Patents Act 1977 **Opinion Number** **12/26**

OPINION UNDER SECTION 74A

Patent	EP 3628491 B1
Proprietor(s)	Hitachi Industrial Equipment Systems Co., Ltd.
Exclusive Licensee	
Requester	Nash Mathews LLP
Observer(s)	Mewburn Ellis LLP
Date Opinion issued	18 November 2026

The Request

1. The comptroller has been requested by Nash Mathews ("the Requester") to issue a validity opinion in respect of EP 3628491 B1 ("the Patent") in the name of Hitachi Industrial Equipment Systems Co., Ltd.

2. The request was received on 20 August 2026 and was accompanied by a statement explaining the request.

3. The Requester has provided the following documents accompanying the request:

   D1: CN 106808799 A (GUANGZHOU EC-PACK PACKAGING EQUIPMENT CO. LTD.) - published 9 June 2017

   D2: US 6550889 A (COLOMBAT et al.) - published 22 April 2003

   The Requester also provided a certified translation of document D1 that they reference in the request.

4. The request asks for an opinion on whether claim 1 is lacking an inventive step over D1 in view of the common general knowledge of the person skilled in the art and/or lacking an inventive step over D1 in view of D2.

5. Each of documents D1 and D2 has a publication date prior to the priority date of the patent and form part of the state of the art under Section 2(2).

6. An opinion is sought in relation to independent claim 1 only. Therefore, this opinion will not consider the validity of the dependent claims.

Observations and Observation in reply

7. Observations were received from Mewburn Ellis LLP ("the Observer"). Observations in reply were received from the Requester.

Further observations

8. Following the observations in reply, further observations were received from both the Requester and the Observer. The Opinion process is intended to be a low cost and quick service. It provides for three well defined rounds of argument i.e. the request, observations and observations in reply. Consequently, for the purposes of this opinion I will not consider the further observations of either the Requester or Observer.

Matters to be considered by this opinion

9. The Observer has highlighted that D1 was cited in the European search report and relied upon by the EPO examiner during pre-grant prosecution of the Patent. The Observer has argued that D1 has already been considered and found not to deprive claim 1 of novelty or an inventive step.

10. Section 74A(3) of the Patents Act 1977 provides that:

> *(3) The comptroller shall issue an opinion if requested to do so under subsection (1) above, but shall not do so;*
>
> *(a) in such circumstances as may be prescribed, or*
>
> *(b) if for any reason he considers it inappropriate in all the circumstances to do so.*

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

> *(1) The comptroller shall not issue an opinion if—*
>
> *(a) the request appears to him to be frivolous or vexatious; or*
>
> *(b) the question upon which the opinion is sought appears to him to have been sufficiently considered in any relevant proceedings.*

12. It is an intrinsic part of the substantive examination process to assess the novelty and obviousness of the claims, as properly construed, in the light of the prior art. I think it reasonable to suppose in general that the examiner will have done his or her job properly in the absence of indication to the contrary, and I see no reason why this assumption should not apply even if the examiner has decided not to raise objection on the basis of any citations at substantive examination.

13. However, I have nothing before me to suggest that the EPO examiner considered the relevance of D1 to the granted claims in view of the common general knowledge of the person skilled in the art as put forward by the Requester and/or lacking an

inventive step over D1 in view of D2. Therefore, I consider the Requester to be raising a new question in relation to D1, and it is appropriate for me to reconsider D1 in this opinion.

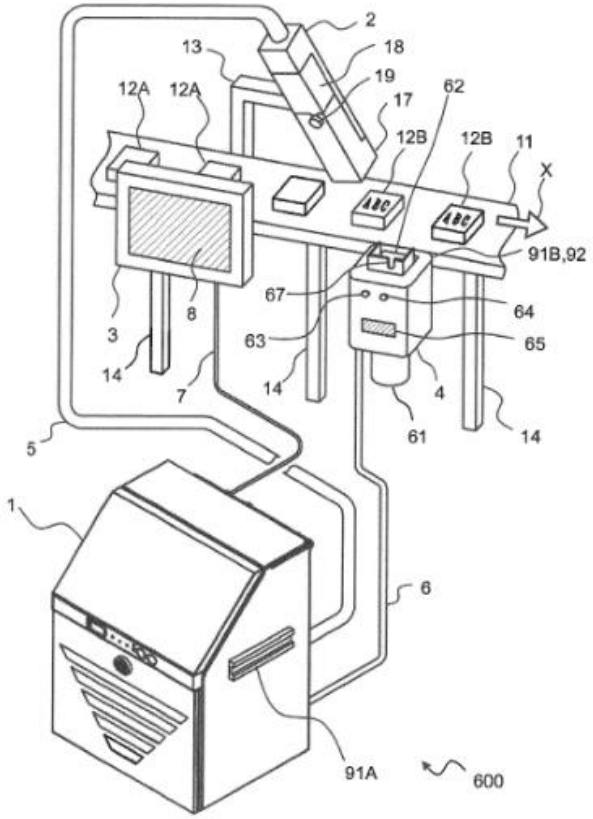
The Patent

14. The Patent is titled “Ink jet recording apparatus”. It was filed on 19th September 2019 with a priority date of 27th September 2018, published on 1st April 2020 and granted on 4th June 2025. The patent remains in force.

15. The Patent relates to an ink jet recording apparatus that continuously ejects ink from a nozzle to perform printing on a medium to be printed. The Patent explains that an object of the invention is to provide an ink jet recording apparatus that can perform a stable operation for cleaning a print head regardless of the level of skill of a worker.

16. Figure 1 below illustrates an ink jet recording apparatus 600 including an ink jet recording apparatus body 1, a print head 2 that is connected to the ink jet recording apparatus body 1 through a conduit 5, and a head cleaning unit 4 that is connected to the ink jet recording apparatus body 1 through a conduit 6.

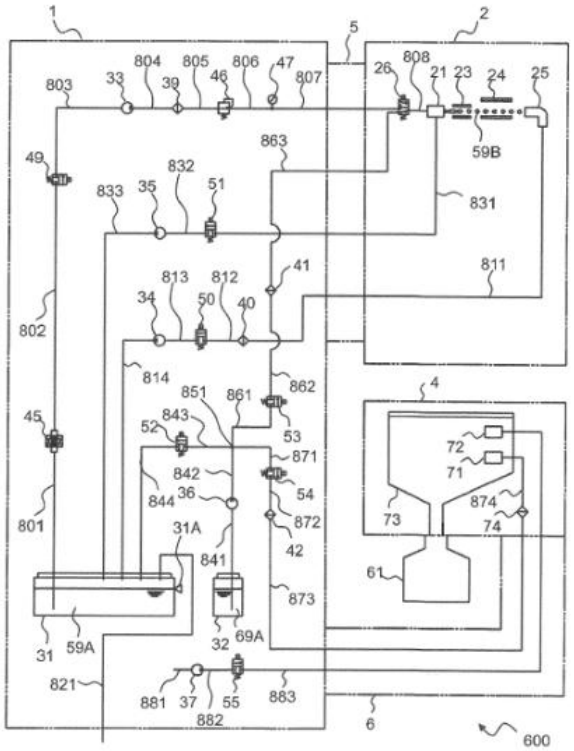
FIG. 1



17. The ink jet recording apparatus 600 is installed on a production line in a factory. The print head 2 is fixed to a print head-fixing bracket 13 installed near a belt conveyor 11 and is installed at a position where the print head 2 can be close to print targets 12A and 12B to be conveyed on the production line.

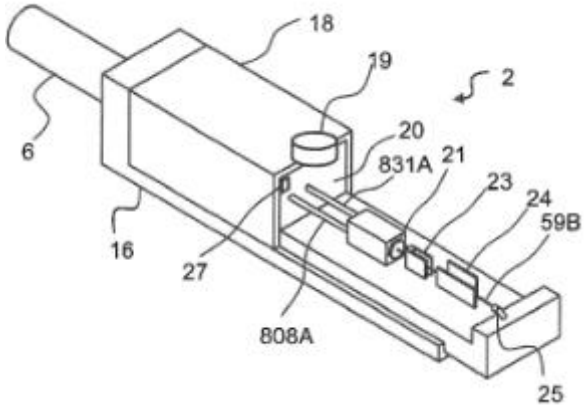
18. The head cleaning unit 4 is installed near the print head 2. Further, the head cleaning unit 4 includes a print head-insertion portion 62 that is used to insert the print head 2 into the head cleaning unit 4, and a print head-fixing part 67 that is used to fix the print head 2 to the head cleaning unit 4. The print head 2 is inserted into the print head-insertion portion 62 of the head cleaning unit 4 from the end of the print head 2 in a state where the head cover 17 is detached. Then, the print head-fixing part 67 and the fixing knob 19 are fitted to each other, so that the print head 2 is fixed to and mounted on the head cleaning unit 4.

FIG. 3



19. Figure 3 is a diagram illustrating the passage configuration of the entire ink jet recording apparatus 600. The ink jet recording apparatus body 1 includes an ink container 31 storing ink 59A for supply to the print head 2 for printing; and a solvent container 32 storing solvent 69A for supply to the head cleaning unit 4 during a print head cleaning operation.

FIG. 4B



20. Figure 4B illustrates the print head 2 with the head cover 17 removed. The print head 2 includes a nozzle 21 which is connected to an ink container 31 and from which pressurized and supplied ink 59A is jetted; charging electrodes 23 that charge ink particles 59B jetted from the nozzle 21 with electricity; deflecting electrodes (24) that deflect the charged ink particles 59B; and a gutter 25 that recovers ink 59A not used for printing

21. Figures 10 and 11 illustrate the print head 2 located in the head cleaning unit 4 for cleaning. The ink jet recording apparatus 600 ejects solvent 69A supplied from the solvent container 32 from the head cleaning nozzle 71 in the head cleaning processing to perform the cleaning of the print head 2.

22. The head cleaning nozzle 71 includes a liquid nozzle-outer portion 71F that is formed in a columnar shape, and a liquid nozzle-flow passage portion 71A that is formed in the head cleaning nozzle 71 so as to extend from the nozzle 21 in the direction of the gutter 25 in a case where the print head 2 is set on the head cleaning unit 4. The head cleaning nozzle 71 includes a liquid nozzle-ejection hole A portion 71B, a liquid nozzle-ejection hole B portion 71C and a liquid nozzle-ejection hole C portion 71H (not illustrated).

23. The liquid nozzle-ejection hole A portion 71B is formed at an angle allowing the solvent 69B to hit the nozzle 21 through the liquid nozzle-flow passage portion 71A. The liquid nozzle-ejection hole B portion 71C is formed at an angle allowing the solvent 69B to hit the deflecting electrodes 24 through the liquid nozzle-flow passage portion 71A. The liquid nozzle-ejection hole C portion 71H is formed at an angle allowing the solvent 69B to hit the charging electrodes 23 through the liquid nozzle-flow passage portion 71A.

24. The solvent 69A is ejected as the solvent 69B in the direction illustrated by an arrow B (a direction where the solvent is ejected to the nozzle 21 from the liquid nozzle-ejection hole A portion 71B) and the direction illustrated by an arrow C (a direction where the solvent is ejected to the deflecting electrodes 24 from the liquid nozzle-ejection hole B portion 71C), and the solvent 69B is sprayed on components assembled to the print head 2, such as the nozzle 21, the charging electrodes 23, and the deflecting electrodes 24.

25. Accordingly, dirt, which is caused by the ink 59A adhering during the operation of the ink jet recording apparatus 600 and at the time of maintenance, can be cleaned. Further, since the solvent 69B, which is sprayed on the assembled components, such as the nozzle 21, the charging electrodes 23, and the deflecting electrodes 24, drops and flows in the directions illustrated by arrow D and E due to gravity, the gutter 25, which is disposed below the deflecting electrodes 24 in a state where the print head 2 is set on the head cleaning unit 4, can be cleaned with the solvent 69B.

26. Further, the solvent 69B having cleaned the components arranged on the print head 2 in the head cleaning processing drops down in the directions illustrated by arrows F, G, and H, flows into the cleaning liquid bottle 61 installed on the lower portion of the head cleaning unit 4, and is stored in the lower portion of the cleaning liquid bottle 61 as the cleaning liquid 69C.

FIG. 10

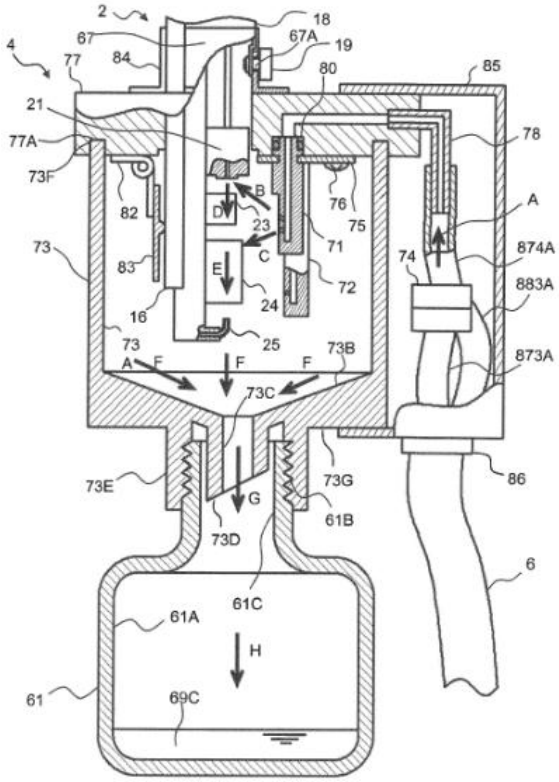
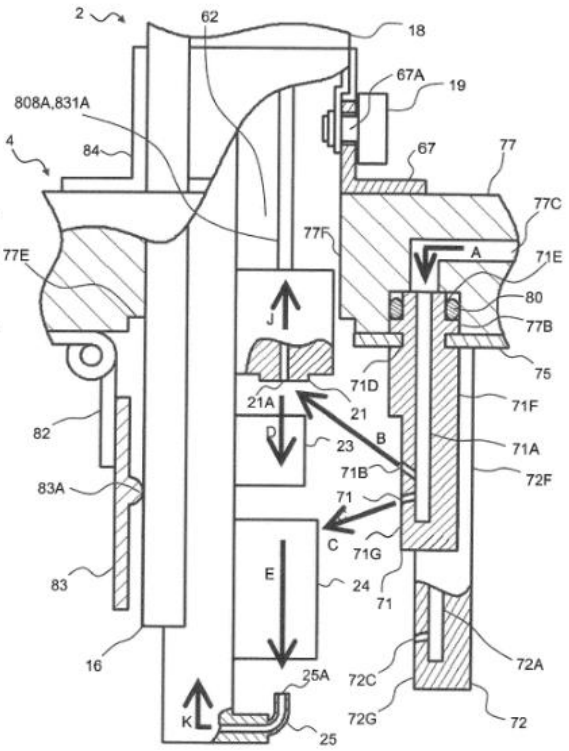


FIG. 11



27. The Patent has 19 claims including a single independent claim 1. Claim 1, adopting the references used by the Requester, reads:

    (a) *An ink jet recording apparatus (600) comprising:*

    (b) *an ink container (31) in which ink to be used to perform printing on a print target is stored,*

    (c) *a nozzle (21) which is connected to the ink container (31) and from which pressurized and supplied ink (59A) is jetted,*

    (d) *charging electrodes (23) that charge ink particles (59B) jetted from the nozzle (21) with electricity,*

    (e) *deflecting electrodes (24) that polarize the ink particles (59B) charged with electricity by the charging electrodes (23),*

    (f) *a gutter (25) that recovers ink (59A) not used for printing,*

    (g) *a solvent container (32) in which a solvent (69A) is stored, and*

    (h) *a liquid nozzle (71) which is connected to the solvent container (32) and from which a pressurized and supplied solvent (69A) is jetted, wherein*

(i) the liquid nozzle (71) includes a liquid flow passage portion (71A) that extends from the nozzle (21) in a direction of the gutter (25),

(j) and a liquid jet hole that is formed at an angle allowing the pressurized and supplied solvent (69A) to hit the nozzle (21) through the liquid flow passage portion (71A),

characterized in that:

(k) the liquid nozzle (71) includes a second liquid jet hole that is formed at an angle allowing the solvent (69A) to hit the deflecting electrodes (24).

Claim construction

28. Before considering the inventive step issues raised in the request, I need to construe the claims of the patent – that is to say, I must interpret them in the light of the description and drawings as instructed by Section 125(1):

> *125(1) For the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.*

29. In doing so I must interpret the claims in context through the eyes of the person skilled in the art. Ultimately the question is what the person skilled in the art would have understood the patentee to be using the language of the claims to mean. This approach has been confirmed in the recent decisions of the *High Court in Mylan v Yeda*[1] and the *Court of Appeal in Actavis v ICOS*[2].

30. In order to interpret the claims through the eyes of the skilled person, they must first be identified. The Requester has not put forward substantial argument on what constitutes the person skilled in the art. The Requester merely refers to a person skilled in the art of CIJ printer design in the initial request.

31. The Observer considers the person skilled in the art to be a team concerned with the design and manufacture of continuous ink jet (CIJ) printers, comprising an engineer experienced in print head design together with a specialist in the associated ink and solvent circuits.

32. In the absence of any argument to the contrary, I am minded to accept the Observer's definition of the skilled person for the purpose of construing the claims.

33. The Requester has put forward argument concerning the construction of features (e) and (i). In my opinion, claim 1 is largely clear and would be understood by the person

[1] Generics UK Ltd (t/a Mylan) v Yeda Research and Development Co. Ltd & Anor [2017] EWHC 2629 (Pat)
[2] Actavis Group & Ors v ICOS Corp & Eli Lilly & Co. [2017] EWCA Civ 1671

skilled in the art. I do not think the skilled person would have any issue understanding feature (e) as it defines the deflecting electrodes as are well-known in the art of CIJ printers. As explained by the Requester the natural meaning of the term “polarize” is to cause something to acquire polarity, *i.e.*, the property of having poles. This construction is consistent with the normal operation of a CIJ printer, in which electric charge on an ink drop that passes through an electric field between deflecting electrodes is redistributed so as to oppose the electric field, thereby polarising the ink drop.

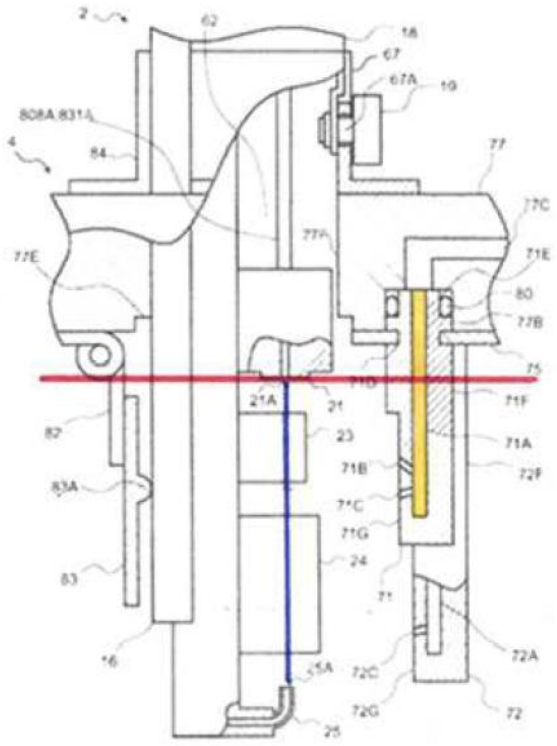
34. However, I agree that feature (i) requires some consideration. Feature (i) requires that “the liquid nozzle (71) includes a liquid flow passage portion (71A) that extends from the nozzle (21) in a direction of the gutter (25)”.

35. The Requester argues that the meaning of the term ‘that extends from the nozzle in a direction of the gutter’ is unclear, because the liquid flow passage portion 71A of the liquid nozzle 71 shown in Figure 11 of Hitachi is separated from and located to one side of the ink nozzle 21 and extends in a direction that does not cause it to approach the gutter 25. The Requester contends that a construction of the term ‘that extends from the nozzle in a direction of the gutter’ that is consistent with the description and drawings of Hitachi may therefore be ‘that extends towards the gutter end of the printhead along the ink nozzle-to-gutter direction’.

36. The Observer disagrees and considers the feature to be clear. The Observer highlights claims 2-3 and figures 8 and 11 to aid the skilled person in construing the feature. Claim 2 specifies that the liquid flow passage portion is parallel to the flight direction of the ink jetted from the nozzle 21 and recovered by the gutter 25, and claim 3 specifies that it is positioned on the side of the nozzle 21, charging electrodes 23, and deflecting electrodes 24 opposite to the head base 16. Further the cross-sectional views in FIGS. 8 and 11 show such a portion extending from the height of the nozzle 21, past the charging and deflecting electrodes, toward the gutter 25.

37. The Requester provided a marked copy of figure 8 with their observations in reply. This is reproduced below as I believe it is helpful in understanding the relationship of the liquid flow passage portion to the print head 2 in the preferred embodiment of the invention as disclosed in the Patent. The blue line represents a flight direction of ink jetted from the nozzle 21 and recovered by the gutter 25. The red line represents a plane containing the nozzle 21 and perpendicular to the flight direction represented by the blue line. The plane represented by the red line intersects the liquid flow passage portion (shown in yellow) 71A. The liquid flow passage portion 71A is formed parallel to the flight direction represented by the blue line.

FIG. 8



38. The Requester argues, for the purposes of limitation (i) of claim 1, therefore, a liquid nozzle can have a liquid flow passage portion as depicted in FIG. 8 that:

    (1) is intersected by a plane, where the plane contains a nozzle and is perpendicular to a flight direction of ink jetted from the nozzle and recovered by a gutter,

    (2) is laterally offset in that plane from the nozzle, and

    (3) is formed parallel to the flight direction of ink jetted from the nozzle and recovered by the gutter.

39. In order to interpret this feature, the skilled person would turn to the description and drawings of the Patent. To my mind, paragraphs [0045] and [0048] along with figures 7-8 and 10-12 would appear to be particularly helpful. As is explained and shown the liquid nozzle-flow passage portion 71A that is formed in the head cleaning nozzle 71 so as to extend from the nozzle 21 in the direction of the gutter 25 in a case where the print head 2 is set on the head cleaning unit 4.

40. The skilled person would understand that the liquid flow passage portion is located within the head cleaning unit 4 which is a separate part of the printing apparatus to the print head 2. Further, it would be understood that when the print head is located within the head cleaning unit 4 for cleaning, the liquid flow passage portion would be located separate from and to the side of the print head 2. The purpose of the liquid flow passage portion is to supply solvent to the first and second liquid jet holes.

41. I am not convinced that the skilled person would understand that the liquid flow passage portion is formed parallel to the flight direction of ink jetted from the nozzle

and recovered by the gutter as argued by the Requester. As highlighted by the Requester this feature is introduced as optional in dependent claim 2 and I don't think the skilled person is taught by the Patent that being parallel to the flight direction of the ink jetted is necessary for the liquid flow passage portion to supply solvent to the first and second liquid jet holes as required by claim 1.

42. In my opinion, the skilled person would understand that the liquid flow passage portion extends in a direction alongside the print head 2 when it is located within the head cleaning unit 4 i.e. extends in a direction extending from the nozzle to the gutter. The extension of the liquid flow passage portion in this direction would appear necessary to supply solvent to any configuration of first and second liquid jet holes angled to allow the solvent to hit the nozzle and the deflecting electrodes respectively as required by claim 1.

The law

43. Section 1(1)(a) and (b) of the Patents Act (henceforth 'the Act') reads:

> *1(1) A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say –*
> *(a) the invention is new;*
> *(b) it involves an inventive step;*

44. The provisions in relation to inventive step are found in section 3 which states:

> *3. An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).*

45. The Court of Appeal in Windsurfing[3] formulated a four-step approach for assessing whether an invention is obvious to a person skilled in the art. This approach was restated and elaborated upon by the Court of Appeal in Pozzoli[4]. Here, Jacob LJ reformulated the Windsurfing approach as follows:

> *(1)(a) Identify the notional "person skilled in the art"*
> *(1)(b) Identify the common general knowledge of that person;*
> *(2) Identify the inventive concept of the claim in question or if that cannot be readily 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, do those differences constitute steps that would have been obvious to the person skilled in the art or do they require any degree of invention?*

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[3] Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd, [1985] RPC 59
[4] Pozzoli SPA v BDMO SA [2007] EWCA Civ 588

The inventive step argument

46. The Requester alleges that the claimed invention of the Patent is not inventive in light of D1 in view of the common general knowledge of the person skilled in the art and/or lacking an inventive step over D1 in view of D2.

(1)(a) Person skilled in the art

47. The person skilled in the art has been discussed above in paragraphs 30-32. I consider the person skilled in the art to be a team concerned with the design and manufacture of continuous ink jet (CIJ) printers, comprising an engineer experienced in print head design together with a specialist in the associated ink and solvent circuits.

(1)(b) Common general knowledge (CGK)

48. The Requester refers to a person skilled in the art of CIJ printer design in the initial request. However, the Requester did not define what the CGK of such a skilled person would include.

49. In their observations in reply, the Requester asserts that cleaning nozzles with first and second liquid jet holes formed at first and second angles allowing a cleaning liquid to hit first and second portions of an object to be cleaned formed part of the CGK of the skilled person at the priority date. A car windscreen washer nozzle is given as an example of such a cleaning nozzle.

50. The Requester has not provided any evidence to support their argument that cleaning nozzles with first and second liquid jet holes formed at first and second angles allowing a cleaning liquid to hit first and second portions of an object to be cleaned formed part of the CGK a person skilled in the art of CIJ printer design. They merely assert this is the case. Furthermore, the given example of a car windscreen washer nozzle is from a different technical field to that of the skilled person. I have no evidence before me to support the assertion that the skilled person as defined in paragraph 47 above, would have the specific knowledge of cleaning nozzles with first and second liquid jet holes formed at first and second angles or the design of car windscreen washer nozzles as part of their CGK. Therefore, I do not consider these to form part of the CGK.

51. The Observer sets out the common general knowledge of the team skilled in the art at the priority date to include the general construction of a CIJ print head, that is to say the nozzle, the charging electrodes, the deflecting electrodes and the gutter, the fact that ink accumulates and dries on those components, and the use of solvent sprays, wiping and immersion in order to remove it. I consider this to be a reasonable definition of the common general knowledge, and I am happy to adopt it.

(2) Inventive concept of claim 1

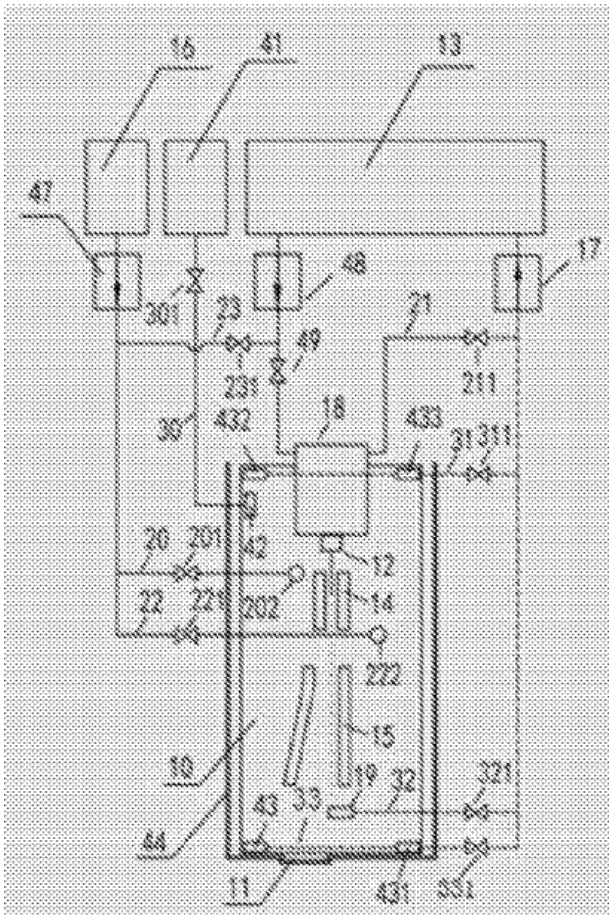
52. The Requester has not set out the inventive concept of claim 1. However, their argument centres around D1 disclosing all of the features of claim 1 apart from feature (k) i.e. the liquid nozzle includes a second liquid jet hole that is formed at an angle allowing the solvent to hit the deflecting electrodes. This is consistent with the

Observer's definition of the inventive concept of claim 1 that one and the same liquid nozzle, having a liquid flow passage portion that extends from the nozzle in the direction of the gutter, carries both a liquid jet hole formed at an angle allowing solvent to hit the nozzle and a second liquid jet hole formed at an angle allowing solvent to hit the deflecting electrodes.

53. I consider the inventive concept of claim 1 to reside in the recording apparatus having a liquid nozzle which includes a liquid flow passage portion that extends in a direction from the nozzle to the gutter, a liquid jet hole formed at an angle allowing solvent to hit the nozzle and a second liquid jet hole formed at an angle allowing solvent to hit the deflecting electrodes.

(3) What differences exist between the D1 and the inventive concept of claim 1?

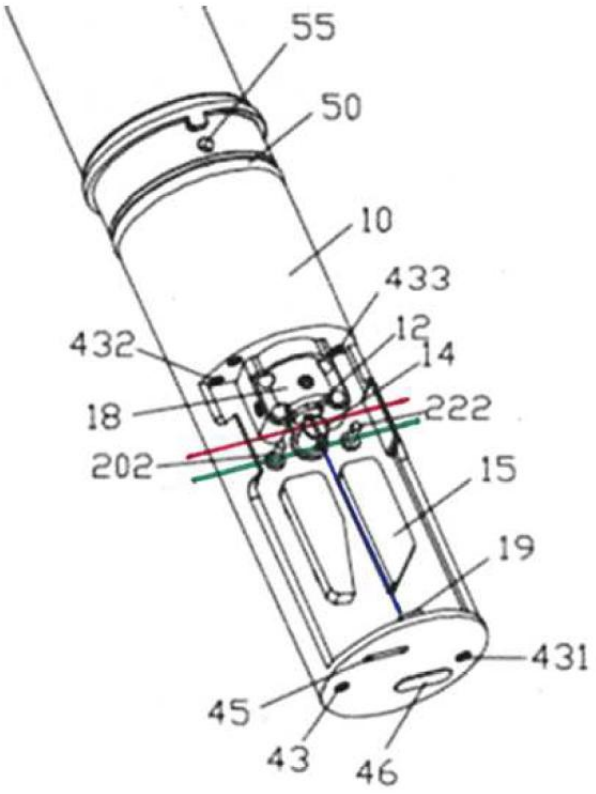
54. Figure 1 of D1 below discloses a CIJ recording apparatus having an ink container 13, a nozzle 12, charging electrodes 14, deflecting electrodes 15, a gutter 19 and a solvent container 16.

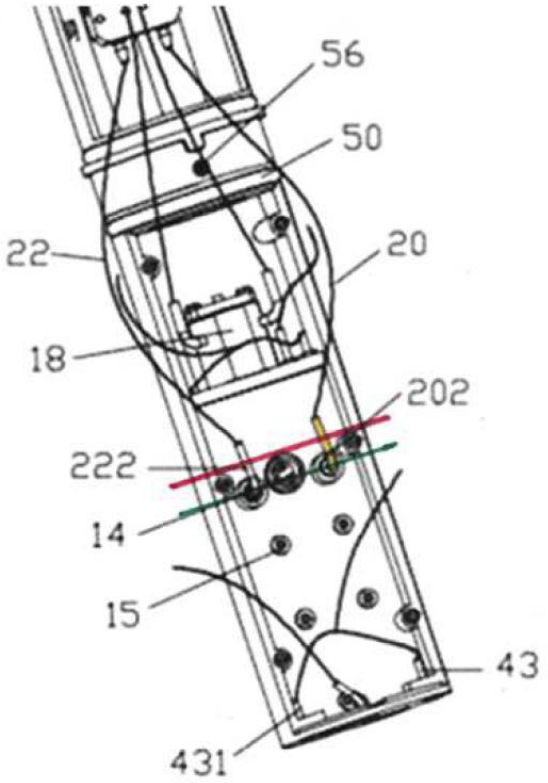


55. The CIJ recording apparatus further includes first cleaning nozzle 202 and second cleaning nozzle 222. The first and second cleaning nozzles 202, 222 are supplied with solvent from solvent container 16 via first and third purge lines 20, 22 respectively. Supply of solvent to the nozzles 202, 222 via the lines 20 22 is controlled by respective first and third control valves 201, 221. These valves may be operated independently of one another. The first cleaning nozzle 202 ejects solvent

towards the nozzle 12 and the second cleaning nozzle 222 ejects solvent towards the charging electrodes 14 or the deflection electrodes 15.

56. The Requester provided a marked copy of figures 2 and 3 or D1 with their observations in reply. These are reproduced below as I believe they are helpful in understanding the disclosure of D1.





57. The Requester argues that D1 discloses a liquid flow passage portion that extends from the nozzle in a direction of the gutter. In the figures above the red line indicates where a first plane containing the (ink jetting) nozzle 12 and perpendicular to the flight direction represented by the blue line would intersect a printhead base front face from which the charging electrode 14, first and second cleaning nozzles 202 and 222 and deflection electrode 15 project.

58. The green line indicates where a second plane parallel to the first plane intersects the printhead base front face and contains the locations where the first and second cleaning nozzles 202 and 222 protrude from that front face. The Requester considers D1 to disclose a liquid flow passage portion (coloured yellow) that extends from a plane (red line) that includes the nozzles 202, 222 in a direction (from the red line to the green line) of the gutter 19.

59. The Observer disagrees that any such features can be unambiguously derived from the above figures. It is argued that there does not appear to be any disclosure in D1 regarding the illustrated portion between the end of the first cleaning conduit 20 and the first cleaning nozzle 202, and it is not clear whether this portion is part of the first purge pipe 20, the first cleaning nozzle 202, or a separate portion. Furthermore, this feature cannot be derived from the drawings of D1, which are schematic in nature. A feature shown only in a drawing is part of the disclosure only if its structure and

function are clearly and unmistakably derivable from that drawing by a person skilled in the art. To the extent that anything can be inferred from the figures in this regard, they show the nozzle 202 itself extending in a direction perpendicular to a direction that extends from the nozzle 12 to the trough 19.

60. Claim 1 defines a liquid nozzle which is connected to the solvent container and includes a liquid flow passage portion and two angled liquid jet holes. In my opinion, the skilled person would understand the figures above to show a first purge pipe 20 connecting to a portion (coloured yellow) at one side of the apparatus which supplies solvent to a liquid jet hole on the other side of the apparatus. To my mind, the portion (coloured yellow) is equivalent to the liquid flow passage portion of claim 1 as the skilled person would understand from the Patent. The portion extends from the nozzle in a direction of the gutter as shown in the figures. The portion extends in that direction to enable connection with first purge pipe 20 from above (as shown in the drawings).

61. D1 discloses in paragraphs [0049]-[0050] that the first cleaning nozzle 202 ejects solvent onto the outlet surface of the nozzle 12. As is shown in the figures above the first cleaning nozzle 202 is positioned below the nozzle 12. Therefore, the skilled person would understand D1 to disclose a liquid jet hole that is formed at an angle allowing the solvent to hit the nozzle through the liquid flow passage portion.

62. I consider D1 to disclose a CIJ printing apparatus having all of features (a)-(j) of claim 1. I have reached my conclusions relating to features (a)-(h) in the absence of any substantive observations from the Observer on features (a)-(h). The Observer nevertheless states that the lack of observations is not to be viewed as an admission regarding them. The Observer has directed their observations regarding the validity of the Patent on features (i)-(k) of claim 1.

63. However, D1 clearly does not disclose feature (k) i.e. the liquid nozzle includes a second liquid jet hole that is formed at an angle allowing the solvent to hit the deflecting electrodes. D1 discloses the use of a separate liquid flow passage portion to supply solvent to a separate nozzle 222 for spraying the solvent to hit the deflecting electrodes.

(4) Are the differences inventive?

64. The inventive step argument forwarded by the Requester is in two parts – (1) claim 1 is not inventive in light of D1 in view of the CGK of the person skilled in the art and (2) claim 1 lacks an inventive step over D1 in view of D2. I will consider each in turn starting with (1).

65. The Requester argues that it would have been obvious at the priority date of Patent to a person skilled in the art of CIJ printer design and mechanically trivial to replace the two single jet hole nozzles of D1 with a single nozzle with two jet holes to obtain the ink jet recording apparatus of claim 1 of Patent.

66. The Observer states that an assertion that a modification would be mechanically simple to carry out is a statement about feasibility once the modification has been conceived; it is not a reason for conceiving it. Further, the observer argues that the Requester has not set out what the CGK of the skilled person is and thus with no

knowledge of the present patent, it would not be obvious to the skilled person to modify the apparatus disclosed in D1 to include a single nozzle with two jet holes as required by claim 1.

67. As discussed above, I do not have any evidence before me to suggest that the inventive concept of a recording apparatus having a liquid flow passage portion that carries both a liquid jet hole formed at an angle allowing solvent to hit the nozzle and a second liquid jet hole formed at an angle allowing solvent to hit the deflecting electrodes forms part of the CGK. Therefore, in my opinion the uninventive skilled person would not be able to modify the CIJ printing apparatus of D1 in light of the CGK in order to arrive at the invention of claim 1.

68. Turning now to (2). D2 discloses a CIJ printing apparatus having a housing 10 which supports at least one droplet generator 12, nozzle(s) 18, charging electrode(s) 14 surrounding the jet, and deflecting electrode(s) 16 for each jet J1 and J2. The CIJ printing apparatus also includes an injector 20 having two cleaning jets 22 that ejects solvent towards each nozzle 18. See figures 2 and 3 of D2 below.

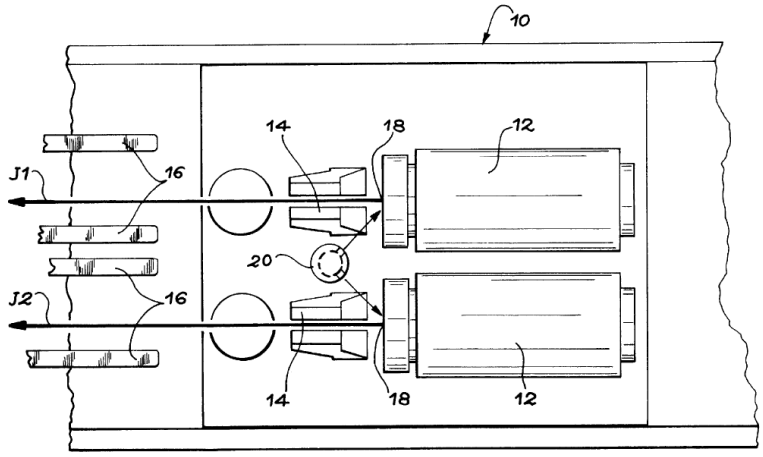


FIG. 2

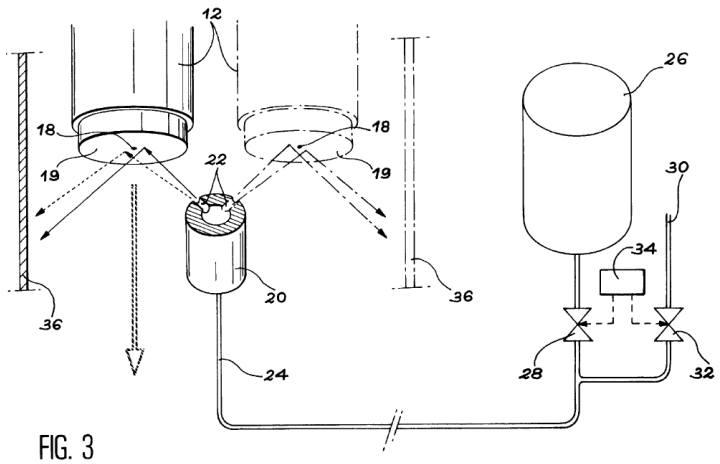


FIG. 3

69. The Requester states that D2 discloses a CIJ printhead provided with a single nozzle 20 with two jet holes 22, each angled to clean an ink jetting nozzle 18 of a droplet generator, charging electrode and deflecting electrodes assembly. Simply by rotating

the single nozzle 20 through 90 degrees, the jet holes of the single nozzle 20 would be arranged to spray solvent onto the nozzle 18 and deflecting electrodes 16 of one or other of the droplet generator, charging electrode and deflecting electrodes assemblies 12, 14 and 16.

70. The invention of D2 is concerned with the cleaning of ink nozzles of a CIJ printer. D2 discusses cleaning a print head with either one or two droplet generators. D2 teaches the skilled person to use an injector 20 to spray the nozzles 18 with solvent. Where the print head delivers a single ink jet, the injector 20 will have only one cleaning jet 22. It is for this reason that one of the cleaning jets and the corresponding ink nozzle have been indicated with a chain-dotted line in FIG. 3. Where the injector 20 includes two cleaning jets 22 the nozzles 18 of each droplet generator 12 are cleaned simultaneously.

71. The Requester argues that D2 teaches that where two components of a CIJ printhead are to be cleaned, the injector should be provided with two orifices formed at respective angles allowing a cleaning liquid to hit the two components. D2 therefore teaches that cleaning nozzles with first and second liquid jet holes formed at first and second angles allowing a cleaning liquid to hit first and second portions of an object to be cleaned are applicable to CIJ printheads. Thus, the skilled person would have been motivated, and it would have been obvious, to apply the teaching of D2 to D1 to obtain an ink jet recording apparatus with all the limitations of claim 1.

72. The Observer explains that the question is not whether the skilled person could have arrived at the subject-matter of claim 1 by making a series of modifications to the cited documents, but whether, without any knowledge of the invention, they would in fact have been motivated by the teachings of D1 and D2 to perform these modifications.

73. The Observer alleges that the Requester is using hindsight which is corroborated by the number and the nature of the modifications required. The skilled person would have had to:

(1) combine the two separate cleaning nozzles 202 and 222 of D1, with their separate conduits and separate control valves, into a single liquid nozzle having a flow passage portion common to both jet holes;

(2) re-orient the injector 20 of D2 through 90 degrees, notwithstanding that it is expressly positioned between, and equidistant from, two parallel ink jets with its cleaning jets lying substantially in the plane of the trajectory of those jets, so that after such a re-orientation neither cleaning jet would be directed at an ink nozzle at all; and

(3) re-aim one of the two cleaning jets, which in D2 are both directed at ink nozzles, at an entirely different component at a different angle and distance, namely the deflecting electrodes, contrary to the express teaching of D2 that residues are to be carried away from the electrodes.

74. The Observer argues that each of those steps would itself have to be obvious to the skilled person, and none of them is suggested by either document. Further, the obviousness argument put forward by the Requester asserts that a skilled person

would replace cleaning nozzle (202) with the injector (20) from D2, rotated by 90 degrees. If the cleaning nozzle (202) were replaced in this manner, the feature relied upon for (i) and (j) would be eliminated. The Requester fails to explain how the resulting arrangement (described only as "a single solvent nozzle located to one side of the ink nozzle (12) and deflection electrode (15)") would include a liquid flow passage portion extending from the nozzle toward the gutter.

75. I consider D2 to teach the skilled person that an injector can be provided with two jet holes each for spraying solvent to a nozzle of separate droplet generators. D2 teaches that in the instance of cleaning two sperate nozzles, the solvent is ejected from both of the two jet holes simultaneously. D2 does not teach or suggest that the jet holes could be positioned to clean any other part(s) of the CIJ printing apparatus apart from the nozzles.

76. Would the skilled person consider modifying D1 in light of D2 to arrive at the invention of claim 1 without any foreknowledge of the invention?

77. D1 teaches a CIJ recording apparatus that includes first cleaning nozzle 202 and second cleaning nozzle 222 which are supplied with solvent from solvent container 16 via first and third purge lines 20, 22 respectively. Supply of solvent to the nozzles 202, 222 via the lines 20 22 is controlled by respective first and third control valves 201, 221. These valves may be operated independently of one another. The first cleaning nozzle 202 ejects solvent towards the nozzle 12 and the second cleaning nozzle 222 ejects solvent towards the charging electrodes 14 or the deflection electrodes 15.

78. There is no motivation or suggestion in D1 that the first cleaning nozzle 202 and second cleaning nozzle 222 could be replaced by a single nozzle having two jet holes. D2 teaches an injector having two jet holes that eject solvent simultaneously. It would not be obvious to the skilled person to modify D1 to include the injector of D2 as the injector of D2 cannot be used to eject solvent through each jet hole independently as in D1.

79. D2 teaches cleaning of CIJ print head nozzles, and the injector is used for that purpose only. There is no suggestion that the injector could be used to clean other printer components as required by D1. D2 explains that the injector has two jet holes when required to clean two droplet generators located within the CIJ printer. D2 states that where only print head delivers a single ink jet, the injector 20 will have only one cleaning jet 22. Therefore, the skilled person would understand that if they were to attempt to implement the injector of D2 into the CIJ printer of D1, they would use an injector having only a single jet hole as D1 only includes a single droplet generator and associated nozzle.

80. Simply the skilled person is provided with no motivation to modify D1 in light of D2 and their respective teachings would appear to teach away from any such modification. D1 teaches independent cleaning of different CIJ printer components through separate cleaning nozzles having their own independently controllable supply lines. To implement the injector of D2 into the CIJ printing apparatus of D1 would require significant modification of D1, that would not be obvious without the benefit of hindsight in my opinion.

81. I am therefore of the opinion that the invention as defined by claim 1 is inventive in light of D1 in view of the CGK of the person skilled in the art and is inventive in light of D1 in view of D2.

Opinion

82. On the basis of the evidence put forward, I am of the opinion that claim 1 of the Patent is inventive in light of D1 in view of the CGK of the person skilled in the art and is inventive in light of D1 in view of D2.

Marc Collins
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.