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**Datasheet for the decision
of 21 June 2018**

Case Number: T 0332/14 - 3.2.05

Application Number: 08718682.1

Publication Number: 2125376

IPC: B41J2/18, B41J2/185

Language of the proceedings: EN

Title of invention:

Ink Jet Printing

Patent Proprietor:

Linx Printing Technologies Ltd

Opponent:

Markem-Imaje SAS

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step (no: all requests)

Decisions cited:

T 0056/87, T 0451/88, T 0410/99



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Case Number: T 0332/14 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 21 June 2018

Appellant: Linx Printing Technologies Ltd
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 16 December
2013 revoking European patent No. 2125376**

Composition of the Board:

Chairman M. Poock
Members: O. Randl
D. Rogers

Summary of Facts and Submissions

- I. The patent proprietor filed an appeal against the decision of the opposition division revoking European patent No. 2 125 376.

The opposition division was of the opinion that claims 7 and 21 of the main request and the auxiliary requests 1 to 3 did not fulfil the requirements of Article 123(2) EPC, that the subject-matter of claim 8 of auxiliary requests 4 and 5 was not new and that the subject-matter of claim 8 of auxiliary requests 6 to 8 did not involve an inventive step.

The following documents cited in the decision under appeal were relied upon by the parties in the appeal proceedings:

- D1: US 4,575,735;
- D2: JP 60011364 A;
- D7: EP 0 560 332 A2;
- D8: US 2006/197810 A1;
- D9: US 4,283,730;
- P10: Hue P. Le, "Progress and Trends in Ink-jet Printing Technology", Journal of Imaging Science and Technology, Volume 42, Number 1, January/February 1998, p. 49-62.

Together with its reply to the statement of grounds of appeal, the respondent filed an English translation of document D2 ("D2a").

In response to the communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal, the appellant filed an extract of a document entitled "British Standard - Engineering diagram

drawing practice. Part 3: Recommendations for mechanical/fluid flow diagrams" dated 15 September 2002, which will be referred to as document "E1".

- II. The oral proceedings before the board took place on 21 June 2018.
- III. The appellant (patent proprietor) requested that the board set aside the decision under appeal and maintain the patent in amended form on the basis of the main request, or on the basis of either the 1st or the 2nd auxiliary request, all requests having been filed under cover of a letter dated 15 April 2014.
- IV. The respondent (opponent) requested that the board dismiss the appeal.
- V. Claim 7 of the main request reads as follows (feature references used by the board are indicated in brackets):

"[7.1] A printhead for a continuous ink jet printer, comprising [7.2] an ink gun for forming an inkjet, [7.3] an arrangement of electrodes (9,11,13) for trapping electric charges on ink drops of the ink jet and for creating an electrostatic field for deflecting drops carrying trapped electric charges, and [7.4] a gutter (15) for receiving ink drops of the inkjet that are not used for printing, the gutter having:
[7.5] a first enclosed fluid flow path (15a, 15b) through the gutter, extending from a first end to a second end, the first end of the first enclosed fluid flow path being suitable for receiving ink drops of an ink jet of the printer in use and the second end of the

first enclosed fluid flow path being suitable for connection to a suction line (17) for sucking away ink in the first enclosed fluid flow path, characterised by further having;

[7.6] a second enclosed fluid flow path (37a) through the gutter, extending from a first end to a second end, the first end of the second enclosed fluid flow path being suitable for connection to a line (37, 69) for supplying air to the second fluid flow path and the second end of the second fluid flow path opening into the first enclosed fluid flow path at a position within the gutter (15), between the first and second ends of the first fluid flow path, and [7.7] at a distance of no more than 10mm along the first enclosed fluid flow path from the first end thereof."

Claim 7 of auxiliary request 1 differs from claim 7 of the main request in that the expression "and an arrangement of electrodes (9, 11, 13)" has been replaced by "a charge electrode (9)" and by the replacement of "and for creating" by the expression "first and second deflection electrodes (11, 13) for creating".

Claim 8 of auxiliary request 2 differs from claim 7 of the main request in that "10mm" has been replaced by "2mm".

VI. The appellant argued as follows:

(a) Main request

The claimed subject-matter is inventive over document D2.

Feature 7.6 is not disclosed in document D2. Very little reliance can be put on figures. In the case of document D2, the description is contradictory to any suggestion that the air is recirculated downstream.

Decision T 56/87 clearly states that the technical disclosure in a prior-art document must be considered as a whole. Therefore, a figure must not be interpreted in isolation from the description. According to decision T 410/99, a prior-art disclosure is novelty-destroying if it discloses directly and unambiguously the subject-matter in question, account also being taken of a skilled person's common general knowledge at the publication date of the cited document. As far as drawings are concerned, decision T 56/87 has established that a technical feature that is derived from or based on dimensions obtained from a diagrammatic representation and that technically contradicts the teaching of the description does not form part of the disclosure of a document. According to decision T 451/88, the distinction has to be drawn between scaled construction drawings and the schematic drawings conventionally included in patent documents, the latter being sufficient to indicate the essential elements of the invention but not to manufacture the product. These decisions are relevant in respect of Figures 2 and 3 of document D2, which clearly are schematic drawings (in contrast to Figure 4).

The respondent's reference to the schematic nature of claim 7 and the patent drawings has no merit. The only relevant question is what is clearly and unambiguously disclosed in the prior art.

British standard E1 confirms the jurisprudence of the boards of appeal. According to this document, "the purpose of a flow diagram is to depict all the essential parts of a process or item of equipment which enables the analysis and calculation of physical characteristics to be undertaken. These are so arranged to show the operation as clearly as possible without regard to physical layout of the items, their parts or connections" (see point 5.1). With regard to fluid circuit diagrams, document E1 states that "the purpose of a circuit diagram is to show the function of fluid and motion systems depicting all their essential parts and connections by means of graphical symbols. Its arrangement should clearly show the operation of the system but without regard to physical layout of parts and connections." Therefore, limited weight should be placed on what is shown in the figures of document D2.

The respondent's counterargument that the content of document E1 could have changed before the priority date is irrelevant, in so far as the document only confirms the jurisprudence of the boards of appeal.

Document D2 is concerned with problems related to dust and solvent loss caused by air containing dust taken in with the ink. The solution is to recirculate air, so that the ink is not exposed to outside air and no solvent is lost. The problems are problems of the air upstream of the gutter, in the region between the nozzle and the gutter inlet. The reference to "ink ... flying through the

air" (page 2, third paragraph of document D2a) makes clear that this upstream region is concerned.

Document D2 contains a summary of the causes of degradation of ink: "(1) evaporation of ink solvent components at portions of the circulation route that come into contact with outside air (between ejection from the nozzle until reaching the gutter, inside the gutter and inside the ink tank); (2) reactions between the ink and peripheral atmosphere at portions of the circulation route that come into contact with outside air (reactions with moisture etc. in the air); and (3) intake of airborne dust from the ink recovery gutters and intermixture into ink" (see page 2, antepenultimate paragraph of document D2a). This is an explicit confirmation that the problematic part is upstream of the gutter.

It is true that document D2 mentions problems that are both upstream and downstream of the gutter opening, but the only solution that solves all the problems is to provide the recirculation upstream of the gutter.

The respondent's argument based on the "to the gutter" language of certain passages of document D2 ignores the fact that the disclosure of document D2 as a whole is decisive. "To the gutter" must not be read as "downstream of the gutter" when the rest of the document insists on the upstream effects.

According to the second paragraph on page 3 of document D2a, the invention reduces the causes (1), (2) and (3). The fourth paragraph on page 3 is also relevant. It discloses that "by circulating the air

recovered by the circulation pipe 17 back to the gutter 3, almost all the aforementioned causes of ink degradation can be eliminated". The only configuration that the skilled person could reasonably consider is recirculation upstream of the gutter inlet. Downstream recirculation does not solve all the problems mentioned.

If the teaching of document D2 was considered to be ambiguous, the common general knowledge of the skilled person would have to be taken into account (see decision T 410/99). There is a lot of evidence for what the skilled person would understand recirculation to look like. Only documents D1, D2, D7 and D9 show recirculation. D1 is at best ambiguous. Documents D7 and D9 are clear disclosures of what the skilled person might do. Document D9 is most appropriate because it describes two prior-art embodiments, each of which shows recirculation upstream of the gutter (see item 9 of Figure 1 and item 21 of Figure 2, as well as item 41 of Figure 3). This is also supported by the description (col. 7, lines 59-60; col. 9, line 67, to col. 10, line 2; col. 17, lines 8-15). Document D7, col. 4, lines 4-13, explicitly discloses that air is supplied "to the outside of the gutter".

To sum up, neither feature 7.6 nor feature 7.7 are disclosed in document D2.

In view of the disclosure of paragraph [0021] of the patent, the problem solved by these features can be defined as avoiding the presence of solvent-laden air in the printhead (and, as a consequence, problems arising from moisture in contact with

electrically conductive parts). This problem has never been contemplated in any of the prior-art documents. That there are other problems solved by the feature does not matter.

The respondent's argument that the problem was known from and solved by document D2 is incorrect. Venting to the atmosphere does not lead to solvent condensation; it is because the prior art vents into a closed space that a situation arises where there is a 100% saturation of solvent. Thus the condensation problem is not solved by D2; it is specifically solved by downstream recirculation.

The skilled person had no motivation to modify the device of document D2 to recirculate air downstream. There is a clear bias in the art that pushes the skilled person towards recirculation upstream of the gutter.

As to feature 7.7, the appellant explained in writing that the particular dimension of 10 mm was not required to have a particular effect but was introduced for the sake of clarity. The opposition division was wrong to hold that the distance is a merely arbitrary choice.

When asked by the board what the proper technical effect of feature 7.7 was, the appellant explained that the description of the patent contemplated further problems related to this particular dimension. However, this did not really matter, "because what matters is placing it downstream". When the recirculation is placed as close as possible to the inlet of the gutter, the clearing of the gutter is improved.

(b) Auxiliary request 1

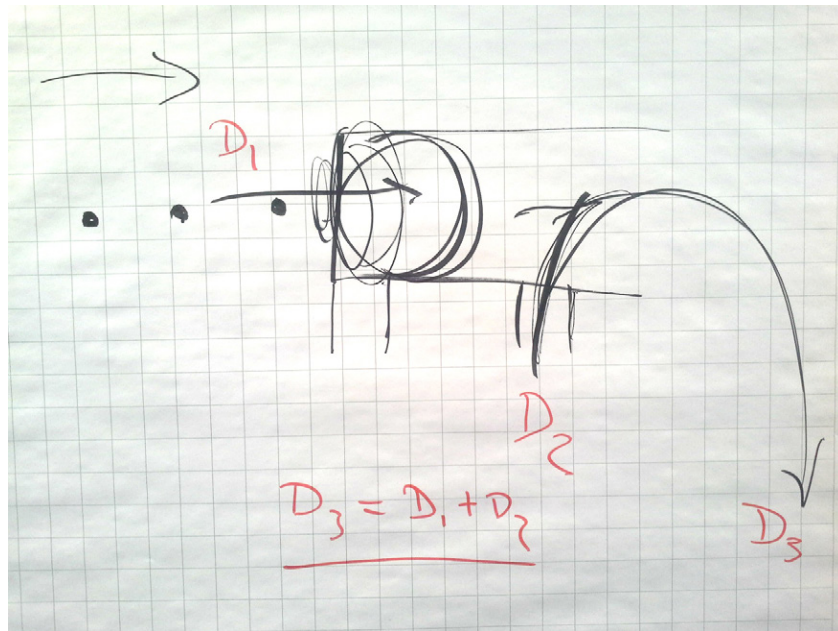
The request was filed in case the board endorsed the Article 123(2) EPC objection raised by the opposition division.

(c) Auxiliary request 2

In this request the downstream distance is set to "no more than 2mm".

When air circulation is added downstream, the vacuum source draws recirculated air instead of drawing only the air coming from the gutter inlet. This is problematic because the clearing effect in the initial area is reduced. The prior art is unaware of this problem; documents D1 and D2 are concerned with completely different problems. The patent proprietor has identified the problem and realised that it can be solved by putting the recirculation entry within the particular range of < 2 mm (see paragraphs [0026] and [0028] of the patent). If the downstream distance is within this range, the air flow can pick up the incoming ink droplets, which improves the clearing effect.

So the invention is twofold: (1) the patent proprietor has discovered that there is a problem with the air flow in the gutter line; and (2) has defined a special range that addresses the problem by means of a surprising additional technical effect.



Drawing made by the appellant
during the oral proceedings before the board
(references D1, D2 and D3 added by the respondent)

There is no motivation in the prior art, and in particular in document D2, for the skilled person to locate the recirculation as close as possible to the gutter orifice. It should be noted that paragraph [0003] of the patent discloses that the flexible conduit between the printer body and the printhead is typically a few meters long.

The invention satisfies all the requirements of the jurisprudence of the boards of appeal in respect of selection inventions (narrow range, remoteness from examples, non-arbitrary choice). The fact that the claimed subject-matter concerns continuous inkjet printing provides the skilled person with information on the dimensions involved. Therefore, there is no arbitrary selection of dimensions.

Most of the arguments of the respondent are based on the knowledge of the invention.

The 2 mm limitation has to be appreciated with respect to the prior art and not with respect to the 10 mm distance claimed in claim 7 of the main request.

VII. The respondent argued as follows:

(a) Main request

Document E1 used by the appellant is only a recommendation and not compulsory. It carries the date 2002, which is five years before the priority date; there is no indication that the "rules" set by document E1 would still apply. In point 1 (Scope), it is stated that the document "should always be used in conjunction with BS 5070-1", but this document has not been filed. Document E1 is only an extract; other pages are required for its proper understanding. Finally the document is late-filed, although it was available well before the oral proceedings before the board. The information available is not sufficient for changing the jurisprudence of the EPO.

There is no contradiction between the figures of document D2 and the description. The fourth paragraph of page 3 of document D2a discloses that "in Fig. 2, an air circulation pipe 17 circulates air recovered from the ink tank 15 to the gutter 3. ... In other words, by circulating the air recovered by the circulation pipe 17 back to the gutter 3, almost all the aforementioned causes of ink degradation can be eliminated". The drawing of Figure 2 is consistent with that paragraph. The drawing is schematic, but claim 7 and the

Figures 4 to 11, as well as paragraph [0054] of the patent are also schematic.

It is true that document D2 mentions problems upstream of the gutter, but problems downstream are also disclosed (D2a, page 2: "inside the gutter and inside the ink tank"). There is no contradiction within the meaning of decision T 56/87 because the description never mentions an upstream position. The disclosure of Figure 2 is clear; the respondent shares the provisional opinion of the board expressed in its communication.

Documents D7 and D9 are not part of the common general knowledge but patent documents. Document D9 discloses recirculation upstream, but there are other solutions in the state of the art. Document D1 also has a clear disclosure in this respect.

Feature 7.6 is disclosed in documents D1 and D2 (Figures 2 and 3; "to the gutter").

Feature 7.7 does matter, because it is part of the claim. As can be seen from paragraphs [0045] and [0048], this feature has been obtained by trial and error. Paragraph [0026] states that this feature is preferred, but does not explain why. The teaching of paragraph [0026] in respect of venting is also given in document D2 and has no causal link with the precise dimensions.

The technical problem referred to in paragraphs [0021] and [0027] is just one of the problems arising in connection with solvent escaping into the atmosphere. The problem is known from

document D2. It may concern the printheads, but also the operators. It is solved in document D2 by recirculation.

(b) Auxiliary request 1

The subject-matter of claim 7 lacks inventive step over document D2 for the same reasons as claim 7 of the main request.

(c) Auxiliary request 2

The subject-matter of claim 8 lacks inventive step over document D2.

There is no disclosure in the patent in respect of the 10 mm and the 2 mm distances. Paragraphs [0045] and [0048] do not say anything specific with regard to the 2 mm distance. There is no dimensional limitation concerning the rest of the device. The statement in paragraph [0026] of the patent that it is not possible to recirculate 100% of the air is a law of physics and not something the patent proprietor has discovered. There is no link between this sentence and the range that is now claimed. Paragraph [0028] mentions experiments conducted by the appellant "on its own design of printhead", which suggests that the particular design is relevant.

The skilled person trying to implement the teaching of document D2 would necessarily be faced with the problem of where to introduce the recirculated air. He would proceed by trial and error, just like the patent proprietor, and would reach the appropriate

solution (<2 mm or <5 mm, depending on the precise design).

In respect of the drawing made by the appellant during the oral proceedings (see point VI.(c) above), the respondent noted that according to the basic principles of fluid mechanics, $D_3 = D_1 + D_2$ (see the drawing reproduced above, point VI.(c)). It would be wrong to believe that only the recirculated air is drawn by the vacuum, regardless of the downstream distance.

It is also unsurprising that the recirculated air does not clean the portion that is upstream. Therefore, the skilled person would expect the cleaning effect to be more efficient when the downstream distance is reduced. Consequently, there is a clear incentive to situate the entry of the recirculated air as close as possible to the gutter orifice.

Document D2 discloses that the nozzle orifice diameter is 60 microns (see the end of the first paragraph on page 4 of document D2a), which means that the drops - and the gutter - have to be very small. If the gutter entry has a diameter of 200 microns, a downstream distance of 10 mm is unrealistic.

Page 54 of document P01 cited by the appellant mentions 10 pL droplets and shows a light microscopic photograph of a channel. The sizes involved are far from the cm range. Again, 10 mm and 5 mm distances are unrealistic; the 2 mm range alone is compatible with the dimensions disclosed.

In document D8 no electric effects are involved in the deflection of the ink droplets (see paragraph [0001]); paragraph [0040] refers to technologies such as CMOS circuit fabrication, etc. (see also claims 10 and 11), which involve sub-micron distances. A downstream distance of less than 2 mm is obvious in view of these indications.

Reasons for the Decision

1. Terminology

In a printhead according to the invention, a second enclosed fluid flow path opens into a first enclosed fluid flow path at a position within the gutter between the first and second ends of the first fluid flow path, and at a certain distance along the first enclosed fluid flow path from its first end. For the sake of concision the board designates this distance as "downstream distance".

2. Main request: claim 7

2.1 Interpretation

Claim 7 requires the gutter to have two fluid flow paths that extend through the gutter. The first path has to be suitable for receiving ink drops at its first end and extends to a second end that is connected to a suction line. The second path has to be suitable for receiving air from an air line at its first end and has to open into the first path at its second end, which is within the gutter and at a position between the first and the second end of the first path. This is

understood to mean that the second end of the second path cannot coincide with one of the ends of the first path but is found at some distance from each of those ends. To put it differently, the air enters the gutter at a position that is downstream of the gutter opening receiving the ink drops.

2.2 Inventive step

2.2.1 Starting point

The board uses document D2 as starting point for the assessment of inventive step. This choice has not been contested by the parties.

2.2.2 Differences

It was undisputed that document D2 discloses features 7.1, 7.2, 7.4 and 7.5. Consequently, only the disclosure of features 7.3, 7.6 and 7.7 will be discussed in what follows.

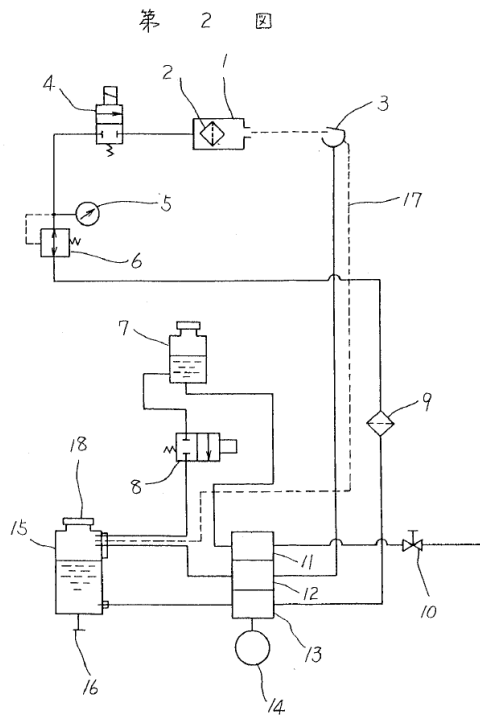
(a) Feature 7.3

The question whether the references in document D2 to charge control type (荷電変調形; lit. "charge modulation type") inkjet printers in claim 1 and the description corresponds to an implicit disclosure or not may remain unanswered. The expression certainly suggests an electrode arrangement according to feature 7.3. As a consequence, even if the feature were a distinguishing feature, it could not contribute to inventive step. It may therefore be ignored.

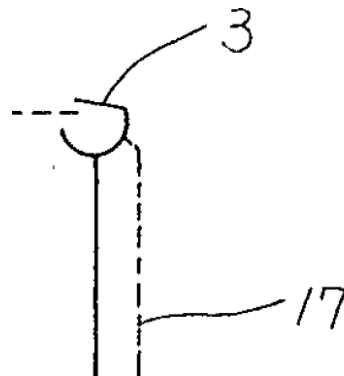
(b) Feature 7.6

As explained under point 2.1, this feature requires the air to enter the gutter at a position that is "downstream" of the gutter opening receiving the ink drops.

Whether this feature is disclosed or not has to be judged on the basis of the disclosure of document D2 as a whole (see decision T 56/87). Figures 2 and 3 clearly constitute an important part of that disclosure in respect of feature 7.6:



The dashed line 17 represents an air circulation pipe (エア-循環パイプ) that is connected to the gutter 3.



Detail of Figure 2 of document D2

It is possible - and not unreasonable - to construe the inner volume of the gutter 3 as the first enclosed fluid flow path, the first end of which being the orifice through which the ink enters the gutter and the second end being the connection to the suction line. As the air line 17 is connected to the gutter, there must be a corresponding second fluid flow path through the gutter. This path opens into the first flow path at a position within the gutter between the first and second ends of the first path as construed above. In other words, Figure 2 shows recirculation downstream of the orifice through which the ink enters the gutter.

The skilled reader of document D2 would understand that Figure 2 is schematic and that it does not disclose the precise structure of the gutter. He would, however, understand that the recirculated air is directed into the gutter, i.e. that there is no upstream recirculation.

According to decision T 56/87, a technical feature that is derived from a diagrammatic representation and that technically contradicts the teaching of the description does not form part of the disclosure of a document. As

it has been alleged that there is such a contradiction between the figures and the description of document D2, the board has examined this matter.

The board is unable to endorse the appellant's assertion that document D2 as a whole insists on upstream effects. Document D2 is concerned with problems related to dust and solvent loss caused by air containing dust taken in with the ink. It presents a solution to these problems involving the recirculation of air. The evaporation of ink solvent components at portions of the circulation route that come into contact with outside air is cited as the first cause for ink degradation. Three such portions are explicitly mentioned (see item (1) in the penultimate paragraph on page 2 of document D2a):

- the portion between ejection from the nozzle and reaching the gutter;
- the portion inside the gutter; and
- the portion inside the ink tank.

It is correct that in order to tackle the degradation due to the evaporation of ink solvent components at all portions of the circulation route, if possible, at least some of the recirculated air would have to be injected upstream of the gutter orifice. However, the goal of the invention disclosed in document D2 is less ambitious. According to the description, the invention "reduces the causes of ink degradation according to (1), (2) and (3)" (see document D2a, page 3, second paragraph). This language is compatible with a configuration that eliminates only certain but not all the causes. This is even explicitly stated in the context of Figure 2, where the description states that "almost all the aforementioned causes of ink degradation can be eliminated" (see document D32a, end

of the fourth paragraph on page 3). It is, therefore, impossible to assert that there is a contradiction between the description and the devices of Figures 2 and 3. These devices reduce the causes of ink degradation and arguably eliminate almost all of them. As a consequence, the *ratio decidendi* of decision T 56/87 is inapplicable.

The teaching of document E1 does not lead to a different evaluation of the disclosure of document D2 because a British standard recommending ways in which to prepare flow and circuit diagrams is hardly relevant for interpreting drawings of a Japanese patent document.

There is no convincing evidence that the common general knowledge of the skilled person would lead the skilled person to the conclusion that recirculation can only be upstream and that Figures 2 and 3 of document D2 must be erroneous. Documents D7 and D9, which disclose upstream recirculation, are patent documents and, as such, not suitable for establishing the common general knowledge of the skilled person. They only show that upstream recirculation was known at the priority date.

Having considered all the above, the board has reached the conclusion that document D2, and in particular its Figures 2 and 3, discloses feature 7.6.

(c) Feature 7.7

Feature 7.7 is not disclosed in document D2. Figure 2 of document D2 is schematic and the description is silent on dimensions, so it is impossible to determine whether the downstream distance, which has a finite value, is greater than 10 mm or not.

(d) Conclusion

Document D2 suggests feature 7.3 and discloses feature 7.6. Therefore, the examination of whether claim 7 involves an inventive step has to concentrate on feature 7.7, according to which the downstream distance is no more than 10 mm.

2.2.3 Technical effect/objective technical problem

When applying the problem-solution approach, the board needs to determine the technical effect of feature 7.7 and the objective technical problem solved by this feature.

The appellant has defined the objective technical problem as follows: "how to construct in practice the device of figure 2 or figure 3 of D2". This is not a satisfactory objective technical problem within the problem-solution approach, because the invention does not actually disclose a solution to this problem.

In its discussion of inventive step of claim 8 of the sixth auxiliary request before it (see item 6.2, penultimate paragraph, of the decision under appeal) the opposition division reached the conclusion that there was no particular technical effect associated with this feature and that the claimed range expressed "a mere arbitrary choice" among a host of possible embodiments.

The description of the patent refers to the claimed distance only in paragraph [0045], which specifies the feature to be "generally preferable" but does not provide any teaching on the technical effect.

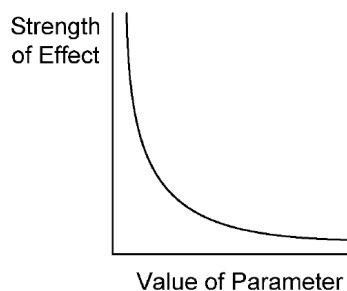
Paragraphs [0047] and [0048] teach that the distance is related to the reliability of the ink entering the gutter being cleared.

It is not plausible that a downstream distance of 10 mm or less can guarantee that the ink entering the gutter is cleared in a reliable way, regardless of the dimensions of the device. Arguably, a physically meaningful definition of the boundary value would have to be given in terms of other characteristic dimensions of the device rather than in absolute values. As a consequence, it appears not to be possible to define the objective technical problem solved by the invention in terms of the reliability of gutter clearance.

The appellant did not explain how the value of 10 mm as such was relevant for the problem solved by the invention but adopted a different line of reasoning. It stated that the teaching of the patent could be summarised as "the shorter the distance the better" (statement of grounds of appeal, page 10, last paragraph).

According to the appellant, the invention had a technical effect that varied smoothly as a function of the distance at which the second fluid flow path opens into the first enclosed fluid flow path.

The appellant represented the situation as follows:



In such a situation, there is an effect as soon as the distance is finite. This does not mean, however, that it is impossible to define a physically meaningful upper boundary for the parameter. In order to do so, one has to consider the distance at which the effect becomes significant in terms of the use to which the effect is put. It is not sufficient to simply choose an arbitrary value.

It is clear that the downstream distance as such has a technical effect, and that the patent teaches that shorter downstream distances are to be preferred. When seeking to obtain patent protection for this discovery, the appellant has chosen to claim a range having the upper boundary of 10 mm. As explained in the statement of grounds of appeal, this limit was chosen in order to have a feature expressing a "short" distance that would not be open to an objection of lack of clarity. In other words, the technical effect might still be obtained at greater distances but the appellant limited itself to a conservative upper limit, which in itself appears to be arbitrary, for the sake of clarity.

The board is aware of the intrinsic difficulty of defining meaningful boundary values when ranges are claimed, but it cannot simply ignore the actual

boundary value chosen when assessing whether the claimed subject-matter involves an inventive step, in particular when it constitutes the only distinguishing feature. The objective technical problem can only be a problem that is credibly solved when the downstream distance is less than or equal to 10 mm but not when its value is significantly outside that range. No such problem has been identified.

Having considered all the evidence and arguments before it, the board found itself unable to define an appropriate objective technical problem solved by feature 7.7.

2.2.4 Obviousness

In a situation such as in the present case, where the skilled person would expect a feature to have a technical effect but is unable to identify the effect and define a corresponding objective technical problem, the problem-solution approach appears not to be the adequate tool for examining whether the claimed subject-matter involves an inventive step.

The decisive question to ask in the present context is which downstream distance would be contemplated by the skilled person trying to put into practice the teaching of document D2, and in particular the device disclosed in its Figure 2.

The board has reached the conclusion that the skilled person would realise that choosing a small downstream distance is advantageous because the ink drops entering the first flow path would be dragged by the air stream as soon as they enter the gutter, and that a significant downstream distance would result in a "dead

zone" in the gutter in which ink deposits are more likely to occur. The board is not aware of any good reason the skilled person would have to provide a significant downstream distance. He would position the opening of the second path into the first path as close as possible to the first end of the first flow path.

The choice of a downstream distance of no more than 10 mm cannot, therefore, establish an inventive step.

Consequently, the board has reached the conclusion that the subject-matter of claim 7 does not involve an inventive step over the disclosure of document D2 in combination with the common general knowledge of the skilled person.

2.3 Conclusion

As the subject-matter of claim 7 does not comply with the requirements of Article 56 EPC, the patent cannot be maintained on the basis of the main request.

3. Auxiliary request 1

Claim 7 of auxiliary request 1 differs from claim 7 of the main request in that more details are provided in respect of the arrangement of electrodes, which is now required to comprise a charge electrode as well as first and second deflection electrodes.

The purpose of this amendment was to overcome possible objections in respect of Article 123(2) EPC and not to make the subject-matter patentable (see "Explanation of Requests", pages 1 and 2 of the statement of grounds of appeal).

The board has reached the conclusion that the finding of lack of inventive step in respect of claim 7 of the main request also applies to auxiliary request 1. Hence the patent cannot be maintained on the basis of auxiliary request 1.

4. Auxiliary request 2

Claim 8 of auxiliary request 2 differs from claim 7 of the main request in that the downstream distance of 10 mm has been reduced to "no more than 2mm".

Paragraph [0028] does not provide a disclosure of this feature because it only discloses a preferred range "of 1mm to 2mm from the opening". The only relevant disclosure in the patent is found in paragraph [0045], which reads:

"Because of the many gutter constructions and fluid systems possible with continuous ink jet printers, it will normally be necessary to optimise any particular design by trial and error. However it is generally preferable for the point at which the recirculated air joins the path of ink from the ink-receiving orifice of the gutter to and along the gutter line to be at a point not more than 10 millimetres from the ink-receiving orifice, more preferably not more than 5 millimetres from the orifice, and most preferably not more than 2 millimetres from the orifice." (underlining by the board)

There is no disclosure of a particular advantage related to a distance of not more than 2 mm; the difference with respect to the preferred value of 10 mm

appears to be a difference of degree, not kind. The different values illustrate the underlying principle which may be formulated as "the shorter the downstream distance, the better".

The assertion that a distance of 2 mm provides a particular advantage, irrespective of the geometry of the device and in particular of the shape and dimension of the gutter, lacks credibility. As stated in paragraph [0045], it is "normally ... necessary to optimise any particular design by trial and error". That a distance of less than 2 mm guarantees good results for all geometries is not plausible.

As there is no credible particular technical effect related to a downstream distance of "no more than 2mm", the reasoning that has led the board to conclude that claim 7 of the main request lacks inventive step also applies to claim 8 of auxiliary request 2.

As a result, the board reaches the conclusion that the subject-matter of claim 8 of auxiliary request 2 does not comply with the requirements of Article 56 EPC.

Hence the patent cannot be maintained on the basis of auxiliary request 2.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



N. Schneider

M. Poock

Decision electronically authenticated