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D E C I S I O N
of 18 May 2006

Case Number: T 0234/03 - 3.3.01

Application Number: 98945406.1

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Language of the proceedings: EN

Title of invention:
Jet ink composition

Patentee:
Videojet Technologies Inc.

Opponent:
-

Headword:
Jet ink composition/VIDEOJET TECHNOLOGIES

Relevant legal provisions:
EPC Art. 54, 56, 123(2)

Keyword:
"Main and first auxiliary request: novelty (no) - "suitable for use" not a technical feature of the composition"
" Second auxiliary request: inventive step (no) - improvement (no) - test vague and imprecise - obvious solution"

Decisions cited:
G 0006/83, G 0002/88, T 0181/82, T 0197/86, T 0891/91,
T 0955/96, T 0494/99, T 0553/02

Headnote:

To be relevant for demonstrating that a technical improvement is achieved in comparison with the closest state of the art any comparative test presented for that purpose must be reproducible on the basis of the information thus provided, thereby rendering the results of such tests directly verifiable (T 494/99 followed, cf. point 5.2). That requirement implies, in particular, that the procedure to perform the test relies on quantitative information enabling the person skilled in the art to reliably and validly reproduce it. Vague and imprecise operating instructions render the test inappropriate and thus irrelevant (cf. point 8.4.4 of the Reasons).



Case Number: T 0234/03 - 3.3.01

D E C I S I O N
of the Technical Board of Appeal 3.3.01
of 18 May 2006

Appellant: Videojet Technologies Inc.
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Wood Dale, IL 60191-673 (US)

Representative: McGowan, Nigel George
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 12 September 2002
refusing European application No. 98945406.1
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. Nuss
Members: P. Ranguis
J. Van Moer

Summary of Facts and Submissions

I. The appeal lodged on 19 November 2002 lies from the decision of the Examining Division posted on 12 September 2002 refusing European patent application No. 98 945 406.1 (European publication No. 1 023 407).

II. The decision under appeal was based on a set of fourteen claims submitted in the course of the examining proceedings. Independent Claim 1 read as follows:

"1. A continuous jet ink composition suitable for printing on plastic substrates messages having abrasion resistance, said composition comprising an organic solvent, a colorant, a cellulose nitrate resin, and a rosin resin."

III. The Examining Division found that the subject-matter of the above cited Claim 1 lacked novelty over document

(1) US-A-5 658 968

on the ground that this document disclosed ink compositions comprising all the ingredients recited in Claim 1 and, furthermore, were suitable for printing flexible packages by rotary letterpress, gravure printing or jet ink and thus had to exhibit an abrasion resistance.

The Examining Division also considered the inventive step issue. It held that in view of documents

(2) US-A-5 637 139 or

(3) US-A-4 389 503,

the sole distinguishing feature characterizing the claimed subject-matter lay in the use of a cellulose nitrate instead of a cellulose ester. Since document (1) taught that cellulose nitrate was a common binder in the art of printing inks and in the absence of evidence showing that changing cellulose ester to cellulose nitrate provided an unexpected result, the subject-matter of Claims 1 to 14 represented an obvious alternative to the teaching of documents (2) or (3).

IV. The Appellant, annexed to the statement of grounds of appeal, submitted two fresh sets of claims as main request and first auxiliary request.

Claim 1 of the main request reads as follows:

"1. A jet ink composition suitable for use in a continuous ink jet printing process for printing on plastic substrates messages having abrasion resistance, said composition comprising an organic solvent, a colorant, a cellulose nitrate resin, and a rosin resin."

Claim 1 of the auxiliary request reads as follows:

"1. A jet ink composition suitable for use in a continuous ink jet printing process for printing on plastic substrates messages having abrasion resistance, said printing process comprising the projection of a stream of ink droplets onto said substrate, and controlling the direction of the stream so that the droplets are caused to form the desired printed message,

said composition comprising an organic solvent, a colorant, a cellulose nitrate resin, and a rosin resin."

- V. In a communication attached to the summons to oral proceedings, the Board pointed out that the question arose as to which technical feature of Claim 1 of both requests distinguished them from the disclosure of document (1). In the absence of common general knowledge, the Appellant's contention that the inks disclosed in document (1) were not conductive might be considered as unsubstantiated allegations. The Appellant filed in response a further argumentation together with a fresh set of claims as second auxiliary request.

Claim 1 of this second auxiliary request reads as follows:

"1. A jet ink composition suitable for printing on plastic substrates messages having abrasion resistance, said composition comprising an organic solvent, a colorant, a cellulose nitrate resin, and a rosin resin, wherein said composition has (1) a viscosity from 1.6 to 6.0 centipoises at 25°C; (2) an electrical resistivity from 50 to 2000 ohm-cm; and (3) a sonic velocity from 1100 to 1700 meters/second."

- VI. In respect of Claim 1 of the main request and the first auxiliary request, the Appellant submitted in essence the following arguments:

The claimed jet ink compositions used in a continuous ink jet printing process had different physical

properties from traditional printing inks, particularly rotary letterpress and gravure printing inks disclosed in document (1). The latter had a much higher viscosity (10cps and often higher) than the ink compositions suitable for use in a continuous ink jet printing process (2 to 5cps) and consequently would not run in a continuous ink jet printer. Furthermore, in a continuous ink jet printing, it was necessary to charge the generated ink droplets so they could be deflected by an electric field. For the ink droplets to be charged, the ink composition had to be conductive.

In order for an ink composition to be conductive it had to contain a component that was both (i) ionic in nature, containing both positive and negative ions, and (ii) in solution in the ink composition so that the ionic species were able to travel within the ink composition in the presence of an applied charge voltage. In a case where an ink composition did not contain a component that was both ionic and in solution, a conductive agent had to be added to the composition to provide the required conductivity.

The present application in its section headed "Colorant" lists Solvent Black 3 and 7 dyes. These dyes were not ionic in nature, and hence did not impart the required conductivity. Use of these two black dyes would require the addition to the ink composition of a conductive agent as set out in the application. By contrast, the printing inks disclosed in document (1) were not conductive.

In document (1), the colorant was always a pigment. Pigment existed as dispersions of particles in ink

compositions. Pigments were not dissolved in solution, as was the case with dyes. Thus, in document (1), the colorant did not impart the necessary conductivity to the ink composition. Further, there were no other components in the ink compositions of document (1) that were both ionic in nature and soluble in the ink carrier. Hence, none of the ink compositions of document (1) were conductive.

Regarding the inventive step of Claim 1 of the second auxiliary request before the Board (cf. point V), the Appellant argued that starting from document (2) as the closest state of the art, the technical problem to be solved could be seen in the provision of jet ink compositions suitable for printing on plastic substrates messages showing improved rub resistance and scratch resistance. He submitted in support thereof with letter dated 21 January 2003 experiments showing allegedly the improved abrasion resistance of the claimed jet ink compositions versus *inter alia* the ink compositions comprising ethyl cellulose disclosed in document (2).

It was true that the tests used for assessing the rub and scratch resistance were not standardized, but that did not affect the results which concerned the relative resistance of the tested ink compositions with respect to each other for a force applied whatever the force was. The measure was consistent and fair since for each series of measures with the different compositions, the conditions of the test were identical and the scale of notations "poor", "fair" or "good" would remain.

If the Board did not accept that an improvement could be acknowledged, the claimed subject-matter was not obvious in view of the prior art either, given the person skilled in the art would not have considered the teaching of document (1) since the technical field of gravure inks was remote from that of the ink jet compositions.

VII. The Appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the main request received on 19 November 2002 or, in the alternative, on the basis of the first auxiliary request received on the same date or on the basis of the second auxiliary request received on 12 April 2006.

VIII. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Amendments - Article 123(2) EPC*

Compared to Claims 1 and 11 as originally filed, present Claims 1 and 11 specify that the jet ink composition is suitable for use in a continuous ink jet printing process. Such amendments find support in the description as originally filed on page 10, line 31 to page 11, line 2. Claims 2 to 10 and 12 to 14 remained

unchanged. There is, therefore, no objection under Article 123(2) EPC.

3. *Novelty - Article 54 EPC*

3.1 Document (1) discloses a flexible packaging printing ink intended to be applied on the packaging through a rotary letterpress printing or a gravure printing (see col. 1, lines 13 to 19). Said printing ink is comprised of a polyamide resin, a pigment, nitrocellulose, a solvent such as C₁-C₄ alkanols or C₂-C₄ fatty acid acetate or mixtures thereof and a dimerized rosin (see col. 2, lines 7 to 12, col. 3, lines 14 to 32). Since the term "colorant" in Claim 1 encompasses a pigment or a dye (see page 4, lines 35 to 36 of the application as originally filed), it follows that the chemical entities which define the composition disclosed in document (1) are identical to those defined in Claim 1.

3.2 The Appellant argued that the claimed printing inks used in a continuous ink jet printing process had different physical properties from traditional printing inks, particularly rotary letterpress and gravure printing inks, disclosed in document (1).

3.3 The Board agrees that the printing inks of document (1) are intended to be applied on the packaging in a different way to the claimed jet inks since a rotary letterpress printing or a gravure printing requires direct contact between the printer and the surface whereas ink jet printing involves the technique of projecting a stream of ink droplets to a surface (see page 1, lines 6 to 15). However, apart from the exception provided by Article 54(5) EPC not relevant in

the present case (cf. G 6/83, OJ EPO 1985, 67, point 10, second sentence and point 15, first paragraph), a composition is not necessarily distinguished from a composition of the prior art by the mere fact that the intended use is different. When an Applicant wants to demonstrate that a composition is new over a composition already in the state of the art due to different uses of both compositions, he must show without ambiguity that the composition of the prior art would not be suitable for the use defined in the claimed invention. The burden of proof rests upon the Appellant who in that respect must produce evidence that the intended use provides a technical contribution to the claimed composition and is, therefore, a technical feature which distinguishes **unambiguously** the claimed composition from that of the prior art.

- 3.4 In support of his view (see point 3.2 above) the Appellant neither submitted any document which would reflect the common general knowledge of the relevant technical field nor any experimental evidence but relied on unsubstantiated allegations which in the Board's judgment are not convincing and even are contradictory.

He argued, in particular, that the viscosity of the rotary letterpress and gravure printing inks of document (1) were not "suitable for use in a continuous ink jet printing process" since they had a much higher viscosity (10cps and often much higher) than continuous ink jet inks (2 to 5cps). However, first, nowhere in the description is such a narrow viscosity range recited but, furthermore, this is in contradiction with the statement in the description as filed which

provides that "In general, the ink compositions of the present invention exhibit the following characteristics for use in ink jet printing systems: (1) a viscosity from about 1.6 to 10 centipoises (cps)" (see page 3, lines 29 to 32), which is overlapping with the purported viscosity of the compositions of document (1).

The Board is also not convinced by the Appellant's further argument that the compositions of document (1) would not be conductive either. In the communication attached to the summons to the oral proceedings, the Board had informed the Appellant that if it could be accepted that the claimed jet ink compositions had necessarily a defined resistivity, the Appellant's contention that the inks disclosed in document (1) were not conductive might be considered as unsubstantiated allegations in the absence of common general knowledge.

Instead of meeting the deficiency addressed by the Board's inquiry, the Appellant submitted a non-substantiated explanation arguing that in order for an ink composition to be conductive it must contain a component that is both (i) ionic in nature, containing both positive and negative ions, and (ii) in solution in the ink composition so that the ionic species are able to travel within the ink composition in the presence of an applied charge voltage. In a case where an ink composition does not contain a component that is both ionic and in solution, a conductive agent must be added to the composition to provide the required conductivity. However, the Board observes that this statement is not in line with the description as filed. Indeed, the description mentions that if a pigment is used, then a conductivity agent **may** be needed.

According to the Board's understanding, this means that when a pigment is used a conductivity agent is not necessarily required in the composition to render it conductive. As document (1) discloses an ink composition comprising a pigment and a solvent, the Appellant did not demonstrate unambiguously that such compositions were not conductive. If this were indeed the case, that would mean that some of the compositions encompassed by present Claim 1 would not be conductive either, contrary to the Appellant's own statement.

- 3.5 According to the established jurisprudence that any party to an appeal procedure carries the burden of proof for the facts it alleges, the onus was on the Appellant to produce adequate evidence that there was a significant difference as regards the physical properties between, on the one hand, the rotary letterpress and gravure printing inks and, on the other hand, the jet inks suitable for use in a continuous ink jet printing process. In view of the above (see point 3.4), the Appellant failed to prove that the indication of the intended use amounts to a technical feature of the claimed composition which distinguishes it from that of document (1). It follows that the indication of use is not to be considered in the evaluation of novelty (see T 553/02, point 1.3).
- 3.6 A claimed invention lacks novelty unless it includes at least one technical feature which distinguishes it from the state of the art (see G 2/88, OJ EPO 1993, point 7). Since no technical feature distinguishes the subject-matter of Claim 1 from the disclosure of document (1), the requirement of Article 54 EPC is not met and Claim 1 lacks novelty.

- 3.7 Since the Board can only decide on a request as a whole, the main request is rejected under Article 54 EPC.

First auxiliary request

4. *Amendments - Article 123(2) EPC*

Compared to Claim 1 as originally filed, present Claim 1 specifies that the jet ink composition is suitable for use in a continuous ink jet printing process and that said printing process comprises the projection of a stream of ink droplets onto said substrate, and controlling the direction of the stream so that the droplets are caused to form the desired printed message. The same amendments were made with regard to Claim 11. Such amendments find support in the description as originally filed on page 1, lines 9 to 12 and page 10, line 31 to page 11, line 2. Claims 2 to 10 and 12 to 14 remained unchanged. There is, therefore, no objection under Article 123(2) EPC.

5. *Novelty - Article 54 EPC*

- 5.1 For the same reasons as set out in point 3 above, the subject-matter of Claim 1 of the first auxiliary request lacks novelty over the disclosure of document (1).

- 5.2 Since the Board can only decide on a request as a whole, the first auxiliary request is also to be rejected under Article 54 EPC.

Second auxiliary request

6. *Amendments - Article 123(2) EPC*

Compared to Claim 1 as originally filed, the present Claim 1 was amended to incorporate the content of Claim 2 as originally filed with the further limitation that the viscosity ranged from 1.6 to 6.0 centipoises at 25°C. Present Claim 10 (previously Claim 11) was rendered dependent of Claim 1. The subject-matter of Claims 2 to 9 and 11 to 13 corresponded to that of Claims 3 to 10 and 12 to 14 as originally filed. There is, therefore, no objection under Article 123(2) EPC.

7. *Novelty - Article 54 EPC*

The subject-matter of Claim 1 is novel in view of document (1) in that the physical characteristics of the claimed ink composition are not unambiguously disclosed in that document. The claimed subject-matter is also novel in view of documents (2) and (3) since those documents do not disclose ink compositions containing cellulose nitrate. There is, therefore, no objection under Article 54 EPC.

8. *Inventive step - Article 56 EPC*

8.1 Independent Claim 1 of this request relates to a jet ink composition suitable for printing on plastic substrates messages having abrasion resistance, defined by the substances contained therein and by its physical properties, i.e. viscosity, electrical resistivity and sonic velocity (see point V above).

8.2 According to the established jurisprudence of the Boards of Appeal it is necessary, in order to assess inventive step, to establish the closest state of the art, to determine in the light thereof the technical problem which the invention addresses and successfully solves, and to examine the obviousness of the claimed solution to this problem in view of the state of the art. This "problem-solution approach" ensures assessing inventive step on an objective basis and avoids an ex post facto analysis.

8.3 The Board concurs with the Appellant that document (2) is the closest state of the art to start from in assessing inventive step.

That document discloses an ink jet composition (see col. 1, line 5) and, therefore, aims at the same objective as the presently claimed subject-matter. Furthermore, the said composition exhibits the same following characteristics, i.e. a viscosity from about 1 to about 10 centipoise (cps) at 25°C, an electrical resistivity from about 50 to about 2,500 ohms-cm⁻¹, (3) a sonic velocity from about 1,000 to about 1,700 m/sec (see col. 3, lines 58 to 63) and is formulated to contain a non-water-soluble dye, a binder such as wood rosin resin and a cellulose derivative such as ethyl cellulose and ethanol and acetone as a carrier (see col. 3, lines 28 to 48; col. 3, lines 66 to 67 and col. 4, lines 40 to 58). Hence, document (2) discloses subject-matter conceived for the same purpose as the claimed composition and has the most relevant technical features in common.

- 8.4 The technical problem to be solved by Claim 1 of this request is to be determined in respect of this prior art.
- 8.4.1 The Appellant argued that the technical problem was to be seen in the provision of further ink jet compositions showing an improved abrasion resistance over the compositions of document (2) due to the use of nitrocellulose instead of ethyl cellulose and submitted to this end comparative examples with the statement of grounds of appeal.
- 8.4.2 According to the established jurisprudence of the Boards of Appeal, some beneficial effects or advantageous properties, if appropriately demonstrated by means of truly comparable results, could in certain circumstances properly form a basis for the definition of the problem that the claimed invention sets out to solve and could, in principle, be regarded as an indication of inventive step; the only comparative tests suitable for this are, however, those which are concerned with the structurally closest state of the art to the invention, because it is only here that the factor of unexpectedness is to be sought (see T 181/82, OJ EPO 1984, 401, point 5 and T 955/96, point 5.10). To be relevant, in the present case, such comparative tests must include the choice, on the one hand, of a nitrocellulose containing composition and, on the other hand, a composition containing ethyl cellulose as used in the closest state of the art, namely document (2). Moreover, the nature of the comparison with the closest state of the art should be such that any alleged advantages of beneficial effects are convincingly and unambiguously shown to have their origin in the

distinguishing feature of the invention vis-à-vis the closest state of the art (see T 197/86, OJ EPO 1989, 371, point 6.1.3).

8.4.3 The Appellant chose, in particular, to compare example 1 of the present application (control) with a composition which differed from example 1 in that, following the teaching of document (2), ethyl cellulose is used instead of cellulose nitrate in the same amount, i.e. composition 4. In the Board's judgment, that comparison meets the criteria established by the Boards of Appeal (see point 8.4.2 above) in the sense that it aims to demonstrate that the improvement is due to the critical feature, i.e. cellulose nitrate, which distinguishes the claimed subject-matter from the prior art.

8.4.4 However, to be relevant for demonstrating that a technical improvement is achieved in comparison with the closest state of the art any comparative test presented for that purpose must be reproducible on the basis of the information thus provided, thereby rendering the results of such tests directly verifiable (T 494/99 followed, cf. point 5.2). That requirement implies, in particular, that the procedure to perform the test relies on quantitative information enabling the person skilled in the art to reliably and validly reproduce it. Vague and imprecise operating instructions render the test inappropriate and thus irrelevant.

The two tests which form the basis for the comparison are disclosed in the application as originally filed as follows:

"Rub resistance was tested by rubbing 10 times the dry printed message with a thumb using a heavy force. Scratch resistance was tested by scratching the dry printed message 10 times with a fingernail using a medium force. The rub or scratch resistance was rated "good" if the message was not at all or only very slightly removed, "fair" if the message was partially removed and still legible, and "poor" if the message was completely removed and illegible" (see page 11, lines 30 to 37).

The Board considers that "rubbing with a thumb" using a "heavy force" is extremely vague in the absence of more concrete operating instructions since the part of the thumb in contact with the printed message may have a varying abrasive effect depending on the individual performing the test and the pressure with which the thumb is to be applied remains obscure. The purely descriptive term "heavy" is in that respect indeed highly imprecise as it can vary greatly depending on the estimation of the person carrying out the test. Very similar remarks apply to the scratch resistance test since neither the hardness and shape of the "fingernail" is defined nor the "medium force" applied.

The Appellant argued that the measure was relative in the sense that any skilled individual reproducing the tests would obtain the same scale of values for a force applied whatever the force is. The Board cannot accept that assertion for the following reasons.

The scale of notations in the present case has lower and upper limits which are invariable, namely erasing

the dry printed message ("poor") or no degradation ("good"). Therefore, depending on the way of interpreting the expressions "heavy force" and "medium force", the abrasive effect of the "thumb" or the hardness and shape of the "fingernail" to carry out the tests, the notation of all tests (control and comparative) may be pulled down to the value "poor" or to the contrary pulled up to the value "good", so that the scale of notation "poor", "fair" and "good" does not exist any longer rendering any comparison irrelevant.

- 8.4.5 Even though the Board had accepted the comparison provided, no improvement could have been recognized. Indeed, example 1 of the application as originally filed and composition 4 (see point 8.4.3) give the same result. The Appellant argued that the viscosity of composition 4 was too high (5.7cps) to be suited to continuous ink jet printing. However, that assertion is in contradiction with the scope of Claim 1 which encompasses ink jet composition having a viscosity up to 6.0cps (see point V above).
- 8.4.6 Since an improvement cannot be acknowledged vis-à-vis the closest state of the art, i.e document (2), a less ambitious technical problem must be formulated. In that situation, in agreement with the Appellant, the Board finds that the technical problem to be solved vis-à-vis that document may only be seen in the provision of a further ink jet composition having abrasion resistance.
- 8.4.7 As a solution, the present application proposes an ink jet composition (see point V above) which essentially

- differs from that of document (2) by the use of cellulose nitrate resin as binder.
- 8.5 In view of the examples of the application as originally filed, the Board is convinced that the technical problem as above defined is solved within the whole claimed area.
- 8.6 It remains to be decided whether or not the proposed claimed solution was obvious in view of the prior art cited. In particular, the question arises whether or not a person skilled in the art would have been led to design an ink jet composition comprising a nitrocellulose nitrate resin as a binder to solve the stated technical problem.
- 8.6.1 Starting from document (2), the Board observes that there the binder is not limited specifically to an ethyl cellulose binder but teaches more generally that the binder may comprise a cellulose derivative, preferably ethyl cellulose (see col. 4, lines 56 to 57). Looking for a solution to the above defined technical problem, the person skilled in the art would have been directed to the state of the art dealing with the problem of the abrasion resistance of printing inks. Document (1) addresses the problem of the adhesion of the ink to the substrate on non-absorbent flexible packaging and proposes an ink composition comprising a pigment, nitrocellulose, a solvent and a dimerized rosin (see col. 2, lines 7 to 12, col. 3, lines 14 to 32). In the Board's judgment, the skilled person confronted with the technical problem of abrasion resistance of jet ink would have also taken note of the state of the art in the neighbouring technical field of

gravure printing since the same problem of abrasion resistance occurs, which is not linked to the way of applying the composition but to the adhesion of the ink to the substrate after application (see T 891/91, point 4.1.5). The person skilled in the art would have had, therefore, good reasons to follow the teaching of document (1) and to design with a reasonable expectation of success an ink jet composition according to document (2) wherein as cellulose derivative, a cellulose nitrate resin is used, obtaining as a result an ink jet composition falling within the claimed area. The Board concurs, therefore, with the Examining Division that the subject-matter of Claim 1 lacks inventive step in view of the teaching of documents (1) and (2).

8.6.2 Since the Board can only decide on a request as a whole, the second auxiliary request is rejected under Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

N. Maslin

A. Nuss