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Case Number: T 1373/13 - 3.3.05

Application Number: 04784746.2

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Language of the proceedings: EN

Title of invention:
SYSTEM FOR FEEDING SOLID MATERIALS TO A PRESSURIZED PIPELINE

Applicant:
Nalco Company

Headword:
RESAZURIN PELLET FEEDER/NALCO COMPANY

Relevant legal provisions:
EPC Art. 56

Keyword:
inventive step (no) - obvious combination

Decisions cited:

Catchword:

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Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1373/13 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 7 October 2014

Appellant: (Applicant)	Nalco Company 1601 W. Diehl Road Naperville, IL 60563-1198 (US)
Representative:	Chalk, Anthony John HGF Limited Saviour House 9 St Saviourgate York YO1 8NQ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 23 January 2013 refusing European patent application No. 04784746.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Raths
Members:	H. Engl
	D. Prietzel-Funk

Summary of Facts and Submissions

I. European patent application EP04784746.2 was refused by a decision of the examining division posted on 23 January 2013.

II. The documents cited during the examination procedure included, inter alia, the following:

D1: US-A-2 347 271
D3: US-A-5 666 987
D7: US-A-6 079 911.

III. The examining division decided that the claimed subject-matter lacked an inventive step having regard to documents D3 and D1 (Article 56 EPC).

Starting from D3 as the closest prior art the technical problem consisted in providing an apparatus which allowed the continuous addition of solid materials to a pressurized pipeline without interrupting the flow of liquid and without risk of contamination of the solid material in the storage container.

According to the examining division it would have been obvious to use the automatic feeding apparatus disclosed in D1 for automatically feeding the solid materials into the dissolving vessel of the system shown in D3.

IV. The notice of appeal of the applicant (henceforth: the appellant) was filed by letter dated 27 March 2013. The statement of grounds of appeal was received under cover of the same letter and was accompanied by new claims 1 to 6 as a main request.

Under cover of a further letter, dated 29 July 2014 and sent in reply to the summons for oral proceedings, the appellant filed an amended set of claims 1 to 6 as the sole new request.

V. Oral proceedings took place on 7 October 2014. The appellant filed two sets of new claims as first and second auxiliary requests.

VI. The respective independent claims read as follows:

Main request:

"1. An apparatus (10) for allowing addition of one or more pellets (36) to a pre-pressurized process pipeline (30) wherein said pellet is conveyed in such a way as to be readily dissolved by the liquid in said pipeline, comprising:

(a) a solid material storage container (12) linked with a solid material feeder (22);

(b) solid material feeder pipe (24) to convey said pellet from said solid material feeder to a solid material transfer device (26);

(c) a solid material transfer device used to transfer said solid material from said solid material feeder pipe (24) to the point of intake (28) of said pellet in the process pipeline (30), without allowing liquid from the process pipeline to access the one or more pellets in the solid material feeder; and

(d) means (34) for holding said pellet in place for a sufficient length of time such that the liquid in said process pipeline can contact and dissolve said pellet

downstream of the point of intake (28) of said pellet in the process pipeline,

wherein said solid material feeder (22) is capable of controlling the rate of allowing said pellet (36) to pass from solid material storage container (12) into solid material feeder pipe (24) on its way to solid material transfer device (26)."

Dependent claims 2 to 6 are concerned with particular embodiments of the apparatus defined in claim 1.

First auxiliary request:

Claim 1 differs from claim 1 of the main request in that in the first paragraph of the claim the expression "pre-pressurized" is replaced by "pressurized".

Second auxiliary request:

Claim 1 differs from claim 1 of the main request in that in the first paragraph of the claim the expression "pre-pressurized" is replaced by "pressurized" and the phrase "said pellet is conveyed" is replaced by "said pellet is 0.2 cm to 13 cm in diameter and is conveyed".

VII. The arguments of the appellant may be summarized as follows:

The apparatus of claim 1 of the present application was suitable for, and intended for use in, the addition of one or more pellets to a pressurised process pipeline, such that the liquid flow in the pipeline was not interrupted and there was no risk of contamination of the solids in the storage container. The expression "pre-pressurized" in claim 1 of the main request

described the fact that the pipeline was under pressure before and during the introduction of the pellet(s).

According to D3, in order to add the chemicals to a pre-pressurised process pipeline, it would be necessary to open valves 12 and 18, causing the liquid in the pipeline to exit via said opened valves 12 and 18, which would result in a loss of pressure and an increased risk of the liquid entering funnel 13, and thus cause contamination of any chemicals stored therein. The apparatus of D3 was therefore not suitable for the intended use of the apparatus of claim 1.

In contrast, the currently claimed apparatus differed from the apparatus of D3 at least by:

(i) A solid material transfer device that allowed a pellet to be added to an already pressurised pipeline whilst preventing liquid from the process pipeline accessing the pellet(s) in the solid material feeder. This function was lacking in D3.

(ii) An Y-strainer (34) for holding the pellet downstream of the point at which the pellet entered the process pipeline for a time sufficient to dissolve it. The function of the Y-strainer could not be achieved by the equivalent means of D3 (screen 7) as the means of D3 was not downstream of the point at which the pellet entered the process pipeline.

(iii) A solid material feeder for controlling the rate of allowing the pellet to pass from the solid material storage container into the solid material feed pipe on its way to the solid material transfer device. This function could not be achieved by the "solid material feeder" of D3.

Starting from D3, the problem to be solved consisted in providing an apparatus that permitted the addition of one or more pellets to a pressurized pipeline in a controlled manner, whilst providing optimal contact of the pellet with the liquid in the pipeline and preventing both contamination of the source pellet(s) and leaks in the system.

D3 only disclosed an apparatus that allowed the addition of one or more pellets to a process pipeline before the pipeline was pressurised. It was thus not suitable for solving the problem of the invention without significant modification and was not a promising starting point for solving this technical problem.

Nor could the teaching of D3 be combined with D1 or D7 in such a way as to arrive at the claimed invention. D1 disclosed a device for feeding finely divided pulverulent materials into a high pressure zone from a zone of lower pressure. The device comprised a pocket type feed mechanism providing for the more or less continuous introduction of powered catalyst to a pipe or line.

D7 disclosed a device for the contamination-free metering and conveying of solid powders which were to be dispensed or dissolved. The device had a movable cone arranged within a discharge hopper, which, when in an open position, formed an annular gap between itself and the wall of the hopper. The amount of the powder which was discharged through the annular gap was controlled by the amount of time the cone remained in the open position.

The person of skill in the art would not combine the teaching of D3 with that of D1 or D7 to try solve the above addition as they would be aware that the apparatus of D3 did not permit addition of one or more pellets to a pressurised pipeline and that replacement of valve 12 of D3 with the device of D1 (or the discharge hopper of D7) would not remedy this deficiency. Also, D7 and D3 related to the handling of powdery materials.

In summary, the claimed subject-matter involved an inventive step over D3, alone or in combination with D1 or D7.

VIII. Requests:

The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of claims 1 to 6 filed with letter dated 29 July 2014, or on the basis of claims 1 to 6 in accordance with auxiliary requests 1 or 2, filed during the oral proceedings.

Reasons for the Decision

1. Preliminary remark

The board is satisfied that the requirements of Articles 123(2) and 54 EPC are met. Since the appeal fails for other reasons, there is no need to give a detailed reasoning.

2. Inventive step (all requests)

2.1 *The invention*

2.1.1 The present application concerns an apparatus for feeding a solid, pelletized material at a controlled rate into a pipeline where it is dissolved in a continuously flowing liquid.

Main request:

Claim 1 is inter alia directed to a pre-pressurized pipeline.

1st auxiliary request:

Claim 1 is directed inter alia to a pressurized pipeline.

2nd auxiliary request:

Claim 1 is directed inter alia to a pressurized pipeline and a pellet diameter of 0.2 to 13 cm.

2.1.2 Claims 1 of the main and first auxiliary requests differ only by the expression "pre-pressurized" and "pressurized", respectively. The board considers the claimed subject-matters to be effectively the same, as it is clear from the description that the term "pre-pressurized" merely describes the condition of the pressurized pipeline prior to the introduction of the pellet(s).

As regards the subject-matter of claim 1 of the second auxiliary request, it differs from the subject-matter of claim 1 of the main request by the feature according

to which "said pellet is 0.2 cm to 13 cm in diameter". Said new claims feature only requires that the claimed apparatus be capable of conveying, transferring and holding in place pellets in the indicated diameter range. In view of the broadness of the size range, the board considers that this size is also covered by the apparatuses of the preceding requests.

Therefore, the following observations, arguments and the verdict apply equally to all pending requests.

2.2 *Closest prior art*

Document D3 may be considered to represent the closest prior art. Said document discloses an apparatus allowing addition of solid materials to a pressurized pipeline to be dissolved by the liquid in said pipeline (see column 5, lines 51 to 67; column 6, lines 57 to 67). As a solid material, powders, granules or tablets are envisaged (see column 5, lines 5 to 25; abstract).

2.3 *Problem to be solved*

According to the appellant, the technical problem to be solved by the present application was to allow the continuous addition of pellets (of 0.2 to 13 cm in diameter [2nd auxiliary request]) to a (pre-pressurized [main request], respectively) pressurized [1st auxiliary request] pipeline without interrupting its flow and without risk of contamination of the solids in the storage container, and to control the rate of addition of the said solid materials.

2.4 *Solution*

As a solution to this problem, the application in suit

proposes an apparatus according to claim 1 of the respective requests, characterised by

- a solid material feeder (22) capable of controlling the rate of allowing said solid material to pass from solid material storage container (12) into a solid material feeder pipe (24) and by

- a solid material transfer device (26) transferring the solid material to the point of intake of a process pipeline (30), without allowing liquid from the process pipeline to access the one or more pellets in the solid material feeder.

2.5 *Success of the solution*

To the benefit of the appellant, the board accepts that the above-defined problem has been successfully solved.

Indeed, the claimed apparatus comprises
- a solid material storage container (12);
- a solid material feeder (22), capable of controlling the rate of allowing said solid material (36) to pass from solid material storage container (12) into a solid material feeder pipe (24);
- a solid material feeder pipe (24);
- a solid material transfer device (26) transferring the solid material to the point of intake of a process pipeline (30), without allowing liquid from the process pipeline to access the one or more pellets in the solid material feeder;
- means (34) for holding said solid material in place in said process pipeline (30).

In particular, the solid material feeder (22) in the form of a rotating plate, the transfer device (26)

featuring a rotating dispensing ball (Figure 5) and the means (34) for holding the solid material (Figure 2) as disclosed in the description and the figures are specifically designed for handling pelletized solid materials.

As control means for controlling the rate of addition of said solid material there is disclosed a feeder (22) comprising a light emitting diode (71) and a photodetector (73) (page 9, lines 1 to 12; Figure 1).

2.6 *Obviousness*

It remains to be decided whether the claimed solution is obvious having regard to the prior art.

2.6.1 Document D3

(1) Referring in particular to Figure 1 of D3, the prior art apparatus shows:

- a solid material storage container 13 linked with a solid material feeder 12 (column 6, lines 35 to 39);

- a solid material feeder pipe 11 to convey said solid material from said solid material feeder 12 to a solid material transfer device (vessel 8A);

- means 7 (assuming the function of the Y strainer according to the invention) for holding said solid material in place for a sufficient length of time such that the liquid in said process pipeline can contact and dissolve said solid material (column 7, line 66 to column 8, line 12).

Therefore, the apparatus of D3 may be considered to

solve the problem of introducing a solid material from a storage container into a pipeline to be dissolved in the flowing liquid.

(2) The appellant argued in its letter of 15 October 2012 that the subject-matter of claim 1 *inter alia* differed from the apparatus of D3 in that according to the invention the means for holding the solid material (i.e. item (d) of claim 1 illustrated in figure 1 of the application in suit by the Y-strainer) were located inside the pipeline. According to the appellant, said feature had the advantage of allowing the pellets to be dissolved in the liquid.

The board shares the opinion of the examining division that no such difference existed. In the art, the term "pipeline" does not (only) refer to a single tube, but to a set of tubes connected in line, together with the different equipment elements joining them, like valves, connectors and auxiliary vessels. In that sense, the set of pipes 2, 9 and 20, connectors 1, 3, 6, 16, 17, 19 and 21, valves 4, 5, 5A and 24 and vessel 8A in Figure 1 of D3 may all be considered as part of the "process pipeline". Thus, according to the board, D3 discloses a solid material transfer device (vessel 8A) for transferring the solid material from the solid material feeder pipe 11 to the point of intake 6 in the process pipeline (column 7, lines 39 to 48).

Although the point of intake 6 shown in Figure 1 of D3 is the inlet of fresh process liquid into the vessel 8A, whereas item (d) of the current claim defines a point of intake of the solid material in the process pipeline, the board considers in view of Figure 1 of D3 that the solid material is dissolved downstream of the point of intake of said solid material. It appears to

the board that the question of whether or not the vessel 8A is part of the pipeline is a merely semantic one which does not substantially change the technical issues.

Therefore, claim feature (d) is also shown in D3.

(3) However, for lack of a back-pressure or non-return valve in D3 in the solids feeder pipe, the board considers that the prior art apparatus would not allow the introduction of a solid material via valve 12 and feeder pipe 11 into an uninterrupted pressurized flow of liquid.

(4) It follows from the above considerations that the subject-matter of current claim 1 differs

(i) in that the solid material feeder (22) is designed and capable of controlling the rate of allowing said solid material to pass from the storage contained to the solid material transfer device; and

(ii) by a solid material transfer device capable of transferring the solid material to the point of intake of a pressurized process pipeline (30) without interrupting its flow and without risk of contamination of the solids in the storage container.

2.6.2 Documents D3 and D1

Document D1 discloses an apparatus for automatically feeding a powdery solid material from a hopper to a pressurized pipeline containing gas or liquid (see page 1, left hand column, lines 1 to 10, right hand column, lines 2 to 5; Figures 2 and 3). The feeding device comprises a feed wheel with several pockets (slots) and

optionally an additional screw-type feeder (see Figure 4).

The appellant argued that D1 referred to the handling of finely divided pulverulent materials and would not, therefore, be taken into consideration by the skilled person when the problem lies in the handling of solid materials in pellet form. The board disagrees,
(a) firstly, because there is a gradual transition from a pulverulent solid to a small pellet (according to the application in suit, page 5, first paragraph, the pellets may be as small as 0.2 cm in diameter); and
(b) secondly, because the circumferential slots or pockets of the rotating feed wheel (1) shown in Figure 1 to 3 of D1 may be easily adapted to the size of any particulate material such as pellets having a diameter of 0.2 to 13 cm. The same applies to the optional screw-type feeder shown in Figure 4 of D1.

In the board's opinion, the skilled person would consider to implement the feed wheel device of D1 into the apparatus of D3, in order to solve the problem of transferring the solid material to the point of intake of a process pipeline without allowing liquid from the process pipeline to access the one or more pellets in the solid material feeder, thereby posing a risk of contamination.

For instance by controlling the rotation speed of the feeding device of D1, the skilled person would also solve the problem of controlling the rate of allowing a solid material to pass from a solid material storage container into a solid material feeder pipe.

In the board's conclusion, the apparatus claimed in claim 1 does not go beyond a mere iuxtaposition of

features which are per se conventional in the art and which do not functionally combine or interact so as to give rise to a new technical effect. Each of the claim features independently solves a partial problem in a foreseeable manner. The claimed subject-matter does thus not involve an inventive step having regard to D3 in combination with D1.

2.6.3 Documents D3 and D7

Another dispensing apparatus for solid, free-conveying powdery materials, comprising a hopper with a liftable cone and a transfer line with a ball valve is disclosed in D7 (see abstract, Figure 1; column 2, line 59 to column 3, line 8). This apparatus is also evidently capable of controlling the rate of introduction of a solid material from a solid material storage container into a process pipeline and, thanks to the rotating ball valve prevents back-slash of the pressurized flowing liquid into the feeder hopper.

As to the question of combining the teachings of D3 and D7, the reasoning is similar to the one given for D3 and D1.

Therefore, in the board's view, the apparatus claimed in claim 1 does also not involve an inventive step having regard to D3 in combination with D7.

2.6.4 Conclusion:

The requirements of Article 56 EPC are not met.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated