instrument, the optical analyser (1,2,3,6). The specimens are conveyed to and from the cells through flexible PTFE tubes. The tubes extend from a gathering device in the form of a cylindrical member centered on the rotor axis, through respective apertures in the member and then outwards in radial planes, in one version (figure 5) along a generally downward path, to the cells. Thus, this apparatus also has the structural features of the precharacterising part of Claim 1 and feature (a) and part of features (b) and (c) of the characterising part. It is however not designed for analysing pulp-flows and the small diameter of the supply tubes (lines) used would seem to make it unsuitable for such use. In addition these tubes are not shown to form a bunch with vertical extensions concentric relative to the axis.

The two documents cited in the international search report are more remote, since neither of them discloses an apparatus in which media are required to flow to movable cells.

Therefore the apparatus according to Claim 1 is novel.

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4. The question now to be examined is whether the subject-matter of the claim involves an inventive step.

4.1 In the Board's view the closest prior art is the apparatus of document A. A comparison of the apparatus of Claim 1 with this, as indicated in 3 above, shows the distinguishing features to be:

(b) that in an area located at a distance above the level of the cells the supply lines

(i) comprise an elastomeric material; and

(ii) are joined to form a collected bunch of lines comprising substantially vertically extending line sections and arranged concentric relative to the axis; and

(c) that the lines extend obliquely downwardly and outwardly from the bunch to respective associated analysis cells.

4.2 According to the original description (page 2, lines 13 to 17 and page 7, lines 4 to 6) these features jointly serve to ensure that the flow conditions for the media (pulp) passing through the lines are essentially uniform and substantially unaffected by the movement of the cells. Therefore the technical problem which the invention sets out to solve is to provide, in an apparatus of the type disclosed in document A, a supply arrangement ensuring such flow conditions.

The appellant, though not disputing that this is the problem solved by the features designated (b) and (c) above, and apparently admitting in the last paragraph on page 3 of the statement of grounds that the problem of irregularities in pulp flow to the cells is old, states in the third complete paragraph on page 2 of the letter received 22 January 1985 that the problems associated with uneven flow were first discovered in connection with the advent of the present invention. The problems to which reference is there made are presumably those arising from the unequal distribution of the particles of different sizes in the pulp and of the dilution in the analysis cell and the effect of

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changes in this distribution during movement of the cells on the measured values, as explained in the letter received 16 October 1982 in reply to a communication from the Examining Division.

The Board considers that the skilled person, even if unaware of these variations in particle size and dilution distribution, would still not expect accurate results to be obtainable if the movement of the cells caused substantial irregularities in the flow and would therefore strive to design a supply arrangement ensuring as little variation in flow conditions as possible.

4.3 Since it is standard practice to construct flexible lines for carrying all manner of liquids of elastomeric material this is the natural choice for the supply lines (distinguishing feature (b)(i)).

4.4 The document A itself shows only the cell-adjacent ends of the supply lines and does not discuss the matter of supply. Though it shows the lines approaching the apparatus from above along smoothly curving paths to enter the cells axially, it otherwise affords the skilled person no guidance for an appropriate supply line layout. On the other hand, there is nothing in what is shown to lead the skilled person away from the idea of gathering the lines together near the axis of rotation.

The skilled person therefore has to seek guidance elsewhere and must be expected to examine the features of supply line arrangements used in other known apparatus where liquid is fed to locations disposed on and required to move along an arcuate path as in document A. Such an arrangement is shown in figure 5, document B, which is relevant since Claim 1 is not limited to apparatus for the analysis of pulp flows. There the arc through which the analysis cells move (350° - see column 6, line 14) is even greater than in document A and in the embodiment of the present invention. The liquid is fed along flexible elastomeric lines which are gathered together in an axial area above the cells and fan out radially from respective apertures arranged on a circle centred on the axis of rotation and fixed in relation to the cells. Though the arrangement of the lines within the

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cylindrical member having the apertures is neither discussed nor shown in detail, the skilled person would appreciate that they must be free to follow the rotational movement, and would recognise that with such a symmetrical arrangement neither the configuration of the individual radial lines nor their relative position changes during the movement. This could be readily verified by routine experiments.

In view of this and the fact that the area above the carrier in the apparatus of document A is unobstructed and hence available for use, the arrangement would recommend itself for use there, particularly when the pulp is to be gravity fed from sources located above the apparatus. This is just the situation for which the described embodiment of the apparatus claimed in the present application is intended (see page 4, line 31 onwards). It would be natural for the skilled person, in the interests of a compact arrangement, to lead the lines emerging on the inside of the cylindrical member vertically upwards as a group (bunch) to a point at which distribution to the various pulp sources is required, and in the absence of any good reason for doing otherwise, to maintain the lines within the group in the arrangement in which they leave the apertures i.e. on a circle centred on the axis (distinguishing feature (b)(ii)). This would be seen to reduce the risk of distorting the tubes by tangling.

4.5 In the figure 5 arrangement the supply lines, in passing outwards from the cylindrical member, essentially follow the profile of the rotor body to a vertical entry into the cells. In so doing they first run essentially horizontally and then curve smoothly downwards. They thus extend outwardly and downwardly, as indeed they must in order to reach the cells, but do not extend obliquely in the sense of following over a major part of their course a straight line path inclined to the vertical (feature (c)), which is what the term obliquely - as used in the claim - is taken to mean.

The direct path between a respective aperture and cell is not available for the supply line since it is obstructed by the rotor body. As there is no such obstruction in the apparatus of

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document A, the skilled person, in adapting the general features of these supply lines to it, would have no reason for not using the direct path with a straight inclined section blending smoothly into the vertical cell entry (feature (c)). This is a normal way of connecting two vertically and horizontally separated vertical sections of line or pipe and reduces the risk of separation out of solid matter associated with horizontal runs.

4.6 Therefore the Board concludes that the subject-matter of Claim 1 of the main request does not involve an inventive step. The claim is hence not allowable.

5. As indicated at VI above, Claim 1 of the auxiliary request contains the single additional feature "that the transitions between the vertically extending line-sections and the outwardly and obliquely downwardly extending sections are so gentle as to avoid non-uniform flowing media therethrough". In support of this feature, which does not appear in the claims as originally filed, the appellant relies on figure 1 and the penultimate paragraph of the description. However this paragraph makes no reference to a transition and it cannot be deduced from the figure in the absence of details of other parameters of the system that the transition at 48 fulfils this condition. The claim therefore introduces new subject-matter and is hence not allowable under the provisions of Article 123(2) EPC. Even if it were allowable its subject-matter would not involve an inventive step. The skilled person as a routine matter avoids sharp curves in flexible pipes carrying liquids, particularly where the liquid carries solids liable to separate out and cause irregular flow or even blockage, and would in any given situation conduct experiments to ensure that the curvatures adopted provided an even flow.

6. Since neither Claim 1 of the main request nor that of the auxiliary request is allowable, the remaining Claims 2 to 4, which are dependent on one or other of these claims, are not allowable either.

O R D E R

For these reasons it is decided that,

The appeal against the decision of the Examination Division is dismissed.

The Registrar: The Chairman:

B A Norman O Huber