Patents Act 1977 **Opinion Number** **11/16**

OPINION UNDER SECTION 74A

Patent	EP 1358283
Proprietor(s)	SERICOL LIMITED
Exclusive Licensee	FUJIFILM Speciality Ink Systems Limited
Requester	Urquhart-Dykes & Lord LLP
Observer(s)	SERICOL LIMITED
Date Opinion issued	27 May 2016

The request

1. The comptroller has been requested to issue an opinion as to whether claims 1-11 of EP1358283 B2 ("the patent") are valid. The patent was filed on 29 January 2002 with an earliest priority date of 29 January 2001, and published on 5 November 2003. It was granted on 29 September 2004 and remains in force. The patent is exclusively licensed to FUJIFILM Speciality Ink Systems Limited.

2. Opposition proceedings before the European Patent Office (EPO) were filed on behalf of Sun Chemical Corporation on 29 January 2005. The opposition was subsequently withdrawn on 27 October 2005. On 20 November 2005 the Patentee filed written submissions and proposed amended claims. The Opposition Division issued a decision on 9 June 2006 that the amended claims were allowable and these amended claims were published on 24 January 2007. It is this form of the patent that I am now being asked to consider. The request asks whether the claims lack novelty or inventive step in light of a number of documents (E1-E22) provided. More specifically it asks whether claim 1 lacks novelty in light of JP9-183927 (referred to as E5), or rather an English translation of this document (referred to as E4), and lacks an inventive step in light of a number of the other cited documents. The Requester maintains that the subject matter of the subordinate claims do not contain matter that could correct the defects of the principal claim. I also note that the initial request also includes an "additional novelty attack" using document E22.

3. The documents provided with the request are:-

Prior art considered during prosecution of the Patent:

E1 – WO 00/31189 A
E2 – EP 0540203 A
E3 – EP 0779346 A

Documents referred to at the EPO opposition proceedings:

E4 – An English translation of JP9-183927
E5 – JP9-183927
E6 – EP 0997508 A
E7 – US 4303924
E8 – A brochure entitled *"PAPI-CURE Vinyl Ethers, Reactive Agents for Radiation Curing Systems"* published by International Specialty Products (ISP) in 1995
E9 – A letter dated 20 June 2005 from Mr Alex Cox of ISP confirming the year of publication of D4
E10 – An article entitled *"Vinyl Ethers Fulfil Their Early Promise"* by Gary Russell of ISP, page 28, PPCJ, January 1995
E11 – An extract from *"Chemistry & Technology of UV and EB Formulation for Coatings, Inks and Paints"*, Vol.11, Ed. G. Webster, John Wiley & Sons, 1997
E12 – *"Vinyl ethers: Key Monomers for Radiation Curable Coatings"*, F.J. Vara, E.A. Jurczak, J.A. Dougherty and W.J. Burlant, RadTech Europe, 1993, pages 514-529
E13 – *"Vinyl Ethers in UV Curing: Copolymers with Acrylates and Unsaturated Polyesters"* R. Schwalm, H. Binder, D. Funhoft, M. Lokoi, W. Schrof and S. Weiguny, RadTech Europe, 103-109, 1999.
E14 – EP 0511860 A
E15 – GB 2256874 A
E16 – US 5804301
E17 – US 5888649
E18 – US 5262450

Document raised during prosecution of the US patent applications:

E19 – *"The Printing Ink Manual"*, Fifth Edition, Ed. R.H. Leach et al., Kluwer Academic Publishers, 1999.

Additional prior art referenced by the Requester:

E20 – WO 93/20155
E21 – EP 0997507
E22 – EP 0465039
E23 – US 6294592

Observations

4. Observations on behalf of the proprietor were received from Elkington & Fife LLP on behalf of the Patentee on 8 April 2016. These observations advocated refusal of the request on the basis that the issue of inventive step over E4 had already been considered by the EPO Opposition Division, and thus the issue had been sufficiently considered in relevant proceedings. However, specific responses to the novelty and inventive step arguments put forward by the Requester were nonetheless provided.

5. The observations included one document:

A declaration by Nigel Gould of FUJIFILM Specialty Ink Systems Ltd.

Observations in reply

6. In response observations in reply were filed by Urquhart-Dykes &Lord LLP ("the Requester") on 22 April 2016.

The Patent

7. The patent relates to ultraviolet radiation-curable inks for ink-jet printers; this being achieved through the use of alpha,beta-unsaturated ethers as photopolymerisable monomers in radical systems with one or more multi-functional (meth)acrylate monomers to achieve low viscosity inks with good cure speeds.

8. The patent as amended has 11 claims of which claim 1 is the independent claim with the remaining 10 being dependent claims (with claim 11 defining a method of inkjet printing using an ink-jet ink of any of the preceding claims).

9. Claim 1 reads:

"An ink-jet ink which is substantially free of water or volatile organic solvents, including at least one multifunctional (meth)acrylate monomer, at least one α,β-unsaturated ether monomer, at least one radical photoinitiator and at least one dispersible pigment, wherein the ink includes, by weight, from 2 to 15 parts of multi-functional (meth)acrylate monomer to 1 part α,β-unsaturated ether monomer, the ink having a viscosity of less than 50 mPas at 25 °C."

Admissibility of the Request

10. Rule 94(1)(b) of the Patents Rules 2007 provides that:

> *The comptroller shall not issue an opinion if the question upon which the opinion is sought appears to him to have been sufficiently considered in any relevant proceedings.*

11. The Patentee has objected that the Comptroller should refuse the request. In some cases it is appropriate for the Comptroller to consider the allowability of an opinion request after observations have been filed (see for example Office decision BL O/370/07). This is just such a case, as here it was important to have both parties' views in allowing me to determine what the limits of this opinion ought to be.

12. Having carefully considered the arguments put forward by the Requester and the Patentee, I do not intend to re-consider the arguments in relation to the documents (referred to in the request as E4-E18) put before the EPO which, as the Requester notes, formed the basis of the Opposition. Even though the Opposition was withdrawn, the EPO did issue a decision and having done so they must have made a decision on the relevance of document E4 to novelty and, I conclude by their choice of an alternative document (referred to here as E6) as the starting point for their inventive step consideration, obviousness. Therefore, whilst I do not agree with the Patentee's analogy between what may be considered in reviews of opinions and

what constitutes “sufficiently considered” for the purposes of Rule 94, I conclude that documents E4-E18 have been sufficiently considered in relevant proceedings.

13. That nonetheless leaves the following documents which were not considered:

E19 – *“The Printing Ink Manual”*, Fifth Edition, Ed. R.H. Leach et al., Kluwer Academic Publishers, 1999.
E20 – WO 93/20155
E21 – EP 0997507
E22 – EP 0465039
E23 – US 6294592

14. Of these, the first was presented as background art before the USPTO and the remaining documents are new ones put forward by the Requester as additional prior art.

15. The observations on behalf of the Patentee assert that there are no new documents cited which are relevant as common general knowledge. In particular at paragraphs 27-30 of the observations it is suggested that whilst patent documents E20-E23 are stated to be evidence of the common general knowledge, it is well established that patent documents are not evidence of the common general knowledge. The observations then quote Sachs LJ in *General Tire & Rubber Co. v Firestone Tyre & Rubber Co. Ltd.* [1972] RPC 457: “*it is clear that individual patent specifications and their contents do not normally form part of the relevant common general knowledge*”. I agree that, in the absence of evidence of them being so widely reported that they count as such, these patent documents cannot be considered to form part of the common general knowledge. However, I note that E22 is used as part of what the Requester terms an “Additional novelty attack” (see paragraph 41 of the request), and goes on to consider this document (as well as E23) in the context of inventive step (I note that the Patentee’s observations do not deal with these arguments). Thus consideration of these documents in that context is appropriate.

16. The observations on behalf of the Patentee further assert that E22 is merely an equivalent of E2 (cited during prosecution of the EP patent) and that as a consequence it does not constitute new evidence as required under Rule 94. The Requester has not responded to this point in their observations in reply. However looking at these documents, they are part of the same broad family, but do not share the same priority date (EP 0465039 has a priority date of 27 June 1990, whilst EP 0540203 has a priority date of 30 October 1991) and do not have identical disclosures. Therefore I shall consider document E22 and also the arguments made in relation to E2 both due to their similarity and because it is not readily apparent if this document was considered in the context of inventive step pre-grant by the EPO.

17. The Patentee’s observations make no reference to E19, but the Requester cites this document primarily in relation to E4. Whilst this document provides some background relating to viscosities of inks, I do not believe that this document alters the understanding of the common general knowledge in a way that warrants further consideration of E4.

18. My opinion will therefore be limited to arguments in relation to the new documents whether considered on their own or, if appropriate, in combination with other

documents considered previously. In particular I will consider the validity of the claims in terms of novelty with regard to document E22 and inventiveness with regard to documents E22, E2 and E23.

Claim construction

19. Before considering the documents put forward in the request I will need to construe the claims of the patent following the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on the claims, interpret it in the light of the description and drawings as instructed by Section 125(1) and take account of the Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art would have understood the Patentee to have used the language of the claim to mean.

20. The Requester in the request and observations in reply makes various references to the skilled worker and to the "skilled ink jet ink formulator", but has not actually proposed a person skilled in the art apart from naming some of their attributes as reproduced below (much discussion has also been provided with regard to the common general knowledge – see below as part of the consideration of inventive step). By contrast the observations on the Patentee's behalf set out the person skilled in the art as *"an ink formulator, probably working for an ink manufacturer. He will be unlikely to have a PhD, but likely a BSc in chemistry or similar. He will be familiar with the technique of inkjet printing. He will be aware of the types of compounds commonly used in inkjet inks, namely monomers, oligomers, resins, photoinitiators, colorants, solvents and additives."* The Requester asserted that *"the skilled person would also take an interest in scientific papers and conference proceedings relevant to ink jet formulation and in coating technology in general, particularly the proceedings of RadTech conferences which are widely recognized as being industry-leading. He would also have ready access to descriptive material, publicity material and datasheets published by raw material suppliers."* I am happy to use the skilled worker definition for the purposes of claim construction, and accept the comments of the Requester as indicating the skilled worker's interests, but do not equate these to their common general knowledge. I will discuss issues surrounding the common general knowledge of this person later in the opinion.

21. The Patentee's observations suggest that claim 1 is clear enough. Therefore I will merely deal with a minor construction issue. This is highlighted at paragraphs 51 and 52 of the request where it is suggested that claim 1 requires the absence of either water or volatile organic solvents, but not necessarily both. This makes sense from a literal reading of claim 1; however the description of the patent at paragraphs 0002-0005 clearly relates to two alternative approaches to ink-jet inks: one where water or a volatile organic solvent evaporates after application of the ink; and another where the diluent in the ink (a monomer) polymerises on application. As clear alternatives with their own advantages and drawbacks, it appears to me that the skilled worker would understand the statement "*substantially free of water or volatile organic solvents"* to equate to "*substantially free of <u>both</u> water <u>and</u> volatile organic solvents"* i.e. an ink that cures by polymerisation and does not require evaporation of solvent once applied.

Validity

22. Given that all of the claims relate to the same inventive concept, I shall concentrate on the independent claim, claim 1. I will only consider the later claims if I find that claim 1 is either not new or not inventive.

23. The Requester asserts in the initial request that claim 1 is not novel in view of the disclosure of E22. My attention is drawn to column 5 lines 5-15 where it is stated that:

"Another general-purpose and solvent-resistant ink-jet ink, curable by a combination of cationic and free-radical mechanisms, using the medium-pressure mercury arc lamp or equivalent (200-300 nm), comprises 1 to 6% photoinitiator for free-radical polymerisation, 1 to 15% photoinitiator for cationic polymerisation, 0.5 to 5% conductive salt, 0.5 to 5% colourant and 0 to 2% additives, the balance comprising up to 30% of each of four types of monomer, i.e. mono- and di-functional monomers respectively curing by a free-radical or cationic mechanism."

24. My attention is further drawn to various passages where suitable monomers are identified and to column 2 lines 41-47 where the patent application states (my emphasis):

"*As a means to highlight the principle, an ink-jet formulation **may be designed** to provide high solvent resistance by incorporating a relatively high proportion of higher functional monomer..."*

25. The highlighted term is in my view key. To be considered a novelty destroying disclosure it is a general principle that the prior art must disclose subject matter which, if performed, would necessarily infringe that claim. In other words *"The prior inventor must be shown to have planted his flag at the precise destination before the patentee"* as stated in *General Tire and Rubber Co v Firestone Tyre and Rubber Co Ltd* [1972] RPC 457 at 486. The disclosure of E22 invites the skilled worker to design something that might fall within the scope of claim, but will not inevitably do so. Thus I conclude that claim 1 is not anticipated by document E22.

26. Moving on to consider the inventiveness of claim 1, I will rely on the principles established in *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588, in which the well known *Windsurfing* steps were reformulated:

> *(1)(a) Identify the notional "person skilled in the art;*
> *(1)(b) Identify the relevant common general knowledge of that person;*
> *(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;*
> *(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;*
> *(4) Viewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art.*

27. The Requester has argued lack of inventiveness in view of documents E22, E2 and

E23.

(1)(a) Identify the notional "person skilled in the art

28. The person skilled in the art is as discussed above.

(1)(b) Identify the relevant common general knowledge of that person

29. The Requester and Patentee are some way apart on what constitutes the common general knowledge.

30. However, both parties agree that in order for a formulation to function as an ink-jet ink that it is important that its viscosity be extremely low. It is also clear that both parties accept that this viscosity was generally achieved either by use of water or a volatile organic solvent or by use of reactive monomers as diluents which harden by polymerisation on exposure UV radiation.

31. This inclusion of reactive diluents gives rise to difficulties in terms of viscosity control and curing conditions.

32. I also do not think it contentious that the monomers of the invention, whether mono-functional or multi-functional (meth)acrylate monomers, and their advantages and disadvantages are well known in the ink-jet ink field. Equally alpha,beta-unsaturated ether monomers are also well known in the art in inks. That their use cured by a cationic mechanism is well known is also agreed upon.

33. There is however argument between the parties on the extent to which it formed part of the common general knowledge that a vinyl ether would function in a free radical curable system, and indeed be curable via a free radical mechanism.

34. As I have decided that I will not be considering document E4, I do not believe that this issue is as important as it would otherwise be (not least because as pointed out by the Requester in the context of E22 the combination of free radical and cationic curing systems is noted as possible in the prior art, and I note is not excluded by claim 1 of the Patent), but nonetheless I am not convinced that the information provided by both parties allows me to come to a reasoned conclusion. It is clear that radical curing of vinyl ethers was known before the earliest date of the patent, but I cannot say with any certainty that this fact equates to it being part of the common general knowledge.

(**2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;**

35. Having already construed claim 1 above, I believe that this construed claim suffices for the inventive concept. Therefore the inventive concept is an ink-jet ink which is substantially free of both water and volatile organic solvents, including at least one multifunctional (meth)acrylate monomer, at least one α,β-unsaturated ether monomer, at least one radical photoinitiator and at least one dispersible pigment, wherein the ink includes, by weight, from 2 to 15 parts of multi-functional (meth)acrylate monomer to 1 part α,β-unsaturated ether monomer, the ink having a viscosity of less than 50 mPas at 25 °C.

(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed

36. The examples in E22 disclose ink-jet inks formed using N-vinyl-2-pyrrolidinone and hexanediol diacrylate with at least a photoinitiator. They are present in parts ratios of 1728:1000 and no actual viscosity is quoted (although the stated range at column 5 line 27 suggests that these inks should have that property).

37. Thus as noted in the request at paragraph 49, E22 does not specifically describe the use of an α,β-unsaturated ether monomer and does not disclose the requisite ratio of the two monomers.

38. As pointed out by the Patentee's observations, E2 shares many similar features in its disclosure to E22. However E2 lacks any actual examples of inks prepared according to the invention (although it does note how the examples of E22 could be modified to be consistent with the invention of E2). As such, it too does not specifically describe the use of an α,β-unsaturated ether monomer and does not disclose the requisite ratio of the two monomers.

Starting with E23, the difference between the matter cited and the inventive concept includes the fact that E23 provides a pigment preparation which page 1 paragraph 1 of the document defines as having "essential constituents" including water. In addition, neither the examples nor details about preferred formulations clearly suggest a combination of multifunctional (meth)acrylate and one α,β-unsaturated ether.

4) Viewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art.

39. The Requester asserts that "one of ordinary skill in the art, having the general knowledge imparted by one of E8 to E16, and E22, and knowing that vinyl ethers react well with the difunctional monomers mentioned in E22, would be minded to try a vinyl ether, as the monofunctional monomer, with a reasonable expectation of success, particularly so as E22 discloses at Column 5, lines 5-15 that free radical and cationic curing systems can be combined in the same ink."

40. Both documents E22 and E2 do indeed make reference to the possible use of vinyl ethers as part of a list of "suitable monofunctional monomers that cure by a cationic mechanism" (see column 3 lines 8-11 of E22 and column 3 lines 30-34 of E2), but that is the limit of the reference to them. No particular monomer from the vast class of vinyl ethers are suggested (in contrast to some of the other polymers used).

41. E22 also states that "[i]t is preferred that some monofunctional monomer is present in the novel ink, since such materials will solubilise polar conductive materials, and have low viscosity." E2 makes a similar comment omitting the reference to solubilising. However, the preferred monofunctional monomer is clearly N-vinylpyrollidinone (as it is exemplified in E22) and this forms part of a more detailed list of suitable free-radical curing monofunctional monomers. The absence of a corresponding list of suitable vinyl ethers leaves the skilled worker without clear

direction as to which vinyl ethers if any might give the appropriate properties. Thus whilst I believe the skilled worker dealing with either E2 or E22 might be motivated to try other free-radical curing monomers in preference to cationic curing monomers, I do not agree with the Requester that the skilled worker would be minded to try particular vinyl ethers without exercising inventive skill. At most these documents provide an indication that vinyl ethers might work in some combinations of polymer. This is far from the "more or less self-evident" choice that Jacob LJ suggests must be present for an invention to be obvious to try in *Saint-Gobain PAM SA v Fusion Provida Ltd and Electrosteel Castings Ltd* [2005] EWCA Civ 177, [2005] IP & T 880. It appears to me to be hindsight analysis to argue that faced with this document the skilled worker would out of all the available options select vinyl ethers to replace the N-vinylpyrollidinone and then adjust the relative quantities to fall within the ranges defined in claim 1 of the Patent. This is regardless of whether the skilled worker could count "knowing that vinyl ethers react well with the difunctional monomers mentioned in E22" and by extension E2 as part of their common general knowledge as asserted by the Requester.

42. Turning to E23, the Requester asserts that this document is relevant because claim 1 of the Patent requires that the ink jet ink should be essentially free of either water or volatile solvents. I have construed claim 1 of the claim above and do not agree with this interpretation. Therefore as E23 leaves the skilled worker in no doubt that water should be present in the preparations made using the teaching of that document, I do not see a motivation for the skilled worker to remove the water and completely change the nature of the formulation and thus conclude that the claims of the Patent are inventive over E23, particularly in view of the two approaches to ink jet inks described in the common general knowledge discussion above.

Conclusion

43. I am of the opinion that the claims of the patent are novel and inventive over the disclosure of documents E2, E22 and E23**.**

Simon Grand
Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.