Neutral Citation Number: [2016] EWHC 2161 (Pat)

Claim No HP-2015-000027

IN THE HIGH COURT OF JUSTICE
CHANCERY DIVISION
PATENTS COURT

Royal Courts of Justice, Rolls Building
Fetter Lane, London, EC4A 1NL
Date: 2nd September 2016

Before :

MR JOHN BALDWIN QC
(sitting as a deputy Judge of the Court)

- -

Between

NICOCIGS LIMITED — Claimant

- and –

FONTEM HOLDINGS 1 BV — Defendant
(a company incorporated under the laws of the Netherlands)

-and-

FONTEM VENTURES BV — Third Party
(a company incorporated under the laws of the Netherlands)

- -

Iain Purvis QC and Ben Longstaff (instructed by Powell Gilbert LLP) for the Claimant
Andrew Lykiardopoulos QC and Tim Austen (instructed by Simmons & Simmons LLP) for the Defendant and Third Party
Hearing dates: 11th to 13th, 16th, 18th & 19th May 2016

- -

Judgment Approved

1. This is an action in which the Claimant (Nicocigs) seeks an order for revocation of patent EP(UK) 2 022 349 (the P) and/or a declaration that its products do not infringe. The Defendant (Fontem) is the patentee and the Third Party is the exclusive licensee under the P. There is a counterclaim for infringement. Further, Fontem has conditional applications to amend the P should the circumstances require it.

Contents

The Patent

2. The invention in the P relates to an electronic cigarette and, in particular, to an aerosol electronic cigarette that contains nicotine but does not contain tar. The problems sought to be solved by the invention are not complicated and are expressed in these terms:

> **[0006]** The electronic cigarettes currently available on the market … are complicated in structure. Their cigarette bodies can be roughly divided into three sections, which have to be connected through via plugging or thread coupling before use. Also, their batteries have to be changed frequently, making it inconvenient for the users. What's worse, the electronic cigarettes don't provide the ideal aerosol effects, and their atomizing efficiency is not high.

3. The P teaches a simple device to solve this problem and it seeks to provide good aerosol effects and atomising efficiency. The general configuration of the preferred embodiment of the P is shown in Figure 1.

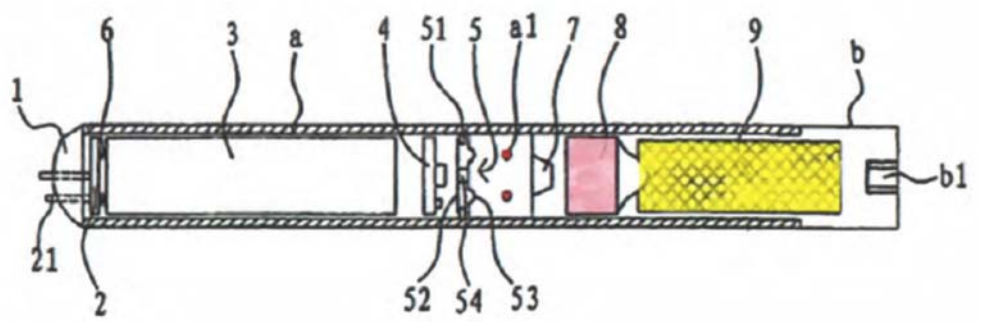

Figure 1

There are three main components: the battery assembly (3), the atomiser assembly (8, left part is coloured pink) and the liquid storage component (9, coloured yellow) in a shell (a, b). The liquid to be vaporised (for example, nicotine) is stored in the liquid storage component and this component is in liquid communication with the porous component of the atomiser assembly.

4. When a person sucks on the device (at end b1) the pressure change causes the battery assembly to activate and provide power to the heating component in the atomiser assembly. This pressure change also causes air to flow into the device through air inlets (a1, coloured red) and towards the atomiser assembly where there is vaporisation of the liquid in the porous component by forced convection. The liquid lost by evaporation from the porous component is replaced by further liquid supplied by capillary flow from the liquid storage component. The vapour condenses within the shell to form an aerosol which is inhaled by the user. The aerosol is intended to simulate the smoke of a cigarette.

The witnesses

5. I heard expert evidence from Professor Shrimpton on behalf of Fontem and Mr Fox on behalf of Nicocigs. Professor Shrimpton is an academic. He trained as a chemical engineer and since 2007 has been a Senior Lecturer, Reader and, since 2014, Professor in the Engineering and Environment Department at the University of Southampton. He was appointed a Fellow of the Institute of Mechanical Engineers in 2011. Mr Fox is a consultant

engineer. He gained a first class degree in Engineering Science in 1986 and has been employed as a mechanical design engineer. In 2011 he established Maddison Consulting Limited, an independent consultancy that provides technical and project management services in medical device development.

6. In circumstances where the experts were not agreed, I found the evidence of Mr Fox more helpful than that of Professor Shrimpton. Mr Fox gave his answers clearly and he did not prevaricate or evade. He seemed to me to be a careful and practically minded witness who was trying to assist the court. He had the ability to explain things in terms which were easily comprehendible. I am satisfied that Professor Shrimpton was also trying to assist the court. On occasion, however, he gave the impression of being an advocate for Fontem, on occasion he was defensive and did not deal as directly as he could have done with simple questions and on occasion his explanation and reasoning were less than satisfactory (e.g. his evidence in relation to the run-through hole and to the orientation of the heated part of the porous member). On the whole the evidence of Professor Shrimpton carried less conviction and was, I found, less soundly based than that of Mr Fox.

7. Mr Lykiardopoulos QC, for Fontem, criticised Mr Fox's approach to the documents and to the case on lack of inventive step on the basis that it was one of compulsive problem solving and 'doing better' than the prior art. Mr Lykiardopoulos was correct in that Mr Fox's general approach to things was one of someone seeking to improve matters. He exhibited one of the characteristics of his trade – he was a man who looked at things with an eye to seeing if they could be improved.

8. I have taken into account Mr Lykiardopoulos' comments about Mr Fox when assessing the evidence in this case.

The skilled addressee

9. It was common ground that the P was addressed to those likely to have a practical interest in the subject matter of the invention and practical knowledge and experience of the kind of work in which the invention is to be used.

10. There was broad agreement about the identity of the skilled addressee. It would be someone with a background in mechanical engineering with postgraduate experience in developing technology for inhalation devices including devices to produce aerosols. Thus he would have expertise in fluid technology and atomisation technology and experience in applying these technologies to consumer products.

The common general knowledge

11. It was common ground that the skilled addressee was possessed with the common general knowledge in the art and that such was all that which was generally known and generally regarded as a good basis for action by those engaged in the field in 2007 (the priority date).

12. Although electronic aerosol cigarettes were not well known in 2007, I am satisfied that the following matters would be known to the skilled addressee:

    12.1. An aerosol is a fluid material that is a collection of sufficiently small liquid droplets such that they are suspended in a gas (e.g. air). The basic principles of aerosol production were well known.

    12.2. Atomisation is a process which was generally understood. It is a mechanical process by which the surface tension energy holding a mass of liquid together is broken and a single liquid mass is transformed into smaller discrete fragments.

    12.3. Known atomiser techniques included pressure atomisers (commonly used in the production of sprays), impingement atomisers (where impingement baffles can break up spray droplets), piezoelectric

atomisers (in which small drops are mechanically produced using piezoelectric atomisers) and flash atomisers (as used, for example in hair spray cans).

12.4. Evaporation and vaporisation are two terms that refer to the same concept, namely the transfer of liquid mass to the vapour phase using thermal energy. The rate of evaporation depends on the surface area of the liquid/vapour interface, the physical properties of the liquid being evaporated and the concentration gradient of the vapour away from the liquid surface. It is also limited by the rate of thermal energy transfer to the liquid.

12.5. Vapour is a fluid material in a gaseous state. Condensation occurs when a vapour is cooled and there is a phase transfer from vapour to liquid. The process of vaporisation and condensation was a known alternative process to atomisation for the production of an aerosol.

12.6. The use of inhaled medications in the form of aerosols and the fact that the extent of absorption of a drug in the respiratory tract and lungs is influenced by the size of droplets.

12.7. Free convection when applied to evaporation of a liquid is the transport of vapour away from the liquid surface as a result of the vapour near the surface being heated, expanding and becoming less dense, and rising. Forced convection is the transport of vapour away from the liquid surface by an externally imposed force that sets the vapour in motion (e.g. blowing over a liquid surface).

12.8. Basic liquid transport processes such as capillary action, diffusion and fluid flow through tubes and porous materials as well as knowledge of a range of typical materials (braided cotton, some polyesters and nylons, wool, fibreglass, sponges) used in such processes as well as an understanding that different liquids behave differently in these processes.

12.9. The use of porous materials to transport liquids in various common applications such as paraffin lamps, air fresheners, candles, sanitary towels.

12.10. The use of various heating elements such as plates, rings, coils, wire, bar heaters and filaments as well as applications in which they were used (such as toasters, kettles, blow driers, irons, room heaters)

12.11. The basic principles of operation of heating elements.

12.12. The use in various applications (such as insect killer devices) of heating elements in combination with a porous material in which the porous material is used to transport liquid to an area for heating in order to promote vaporisation of a liquid.

12.13. Nicotine as a component of tobacco products and its use in quitting devices such as nicotine patches.

Construction

13. There was no dispute about the approach. The general position was summarised by Jacob LJ in *Virgin Atlantic v Premium Aircraft* [2009] EWCA Civ 1062, [5]:

> 5 One might have thought there was nothing more to say on this topic after *Kirin-Amgen v Hoechst Marion Roussel* [2005] RPC 9. The judge accurately set out the position ... We set out what the judge said, but using the language of the EPC 2000 :
>
> [182] The task for the court is to determine what the person skilled in the art would have understood the patentee to have been using the language of the claim to mean. The principles were summarised by Jacob LJ in *Mayne Pharma v Pharmacia Italia* [2005] EWCA Civ 137 and refined by Pumfrey J in *Halliburton v Smith International* [2005] EWHC 1623 (Pat) following their general approval by the House of Lords in *Kirin-Amgen v Hoechst Marion Roussel* [2005] RPC 9. An abbreviated version of them is as follows:
> (i) The first overarching principle is that contained in Article 69 of the European Patent Convention ;
> (ii) Article 69 says that the extent of protection is determined by the claims. It goes on to say that the description and drawings shall be used to interpret the claims. In short the claims are to be construed in context.
> (iii) It follows that the claims are to be construed purposively—the inventor's purpose being ascertained from the description and drawings.

(iv) It further follows that the claims must not be construed as if they stood alone—the drawings and description only being used to resolve any ambiguity. Purpose is vital to the construction of claims.
(v) When ascertaining the inventor's purpose, it must be remembered that he may have several purposes depending on the level of generality of his invention. Typically, for instance, an inventor may have one, generally more than one, specific embodiment as well as a generalised concept. But there is no presumption that the patentee necessarily intended the widest possible meaning consistent with his purpose be given to the words that he used: purpose and meaning are different.
(vi)Thus purpose is not the be-all and end-all. One is still at the end of the day concerned with the meaning of the language used. Hence the other extreme of the Protocol—a mere guideline—is also ruled out by Article 69 itself. It is the terms of the claims which delineate the patentee's territory.
(vii) It follows that if the patentee has included what is obviously a deliberate limitation in his claims, it must have a meaning. One cannot disregard obviously intentional elements.
(vii) It also follows that where a patentee has used a word or phrase which, acontextually, might have a particular meaning (narrow or wide) it does not necessarily have that meaning in context.
(vii) It further follows that there is no general "doctrine of equivalents."
(viii) On the other hand purposive construction can lead to the conclusion that a technically trivial or minor difference between an element of a claim and the corresponding element of the alleged infringement nonetheless falls within the meaning of the element when read purposively. This is not because there is a doctrine of equivalents: it is because that is the fair way to read the claim in context.
(ix) Finally purposive construction leads one to eschew the kind of meticulous verbal analysis which lawyers are too often tempted by their training to indulge.

14. That case went on to deal with three further matters which related to and involved the question of how much of the law and practice of the patent system the skilled addressee is taken to know and take into account when he is trying to work out what, by the words of the claim, the patentee was intending to convey. The Court concluded that the skilled addressee was to assume that the claim was for the purpose of defining the monopoly and that it should be for something new. He was also taken to be aware of drafting conventions, the meaning of divisional applications and the like and the fact that identifying numerals in a claim do not influence the construction of a claim.

15. There are some construction issues in this case but it will be convenient to deal with them in the context in which they arise. Out of context they do not have much interest.

16. There were numerous attacks on the P and I will deal with them in turn.

Validity - Added Matter

17. Nicocigs' complaint is not an unusual one. It contends that the patentee has attempted to broaden and manipulate the scope of its claims in the course of prosecution of the P so as to catch the configuration of the alleged infringements. It contends that in doing so the patentee has changed the nature of the invention in an impermissible way.

18. The relevant authorities on added matter were gathered together and considered by the Court of Appeal in *Nokia v IPCom* [2013] RPC 5:

> 46 The objection is founded upon Article 123(2) EPC :
>
> > "A European patent application or a European patent may not be amended in such a way that it contains subject matter which extends beyond the content of the application as filed."
>
> 47 The test for added matter was stated by Aldous J *in Bonzel v Intervention (No 3)* [1991] RPC 553 at 574 in these terms:
>
> > "The decision as to whether there was an extension of disclosure must be made on a comparison of the two documents read through the eyes of a skilled addressee. The task of the Court is threefold:
> >
> > (1) To ascertain through the eyes of the skilled addressee what is disclosed, both explicitly and implicitly in the application.
> >
> > (2) To do the same in respect of the patent,
> >
> > (3) To compare the two disclosures and decide whether any subject matter relevant to the invention has been added whether by deletion or addition. The comparison is strict in the sense that subject matter will be added unless such matter is clearly and unambiguously disclosed in the application either explicitly or implicitly."
>
> 48 In Case G 2/10, 30 August 2011, the Enlarged Board of the EPO explained in similar terms that an amendment can only be made
>
> > "within the limits of what the skilled person would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of the application as filed".
>
> 49 In *Vector Corp v Glatt Air Techniques Ltd* [2007] EWCA Civ 805, [2008] RPC 10, Jacob LJ elaborated aspects of the test to be applied and drew together various statements of principle from earlier cases at [4]-[9]:
>
> > "4. In *Richardson-Vicks' Patent* [1995] RPC 568 at 576 I summarised the rule in a single sentence:
> >
> > > "I think the test of added matter is whether a skilled man would, upon looking at the amended specification, learn anything about the invention which he could not learn from the unamended specification."
> >
> > I went on to quote Aldous J in *Bonzel* His formulation is helpful and has stood the test of time.

5. The reason for the rule was explained by the Enlarged Board of Appeal of the EPO in *G1/93 ADVANCED SEMICONDUCTOR PRODUCTS/Limiting feature* [1995] EPOR 97 at [Reasons 9]:

> "With regard to Article 123(2) EPC , the underlying idea is clearly that an applicant shall not be allowed to improve his position by adding subject-matter not disclosed in the application as filed, which would give him an unwarranted advantage and could be damaging to the legal security of third parties relying upon the content of the original application."

6. Mr Richard Arnold Q.C. provided a clear articulation as to how the legal security of third parties would be affected if this were not the rule:

> "The applicant or patentee could gain an unwarranted advantage in two ways if subject-matter could be added: first, he could circumvent the "first-to-file" rule, namely that the first person to apply to patent an invention is entitled to the resulting patent; and secondly, he could gain a different monopoly to that which the originally filed subject-matter justified."

7. Kitchin J has recently helpfully elaborated upon the *Bonzel* formulation in *European Central Bank v Document Security Systems* [2007] EWHC 600 (Pat):

> "[97] A number of points emerge from this formulation which have a particular bearing on the present case and merit a little elaboration. First, it requires the court to construe both the original application and specification to determine what they disclose. For this purpose the claims form part of the disclosure (s. 130(3) of the Act), though clearly not everything which falls within the scope of the claims is necessarily disclosed.
>
> [98] Second, it is the court which must carry out the exercise and it must do so through the eyes of the skilled addressee. Such a person will approach the documents with the benefit of the common general knowledge.
>
> [99] Third, the two disclosures must be compared to see whether any subject matter relevant to the invention has been added. This comparison is a strict one. Subject matter will be added unless it is clearly and unambiguously disclosed in the application as filed.
>
> [100] Fourth, it is appropriate to consider what has been disclosed both expressly and implicitly. Thus the addition of a reference to that which the skilled person would take for granted does not matter: *DSM NV's Patent* [2001] RPC 25 at [195]-[202]. On the other hand, it is to be emphasised that this is not an obviousness test. A patentee is not permitted to add matter by amendment which would have been obvious to the skilled person from the application.
>
> [101] Fifth, the issue is whether subject matter relevant to the invention has been added. In case G1/93, *Advanced Semiconductor Products*, the Enlarged Board of Appeal of the EPO stated (at paragraph [9] of its reasons) that the idea underlying Art. 123(2) is that that an applicant should not be allowed to improve his position by adding subject matter not disclosed in the application as filed, which would give him an unwarranted advantage and could be damaging to the legal security of third parties relying on the content of the original application. At paragraph [16] it explained that whether an added feature which limits the scope of protection is contrary to Art. 123(2) must be determined from all the circumstances. If it provides a technical contribution to the subject matter of the claimed invention then it would give an unwarranted advantage to the patentee. If, on the other hand, the feature merely excludes protection for part of the subject matter of the claimed

> invention as covered by the application as filed, the adding of such a feature cannot reasonably be considered to give any unwarranted advantage to the applicant. Nor does it adversely affect the interests of third parties.
>
> [102] Sixth, it is important to avoid hindsight. Care must be taken to consider the disclosure of the application through the eyes of a skilled person who has not seen the amended specification and consequently does not know what he is looking for. This is particularly important where the subject matter is said to be implicitly disclosed in the original specification."

> 8. When an amendment of a granted patent is being considered, the comparison to be made is between the application for the patent, as opposed to the granted patent, and the proposed amendment (see the definition of 'additional matter' in s. 76(1)(b)). It follows that by and large the form of the granted patent itself does not come into the comparison. ...
>
> 9. A particular, and sometimes subtle, form of extended subject matter (what our Act calls 'additional matter') is what goes by the jargon term 'intermediate generalisation'. Pumfrey J described this in *Palmaz's European Patents* [1999] RPC 47, 71 as follows:
>
> > "If the specification discloses distinct sub-classes of the overall inventive concept, then it should be possible to amend down to one or other of those sub-classes, whether or not they are presented as inventively distinct in the specification before amendment. The difficulty comes when it is sought to take features which are only disclosed in a particular context and which are not disclosed as having any inventive significance and introduce them into the claim deprived of that context. This is a process sometimes called "intermediate generalisation"."

50 In *Napp Pharmaceutical Holdings Ltd v Ratiopharm* [2009] EWCA Civ 252, [2009] RPC 18, Jacob LJ re-emphasised at [98]-[99] that not everything falling within the scope of a claim is necessarily disclosed:

> 98. We can deal with this quite shortly. The added subject-matter is said to be contained in claim 6. Mr Silverleaf put it this way:
>
> > We say that if that claim covers water soluble spheronising agents, it must also disclose the possibility of using them or it does not actually read on to them at all; because otherwise the teaching of the document is to use water insoluble ones. We say if in fact the claim is wide enough to cover water soluble spheronising agents, there must be added matter.
>
> 99. The trouble with that submission is that claim 6 does not mention – so cannot possibly teach – water soluble spheronising agents. It just specifies "a spheronising agent." The fallacy in the argument is to equate disclosure of subject matter with scope of claim, a fallacy struck down as long ago as 1991 in *AC Edwards v Acme Signs & Displays* [1992] RPC 131 (see e.g. *per* Fox LJ at p.143)."

51 These principles are enough to deal with the issues arising in most cases. However, this appeal focuses on two particular points: first, the approach to be adopted to claim broadening; second, the objection of intermediate generalisation.

52 As for claim broadening, in decision T 0260/85 *Coaxial connector/AMP*, OJ EPO 1989, 105 the Technical Board of Appeal (TBA) explained (at [7]) that the deletion of a feature would constitute added matter if the application as originally filed contained no disclosure, express or implied, that the feature could be omitted.

53 Then, in decision T 0331/87 *Houdaille*, the TBA laid down a three part test at [3]-[6]:

"3. For the determination whether an amendment of a claim does or does not extend beyond the subject-matter of the application as filed, it is necessary to examine if the overall change in the content of the application originating from this amendment (whether by way of addition, alteration or excision) results in the skilled person being presented with information which is not directly and unambiguously derivable from that previously presented by the application, even when account is taken of matter which is implicit to a person skilled in the art in what has been expressly mentioned (Guidelines, Part C, Chapter VI, No. 5.4). In other words, it is to examine whether the claim as amended is supported by the description as filed.

4. In the decision T 260/85 ("Coaxial connector/AMP, OJ EPO, 1989, 105) the Board of Appeal 3.5.1 came to the conclusion that "it is not permissible to delete from a claim a feature which the application as originally filed consistently presents as being an essential feature of the invention, since this would constitute a violation of Article 123(2) EPC " (cf. Point 12 and Headnote). In that case the application as originally filed contained no express or implied disclosure that a certain feature ("air space") could be omitted. On the contrary, the reasons for its presence were repeatedly emphasised in the specification. It would not have been possible to recognise the possibility of omitting the feature in question from the application (Point 8). It could be recognised from the facts that the necessity for the feature was associated with a web of statements and explanations in the specification, and that its removal would have required amendments to adjust the disclosure and some of the other features in the case.

5. Nevertheless it is also apparent that in other, perhaps less complicated technical situations, the omission of a feature and thereby the broadening of the scope of the claim may be permissible provided the skilled person could recognise that the problem solving effect could still be obtained without it (e.g. T 151/84 — 3.4.1 of 28 August 1987, unreported). As to the critical question of essentiality in this respect, this is a matter of given feasibility of removal or replacement, as well as the manner of disclosure by the applicant.

6. It is the view of the Board that the replacement or removal of a feature from a claim may not violate Article 123(2) EPC provided the skilled person would directly and unambiguously recognise that (1) the feature was not explained as essential in the disclosure, (2) it is not, as such, indispensable for the function of the invention in the light of the technical problem it serves to solve, and (3) the replacement or removal requires no real modification of other features to compensate for the change (following the decision in Case T 260/85, OJ EPO 1989, 105). The feature in question may be inessential even if it was incidentally but consistently presented in combination with other features of the invention. Any replacement by another feature must, of course, be examined for support in the usual manner (cf. Guidelines, Part C, Chapter VI, No. 5.4) with regard to added matter."

54 Thus the skilled person must be able to recognise directly and unambiguously that (1) the feature is not explained as essential in the original disclosure, (2) it is not, as such, indispensable for the function of the invention in the light of the technical problem it serves to solve, and (3) the replacement or removal requires no real modification of other features to compensate for the change.

55 This test provides a convenient structured approach to the fundamental question whether, following amendment, the skilled person is presented with information about the invention which is not derivable directly and unambiguously from the original disclosure.

56 Turning to intermediate generalisation, this occurs when a feature is taken from a specific embodiment, stripped of its context and then introduced into the claim in

circumstances where it would not be apparent to the skilled person that it has any general applicability to the invention.

57 Particular care must be taken when a claim is restricted to some but not all of the features of a preferred embodiment, as the TBA explained in decision T 0025/03 at point 3.3:

> "According to the established case law of the boards of appeal, if a claim is restricted to a preferred embodiment, it is normally not admissible under Article 123(2) EPC to extract isolated features from a set of features which have originally been disclosed in combination for that embodiment. Such kind of amendment would only be justified in the absence of any clearly recognisable functional or structural relationship among said features (see e.g. T 1067/97, point 2.1.3)."

58 So also, in decision T 0284/94 the TBA explained at points 2.1.3–2.1.5 that a careful examination is necessary to establish whether the incorporation into a claim of isolated technical features, having a literal basis of disclosure but in a specific technical context, results in a combination of technical features which is clearly derivable from the application as filed, and the technical function of which contributes to the solution of a recognisable problem. Moreover, it must be clear beyond doubt that the subject matter of the amended claim provides a complete solution to a technical problem unambiguously recognisable from the application.

59 It follows that it is not permissible to introduce into a claim a feature taken from a specific embodiment unless the skilled person would understand that the other features of the embodiment are not necessary to carry out the claimed invention. Put another way, it must be apparent to the skilled person that the selected feature is generally applicable to the claimed invention absent the other features of that embodiment.

60 Ultimately the key question is once again whether the amendment presents the skilled person with new information about the invention which is not directly and unambiguously apparent from the original disclosure. If it does then the amendment is not permissible.

19. Thus the task of the court is to identify and compare the disclosures of the patent application (PA) and the granted patent (P) to determine whether the skilled addressee would learn any information about the invention from the P which he could not learn from the PA. The three part test formulated in *Houdaille* provides a convenient structured approach but it is not the only approach.

20. The problem addressed by the PA is set out in [0006]:

> **[0006]** The electronic cigarettes currently available on the market … are complicated in structure. Their cigarette bodies can be roughly divided into three sections, which have to be connected through via plugging or thread coupling before use. Also, their batteries have to be changed frequently, making it inconvenient for the users. What's worse, the electronic cigarettes don't provide the ideal aerosol effects, and their atomizing efficiency is not high.

21. The technical solution is provided in [0008]:

[0008] The purpose of this invention is fulfilled with the following technical solution: an aerosol electronic cigarette includes a battery assembly, an atomizer assembly and a cigarette bottle assembly, and also includes a shell, which is hollow and integrally formed. The said battery assembly connects with the said atomizer assembly and both are located in the said shell. The said cigarette bottle assembly, which is detachable, is mounted in one end of the shell and fits with the atomizer assembly within the shell[1]. The said shell has through-air-inlets.

22. Claim 1 of the PA is in the same terms as the description of the aerosol electronic cigarette in [0008].

23. There is more information about the cigarette bottle assembly in [0025] of the PA:

[0025] The said cigarette bottle assembly includes a hollow cigarette holder shell, and a perforated component for liquid storage inside the said cigarette holder shell. One end of the said cigarette holder shell plugs into the said shell[2], and the outer peripheral surface of the said cigarette holder shell has an inward ventilating groove. On one end surface of the said cigarette holder shell, there is an air channel extending inward.

24. [0037] sets out the benefits of the invention of which the following are relevant:

[0037] This invention will bring the following benefits:

(1) For this invention, the perforated component for liquid storage of the cigarette bottle assembly stores the nicotine liquid only, which doesn't contain cigarette tar, considerably reducing the carcinogenic risks of smoking. At the same time, the smokers can still enjoy the feel and excitement of smoking, and there is no fire hazard since there is no need for igniting. (2) For this invention, the battery assembly and atomizer assembly are directly installed inside the shell, and then connected with the cigarette bottle assembly. That is, there is just one connection between two parts, resulting in a very simple structure. For use or change, you just need to plug the cigarette holder into the shell, providing great convenience. When the nicotine liquid in the cigarette bottle assembly is used up or the cigarette bottle assembly is damaged and needs to be changed, the operation will be extremely easy. (3) ...

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[1] Regarding this last sentence (and its equivalent elsewhere in the PA), the parties agreed for the purpose of these proceedings that the version set out here was a better translation of the Chinese PCT application than the version currently on the EPO file.

[2] being the shell referred to in [0008] of the specification

25. [0055] of the PA describes one embodiment of the atomiser assembly:

> **[0055]** In the fifth preferred embodiment of this utility model, as shown in Figure 17 and 18, the atomizer assembly is an atomizer (8), which includes a frame (82), the porous component (81) set on the frame (82), and the heating wire (83)[3] wound on the porous component (81). The frame (82) has a run-through hole (821) on it. The porous component (81) is wound with heating wire in the part that is on the side in the axial direction of the run-through hole (821). One end of the porous component (81) fits with the cigarette bottle assembly. The porous component (81) is made of foamed nickel, stain-less steel fiber felt, macromolecular polymer foam or foamed ceramics.

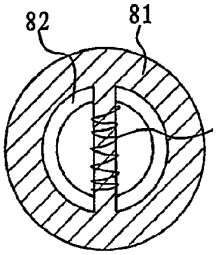

Figure 17

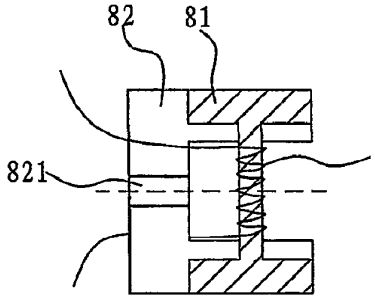

Figure 18

26. Thus the product of the invention as disclosed by the PA comprises three elements: a battery assembly, an atomiser assembly and a cigarette bottle assembly and the disclosure provides for the arrangement of these items. The battery assembly and atomiser assembly are connected together and are both located in a one piece shell, and the cigarette bottle assembly is mounted in one end of that shell so as to fit with the atomiser assembly.

27. The skilled addressee would understand that the purpose of the battery assembly was to supply power to the atomiser, the purpose of the atomiser assembly was to provide an aerosol of a liquid, such as nicotine, for inhalation by the user, and the purpose of the cigarette bottle assembly was to provide a reservoir of liquid for supply to the atomiser assembly. The skilled addressee would understand that the purpose of the shell being integrally formed or 'all

[3] not marked on the figure but (83) should be at the right hand side of it

in one piece'[4] was, as explained in the second benefit in [0037], so that the device was a simple two piece device, with the first piece being this shell and the second piece being the cigarette bottle assembly which could be detachably connected to the first piece. The skilled addressee would understand that the purpose of the cigarette bottle assembly "fitting with" the atomiser assembly (see [0008] of the PA) was to provide physical engagement between the two assemblies so that liquid could flow from the storage component within the cigarette bottle assembly to the porous component of the atomiser assembly wound with heating wire (i.e. to provide for aerosol formation by the atomiser).

28. The problem addressed by the P is identical to and is expressed in identical terms to that in [0006] of the PA. The solution is expressed in different terms:

> **[0009]** The purpose of this invention is fulfilled with an aerosol electronic cigarette comprising a battery assembly, an atomizer assembly, a liquid storage component and a hollow shell having one or more through-air-inlets. The battery assembly connects electrically with the atomizer assembly, and both are located in the shell. The atomizer assembly includes a porous component and a heating body in the form of a heating wire. The atomizer assembly includes a support member having a run- through hole. The porous component is mounted on the support member and is wound with the heating wire in a part that is on the side in the axial direction of the run-through hole. The liquid storage component fits with the porous component of the atomizer assembly and is located in one end of the shell which is detachable.

Claim 1 of the P captures this solution in these terms:

> An aerosol electronic cigarette comprising a battery assembly, an atomizer assembly, a liquid storage component (9) and a hollow shell (a, b) having one or more through-air-inlets (al);
> wherein the battery assembly connects electrically with the atomizer assembly, and both are located in the shell (a, b);
> the atomizer assembly includes a porous component (81) and a heating body in the form of a heating wire (83);
> characterised in that
> the atomizer assembly includes a support member (81) having a run-through hole (821);

[4] it was common ground that this was the meaning of the expression

> the porous component (81) is mounted on the support member (82) and is wound with the heating wire (83) in a part that is on the side in the axial direction of the run-through hole (821); and
> the liquid storage component fits with the porous component of the atomizer assembly and is located in one end of the shell (b) which is detachable.

29. The skilled addressee would understand from the teaching of the P that the "hollow shell" of [0009] and claim 1 was the outer casing of the electronic cigarette and that this shell has a detachable end. He would further understand that the battery assembly, the atomiser assembly and the liquid storage component were all located in the shell and that the liquid storage component was located at the detachable end of the shell.

30. [0032] of the P presents the benefits of the invention in very similar terms to those in [0037] of the PA. [0033] of the P provides a description of the drawings showing embodiments, some of which are of the invention and some of which are not. [0034] onwards describes the invention further on the basis of the drawings.

31. [0035] of the P describes the invention in very similar terms to [0008] and claim 1 of the PA and [0041] goes on to state that in this embodiment the battery assembly and atomiser assembly are mutually connected and then installed inside the integrally formed shell to form a one piece part.

32. [0050] of the P is the same as [0055] of the PA save that the frame (82) is first called a support member and then a frame, and figures 17 and 18 are the same.

33. Mr Purvis QC for Nicocigs submitted that the consequence of the change in wording from the PA to the P was a dramatic change in the nature of the invention. He had a number of separate points.

34. First he submitted that an important teaching of the PA was the use of an integrally formed shell to house the battery assembly and the atomiser assembly, and that the atomiser in that shell fitted with the cigarette bottle assembly so as to provide a two piece device which solved one of the

problems in the art which it had identified. This was referred to as the 'shell' point.

35. Mr Purvis submitted that the P presented a different solution to this problem and it did so by using the word 'shell' to describe the outer casing of the whole of the device (battery assembly, atomiser assembly and liquid storage component) and providing for it to have a detachable end (with the liquid storage component at this end), instead of using the word 'shell' to describe that part of the device containing just the battery assembly and atomiser assembly and into which fits the cigarette bottle assembly.

36. With regard to the word 'shell' there was argument as to whether it had a single meaning in both the PA and the P and, in particular, whether it applied only to a one part device or could it legitimately be applied to a two or more part device? I considered the debate as rather arid. The word shell can properly be applied to a single or multiple part device and whether it does so must be determined from the context. If it is described as integrally formed, it is in one piece; if it is described as being comprised of two pieces which fit together, each of which may properly called a shell, then it is a two piece shell made up of two single piece shells. And that is so even in the law of patents.

37. Mr Purvis went on to submit that the patentee had relegated the essential teaching of an integrally formed shell, housing the battery assembly and atomiser assembly, which shell is detachably fitted to the cigarette bottle assembly, to a mere embodiment of a much wider invention in which it did not matter which part of the overall assembly was detachable from which, so long as at least the liquid storage component part was detachable. By so doing, the patentee had added information to the P, which information was to the effect that the invention would work without the need for an integrally formed shell housing the battery component and atomiser component to which was detachably attached a cigarette bottle assembly.

38. Applying the test in *Richardson-Vicks*, Mr Purvis submitted the skilled addressee would not learn from the PA that the invention would work without the battery assembly and atomiser being in an integrally formed shell to which was detachably attached a cigarette bottle assembly (which fitted with the atomiser assembly). Yet in the P he learns that he can make it that way. He learns that he does not need an integrally formed shell to house the battery and the atomiser and he learns that it does not matter what is in the detachable end of the shell so long as it includes the liquid storage component

39. Mr Purvis also relied on the three part test in *Houdaille* as approved by the Court of Appeal in *IPCom* at [54]. He submitted that the skilled addressee (1) would recognise from the PA that an integrally formed shell enclosing the battery assembly and atomiser assembly was essential as it enabled, when a cigarette bottle assembly was fitted into one end, the manufacture of a two part device and thereby solved the prior art problems of three part devices as referred to in [0006] of the PA; (2) would not recognise directly and unambiguously that this feature was dispensable for the function of the invention, since it was put forward as the means to solve the problem, and (3) would not recognise that the replacement required no real modification of other features to compensate for the change since the device of the P was of an altogether different construction.

40. Mr Lykiardopoulos was dismissive of Mr Purvis' arguments. He submitted they confused added matter with claim scope (see [99] of *Napp v Ratiopharm* at paragraph 18 above). He accepted that the claim of the P might cover a device where the atomiser and the cigarette bottle assembly were in the same shell and that this shell is detachable from the shell housing the battery[5] but, he submitted, it did not disclose such a device. He submitted that with respect to the 'shell' point, the disclosure of both the PA and the P was the same.

[5] as he must to succeed on infringement

41. Mr Lykiardopoulos explained that it was no longer appropriate in the P to describe the shell as integrally formed because it was clearly not. Yet there was, he submitted, no added disclosure because the device of claim 1 of the PA in fact had two shells, the one mentioned as being integrally formed and the one formed by the body of the cigarette bottle holder.

42. Mr Lykiardopoulos also drew attention to the authorities (e.g. *AP Racing v Alcon* [2014] EWCA Civ 40, [30]) to the effect that the claims perform a different function from the disclosure in the body of the specification and that the primary function of the claims is to delimit the area of the patentee's monopoly. Using this as a base, Mr Lykiardopoulos submitted that [0009] of the P was just the claim and it was there in the body of the specification because the EPO insisted upon it. I do not, however, consider that the skilled addressee would read and understand [0009] of the P any differently just because it is in similar terms to claim 1 (in this context, see [40] of *AP Racing*). He would read it in the context of the specification as a whole in order to gain information about the invention (and he would understand that the primary but not the only function of the claim was to delimit the area of the patentee's monopoly).

43. I have compared the disclosures in the P and the PA and have tried to do so from the perspective of the skilled addressee. The disclosures of the PA and the P are not the same. The disclosure of the PA is explicit. It is of an integrally formed shell housing the battery assembly and atomiser assembly, being a shell to which is attached the cigarette bottle assembly. The disclosure of the P is also explicit. Mr Lykiardopoulos is right to point out that it discloses the device of the PA; it does so as one of the embodiments of the invention. But the P also discloses a different device. It is the one disclosed in [0009] where the word 'shell' is used to describe a hollow body (which may or may not be integrally formed) with an end which is detachable. The battery assembly, atomiser assembly and liquid storage component are all in this shell, with at least the liquid storage component being at the

detachable end. This device is different from that of the PA and the skilled addressee learns about it only when he reads the P. Matter has been added to the PA to teach the skilled addressee about this device. The P fails the *Richardson-Vicks* and the *Houdaille* test for the reasons given by Mr Purvis.

44. Mr Purvis' next point on added matter related to the 'liquid storage component' of the invention. It will be recalled that [0025] of the PA described the cigarette bottle assembly as including a hollow cigarette holder shell and a porous component for liquid storage inside the cigarette holder shell. The PA teaches that the cigarette bottle assembly fits with one end of the porous component of the atomiser [0055]. The skilled addressee would understand that it was the porous liquid storage component of the cigarette bottle assembly (as described in [0025]) which was fitting with the porous component of the atomiser assembly and that the arrangement provided for physical contact such as to cause liquid to flow by capillary action from the storage component to the heated part of the atomiser for vaporisation. The skilled addressee was being taught that the liquid storage component of the invention (being a part of the cigarette bottle assembly) was a porous component and it was its porosity which enabled the invention to work.

45. Mr Purvis contrasted this disclosure with that of the P. The different disclosure was alleged to come from [0009], i.e. from what is in claim 1. The vice complained of is the deletion of any reference to cigarette bottle assembly in this description of the invention and its replacement with the term 'liquid storage component'. It was submitted that the liquid storage component has been lifted out of its context in the PA as a porous component of the cigarette bottle assembly and, its character having been changed, put forward as a standalone component with the purpose of storing liquid and enabling, by fitting with the porous component of the atomiser, the flow of liquid to the atomiser. It was submitted that this was a particularly heinous example of an intermediate generalisation; a blatant case.

46. Mr Lykiardopoulos disagreed. He pointed out that the general teaching of the PA ([0008]) made no reference to a porous component but to a cigarette bottle assembly which was mounted in one end of the shell and fit with the atomiser. He pointed out that this general teaching was followed into claim 1 of the PA and it was only in claim 18 was there a reference to a porous component for liquid storage. Claim 18 is the first claim of the PA which refers in any detail to the content of the cigarette bottle assembly.

47. Mr Lykiardopoulos submitted that this 'porous point' was akin to the 'spheronising agent' point in *Napp* and that nowhere does the P disclose anything other than a porous[6] liquid storage component. He submitted it was a classic claim scope point.

48. Moreover, Mr Lykiardopoulos contended that, when looked at purposively, it was apparent that, in the context of the reservoir of liquid provided by the invention for replenishing the heated element of the atomiser, the disclosure of the PA and the P was the same; there was a component which stored the liquid for supply to the atomiser in both cases.

49. Mr Lykiardopoulos may be right in relation to the cigarette bottle assembly of the PA, but the only description and disclosure in the PA about the component for liquid storage is that it is a porous component (e.g. [0025]). An assembly which did not include such a porous component for liquid storage would not be a cigarette bottle assembly within the meaning of the PA.

50. [0009] of the P discloses the use of a liquid storage component which fits with the porous component of the atomiser assembly and is located at the detachable end of the shell. The use in the same sentence of the adjective 'porous' to describe the component of the atomiser and, by contrast, the omission of that adjective to describe the liquid storage component would

[6] sometimes the word 'perforated' was used but it was agreed that this made no difference

teach the skilled addressee that the latter component may not be porous. He would learn something about the invention which he would not have learned from the PA. That is not permissible (*Richardson-Vicks*).

51. Another way to consider the matter is via the *Houdaille* three part test in the context of the deletion from the description of the component for liquid storage of the adjective 'porous' or, expressed another way, the broadening of the claim to include non-porous liquid storage components. This broadening would fail the *Houdaille* test. From the PA the skilled addressee would consider it essential that the liquid storage component be porous since it is this quality which enables it both to hold liquid and to pass liquid by capillary action to the porous atomiser, and the device would not work without that. If the storage component were non porous (say a bottle) there would have to be means to connect the porous atomiser component with the bulk liquid in the bottle and for that liquid not spilling when the device was in use.

52. The final added matter allegation was referred to as the through-air-inlets point. In the PA there is clear disclosure of the through-air-inlets in the integrally formed shell. Their purpose is to permit the flow of air into the shell and over the atomiser as a user inhales at the other end of the device. Their particular location in the shell is constrained only by the fact that the device operates by air flowing over the heated atomiser and into the lungs of the user and the skilled addressee would understand that.

53. In the P the shell of the PA (i.e. the integrally formed piece containing the battery and atomiser) had been replaced by a shell which contains the battery assembly, atomiser assembly and liquid storage component, with the latter at the detachable end) and the through-air-inlets are described as being in the shell. Mr Purvis protested that the through-air-inlets in the P need not be in the part of the shell containing the battery and atomiser assemblies at all.

54. Mr Purvis is right to observe that the claim of the P covers through-air-inlets located anywhere in the device. But the device has to work as an electronic cigarette and the only disclosure is of through-air-inlets which are located such that air can pass through the atomiser when a user inhales. There is no teaching of where else they could be.

55. Mr Purvis accepted that this point was really another aspect of his integrally formed shell point. I think he was right so to do. It is not a free standing point on added matter; it is a claim scope point if anything.

56. My conclusion is that the added matter objection succeeds.

Validity – Novelty over EP 2 022 350 A1 (EP 350)

57. It was common ground that the correct approach to the assessment of novelty was set out in *Lundbeck A/S v Generics* [2008] RPC 19 at [9]. In summary, the prior art, in order to anticipate a patent, must disclose the claimed invention and (together with common general knowledge) enable the ordinary skilled person to perform it. There must be a direct and unambiguous disclosure of the claimed invention.

58. The novelty attack is based on section 2(3) of the Patents Act. It depends on Nicocigs establishing that a) EP 350 (as filed and as published) discloses a product falling within the scope of the claims of the P in issue, here claims 1, 8, 12 and 13, b) EP 350 is entitled to the priority of its Priority Document (PD) and c) the P is not entitled to priority based on the PD.

59. This rather complicated state of affairs arose in this way. On 16 May 2006, Fontem's predecessor in title applied for a Chinese Utility Model for an aerosol electronic cigarette. This is the PD. On 15 May 2007. Fontem's predecessor in title made two different international patent applications in China under the provisions of the Patent Cooperation Treaty (PCT), which took effect as two different European patent applications, each claiming priority from the PD. These were or became EP 350 and EP 2 022 349 (EP

349), which is the P. It was common ground that EP 350 is identical in all material respects to the PD whereas there are some differences with EP 349.

60. There was only one issue in contention on the novelty point and it is whether there was enabling disclosure of the atomiser assembly of claim 1 of the P. It is described in the claim in these terms:

> ... the atomiser assembly includes a porous component (81) and a heating body in the form of a heating wire;
>
> characterised in that the atomiser assembly includes a support member (82) having a run-through hole (821); the porous component (81) is mounted on the support member (82) and is wound with the heating wire (83) in a part that is on the side in the axial direction of the run-through hole (821); ...

The support member and the porous member are shown in paragraph 25 above (these figures are the same in the PA and the P).

61. EP 350 discloses a similar device to that in the P. Its purpose is to provide an emulation aerosol sucker which substitutes for cigarettes and helps smokers to quit smoking. It describes an aerosol as liquid drips suspended in the air.

62. The device of EP 350 is further described by reference to drawings and two types of atomiser are described as being suitable, a capillary impregnation atomiser and a spray atomiser. The capillary impregnation atomiser is shown in figures 8 and 9

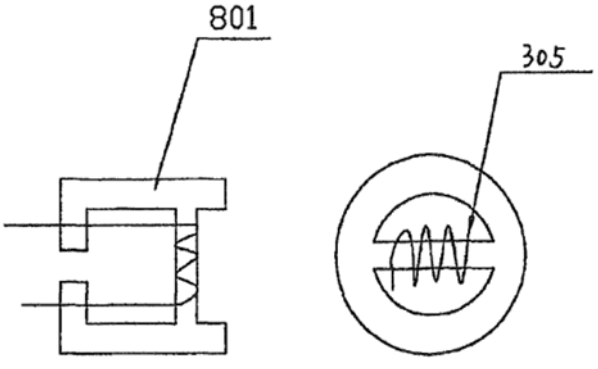

Figure 8 Figure 9

63. The skilled addressee reading EP 350 would understand that 305 is a heating body and 801 is microporous ceramics laden with nicotine liquid. In use, air is sucked from left to right in figure 8. It goes through the run-through hole shown as the gap on the left hand side of figure 8, over the heated element (which is the vertical element to the right of figure 8 wound with wire, and the horizontal element of figure 9) where forced convection causes vaporisation and then condensation of the vapour will lead to an emulsion which the user can inhale. The principle of operation appears to be identical to that in the device of the P and the issue is whether or not there is disclosed an atomiser which includes (i) a support member and (ii) a porous component mounted on the support member and wound with hearing wire.

64. Fontem contends that there is no disclosure or description of the device of the P since there is no disclosure of a support member with a run-through hole, and the language of claim 1 of the P demands a support member as a separate item from the porous member which is mounted on it. Mr Lykiardopoulos invites a simple contrast between figures 17 and 18 of the P (which are the same as in paragraph 25 above) and figures 8 and 9 of EP 350 (paragraph 62 above). He points out that the description of figures 17 and 18 in the P ([0050]) makes clear that items 81 and 82 are separate components and that the porous component (81) is set on the frame/support member (82). Mr Lykiardopoulos is right to contend that the embodiment according to figures 17 and 18 has a separate support member and porous member and that the latter is mounted on the former. But that does not answer the question of whether or not the disclosure of EP 350 is clearly and unambiguously of a device which is within the scope of claim 1 of the P.

65. Mr Purvis submitted that the matter could not be clearer. He submitted that if a Defendant tried to avoid infringement by making his support member out of the same material as his porous member and either fusing the two together prior to their use in the device or making them both together in a single mould he would be laughed out of court. He submitted that there was no basis for

construing the claim to exclude the situation where the support member and the porous component wound with heating wire were an integral part of the same unit.

66. My attention was not drawn to any teaching in the P which was to the effect that the support member could not be made from a porous material and there was no satisfactory evidence to that effect. Professor Shrimpton said the device may work better if liquid is not conveyed by capillary action to the surfaces of the run-through hole since the effect may be to load the air with nicotine before it arrives at the heated portion.

67. However, Professor Shrimpton did not satisfy me that this was a particularly bad thing (the object of the exercise being to vaporise the nicotine) and I do not accept it to be material from a technical perspective (and neither did Mr Fox). Professor Shrimpton gave the example of clothes drying more quickly in a dry environment than in a humid environment but that is an example in which the object of the exercise is to dry the clothes whereas in the present case the object of the exercise is load the air with nicotine vapour.

68. Looking at the matter technically, the purpose of the support member is to provide physical support for the porous member in an appropriate orientation and to provide a run-through hole so that air will pass through the atomiser over the heated part of the porous member. The purpose of the porous member is to transport liquid to that part of it which is heated and over which air will flow when the device is in use.

69. No adequate technical reason was advanced as to why the skilled addressee would not understand that the porous member could do double duty and support itself if it were made of appropriate materials (and Professor Shrimpton's evidence that there may, depending on the materials, be some advantages in a non-porous support member does not answer the point).

70. Consider the function of the porous member. It is to provide a capillary pathway from the liquid storage component to that part which is wound with

heating wire. This functionality is provided by the right hand half of figure 8 of EP 350. The left hand half provides physical support and a properly orientated run-through hole. The element is shown in the diagram as being integrally formed but in my judgment the skilled addressee would understand from the information in the document that the element could be in two parts with the right hand side mounted on the left, that whether or not it was so constructed was no more than a matter of design choice

71. Sub-paragraphs (viii) and (ix) from the citation from *Virgin Atlantic* in paragraph 13 above are just as apposite in the context of anticipation as they are in infringement. The P is addressed to engineers not language pedants.

72. In my judgment a skilled addressee who read claim 1 of the P and made the atomiser all out of the same porous material and used a single piece for both the support member and the porous member, instead of two pieces which he had to fit together, would consider that he was working the invention.

73. Accordingly, a device made in accordance with the disclosure in EP 350 would infringe the P.

74. As an alternative to his construction argument, Mr Purvis also relied on the fact that EP 350 expressly or, at least, implicitly discloses, in [0021], an atomiser wherein the heated or heating part of the porous element is made from a different material from the remainder of that body. The skilled reader was being taught to make the item from ordinary materials which were suitable for purpose, the invention not being about the materials themselves but about the arrangement of suitable materials which enabled efficient atomisation to take place when a user drew air through the device.

75. Mr Lykiardopoulos countered by pointing out that [0021] of EP 350 concerned the spray atomiser of the invention and, furthermore, the issue was one of disclosure and novelty and not of whether EP 350 provided a basis for an attack based on lack of inventive step.

76. As already mentioned, EP 350 puts forward both a spray atomiser and a capillary atomiser as being suitable for purpose. The skilled addressee would readily understand how both worked and he would understand that the general teaching about materials in, for example [0021], was applicable to both atomiser types. This disclosure about use of different porous materials supports the conclusion which I have reached to the effect that the porous member would be understood to include materials strong enough to support that part with the run-through hole and that part where there is heating and vaporisation and at the same time provide for capillary flow from the liquid reservoir to the site of vaporisation.

77. The disclosure of EP 350 anticipates claim 1 of the P.

78. Regarding claim 8[7], the cigarette bottle assembly of EP 350 includes the cigarette liquid bottle, fiber and the suction nozzle. It can be attached (by push fit) to the atomiser assembly of the device. EP 350 describes a device within claim 8 of the P and I was presented with no clear argument to the contrary (apart from the argument about the atomiser).

79. EP 350 discloses the use of polypropylene or nylon fiber for use as the liquid storage component and accordingly claims 12 and 13 of the P are also anticipated.

Amendment

80. In the course of an EPO opposition Fontem has applied to delete claim 14 and, for consistency, also applies to this court for the same relief. This amendment was not opposed and I will allow it.

81. Fontem also has conditional applications to amend depending on my findings as to whether EP 350 is novelty destroying. They raise the same points of principle and can be considered together. Each of them is an amendment to

[7] for the content of this and claims 12 and 13, see paragraph 168 below

the main claim by way of disclaimer and with respect to each there are corresponding and consequential amendments to the body of the specification (to provide a basis for the disclaimer).

82. The first proposed amendment seeks to add the following to claim 1:

> ,the atomiser assembly not being a capillary impregnation atomiser in which the support member (82) having a run-through hole (821) and the porous component (81) wound with heating wire (83) are parts of a single integrated body made of micro-porous ceramics.

83. The second proposed amendment seeks to add the following to claim 1:

> ,the atomizer assembly not comprising a porous component (81) made of micro-porous ceramics and a support member (82) made of foamed ceramics, micro-porous ceramics, micro-porous glass, foamed metal, stainless steel fiber felt, terylene fiber, nylon fiber, nitrile fiber, aramid fiber, hard porous plastics or chemical fiber molding.

84. It is evident that the first proposal seeks to deal with my conclusion that claim 1 of the P covers a device in which the support member and porous member comprise a single integrated body. The second seeks to deal with a refinement to that which is a device where the support member and porous member are made from different porous materials.

85. Amendments to granted patents are subject to the restrictions in Article 123(2) EPC, that is to say must not add subject matter. In considering this question, the comparison is to be made between the application for the patent and the proposed amended patent and the court is concerned about whether the amendment adds subject matter relevant to the invention. The principles already discussed concerning added matter are equally relevant to whether matter is added by a proposed amendment. If the proposed amendment merely excludes subject matter from protection, it will not offend Article 123 (2) (see *Napp v Ratiopharm* [2009] EWCA Civ 252, [72] – [85] for a discussion on undisclosed disclaimers).

86. Fontem contended that its proposals merely exclude matter from protection and that it has proposed the minimum which has achieved that effect. As such, it submitted, the amendments were allowable.

87. Nicocigs contended that the skilled person reading the proposed amended specification and claim would learn several key things about the invention for the first time. As such, the amendments were not allowable.

88. With respect to the first proposed amendment, Mr Purvis submitted the skilled addressee would learn two new matters. First, he would learn that the support member and the porous member may be parts of a single integrated body. Although that is within the scope of the amended claim (save to the extent it is made of micro-porous ceramics) it is not disclosed by the PA and there is no teaching to that effect. Second, he would learn that the support member and porous component may be made of micro-porous ceramics. He submitted that this was entirely new and that in the PA the only disclosure in relation to embodiments of the invention was of a porous component made of foamed nickel, stainless steel fiber felt, macropolymer foam or foamed ceramics. By contrast the skilled addressee is, by the amendment, being told that he can make one or other of the support member and porous component from micro-porous ceramics. The disclaimer provides a new technical contribution which is well established as not being permissible[8].

89. Mr Lykiardopoulos disagreed and submitted that these teachings were not disclosed by the proposed amendments. Again he said, Nicocigs were confusing claim scope with disclosure.

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[8] The following paragraph of Floyd J was expressly approved in *Napp v Ratiopharm*:
"Nevertheless, the test for added subject matter remains that set out in the Convention and the Act. The reason that disclaimers of accidental and deemed anticipations do not offend is that they do not add subject matter relevant to the invention. If a disclaimer introduced by a divisional application does not add subject matter relevant to the invention, but merely excludes subject matter from protection, then it too will not offend against the provision."

90. In my judgment Mr Purvis' analysis is correct. By specifically excluding from protection an atomiser assembly made from a single integrated micro-porous ceramics body the skilled addressee is implicitly being told he can work the invention by making such a single integrated body out of other suitable materials and he is specifically being told that micro-porous ceramics may be suitable for one or other of the support member or porous member.

91. This conclusion left me concerned with whether any disclaimer would achieve Fontem's purpose. The difficulty may be due to the fact that the P has already moved so far from the PA or it may be due to the fact that Fontem have been too limited in their disclaimer. In the event, I need say no more about it.

92. Fontem's arguments with respect to the second proposed amendment were the same, mutatis mutandis, as with the first.

93. Mr Purvis contended that the second proposal was even worse than the first. He submitted that the skilled addressee was taught for the first time a range of materials from which the support member and porous component may be made and all that the disclaimer excludes is a particular combination of a porous component made from micro-porous ceramics and a support member made from one of the other named materials. He submitted that all of this was new information which the skilled addressee would not learn from the PA.

94. The analysis is the same as with the first proposal and the conclusion is the same. By the form of amendment Fontem has proposed, the skilled addressee is taught new technical matter about the invention. The amendment is not allowable.

95. Mr Purvis had another point and it was that the term 'micro-porous ceramics' is not of sufficiently precise technical scope and for this reason the amendment should not be allowed. This point did not impress me and I do not rely on it. Both the PA and the P use similar generic terms (e.g. stainless

steel fiber felt or macromolecular polymer foam) and no-one has suggested these cause any difficulty.

Priority

96. The primary position of both Fontem and Nicocigs was that the earliest priority date of the P was its filing date. Moreover, I was told that in Opposition Proceedings, the EPO Opposition Division has given a preliminary indication that the claims are not entitled to priority. Fontem contended, however, that if EP 350 was novelty destroying (as I have found) then the P was entitled to rely on the PD for priority. It was common ground that the priority date of EP 350 was that of the PD (see paragraph 59 above).

97. The approach to assessing priority was set out by the Court of Appeal, *per* Kitchin LJ, in *Medimmune v Novartis* [2012] EWCA Civ 1234 [151] – [154]:

> 151. Section 5(2)(a) of the Patents Act 1977 provides that an invention is entitled to priority if it is supported by matter disclosed in the priority document. By section 130(7) of the Act, section 5 is to be interpreted as having the same effect as the corresponding provisions of Article 87(1) of the European Patent Convention . Article 87(1) says that priority may be derived from an earlier application in respect of the "same invention".
>
> 152 The requirement that the earlier application must be in respect of the same invention was explained by the enlarged Board of Appeal of the EPO in G02/98 *Same Invention*, [2001] OJ EPO 413; [2002] EPOR 167 :
>
> > "The requirement for claiming priority of 'the same invention', referred to in Article 87(1) EPC , means that priority of a previous application in respect of a claim in a European patent application in accordance with Article 88 EPC is to be acknowledged only if the skilled person can derive the subject-matter of the claim directly and unambiguously, using common general knowledge, from the previous application as a whole."
>
> 153. The approach to be adopted was elaborated by this court in *Unilin Beheer v Berry Floor* [2004] EWCA (Civ) 1021; [2005] FSR 6 at [48]:
>
> > "48. ….The approach is not formulaic: priority is a question about technical disclosure, explicit or implicit. Is there enough in the priority document to give the skilled man essentially the same information as forms the subject of the claim and enables him to work the invention in accordance with that claim.
>
> 154. In *Abbott Laboratories Ltd v Evysio Medical Devices plc* [2008] EWHC 800 (Pat), I added this:
>
> > "228. So the important thing is not the consistory clause or the claims of the priority document but whether the disclosure as a whole is enabling and effectively gives the skilled person what is in the claim whose priority is in question. I would add that it must "give" it directly and

> unambiguously. It is not sufficient that it may be an obvious development of what is disclosed. ”

98. Thus the issue is one of technical disclosure. In *Samsung v Apple* [2013] EWCA 467 (Pat), [130], Floyd J gave an example which illustrates when a specific and limited disclosure in a priority document could provide support for a wider claim:

> 130. ... It is of course the case that the claims of a patent may, in many cases, be generalised from the specific disclosure in a priority document without loss of priority. A “nail” in the priority document may provide support for “fixing means” in the claim of the patent without loss of priority. That will be so where the skilled person could derive such a generalisation directly and unambiguously from the disclosure. ...

99. The PD is a utility model and its purpose is to provide an emulation aerosol sucker that substitutes for cigarettes and helps smokers quit smoking. The following solution is put forward:

> ... this utility model includes a battery assembly, an atomizer assembly and a cigarette bottle assembly; an external thread electrode is located in one end of the battery assembly, and an internal thread electrode is located in one end of the atomizer assembly; the battery assembly and the atomizer assembly are connected through the thread electrodes, and the cigarette bottle assembly is inserted into the other end of the atomizer assembly, thus forming one cigarette type or cigar type body.

Claim 1 is in these terms:

> An emulation aerosol sucker, characterized in that it includes a battery assembly, an atomizer assembly and a cigarette bottle assembly, wherein the cigarette bottle assembly includes a cigarette liquid bottle and the atomizer assembly includes an atomizer, and wherein the cigarette bottle assembly is inserted into one end of the atomizer assembly, thus forming one cigarette type or cigar type body.

100. It is evident from the PD that what is disclosed is a three part device comprising a battery assembly joined to an atomiser assembly (via thread means) with a cigarette bottle assembly inserted into one end of the atomiser assembly. There is no disclosure of a two part device which is said to be one of the advantages of the invention in the P (see paragraph 30 above). This is not a promising start.

101. Fontem's primary argument on priority was that if EP 350 anticipates the claims of the P then all the claimed integers are clearly and unambiguously disclosed by and enabled by EP 350 and that, since the disclosure of EP 350 and the priority document are materially the same, the P must be entitled to priority just as night follows day.

102. Nicocigs contended that Fontem's argument was misconceived and that it elided the concept of anticipation (does the prior document disclose something which falls within the claim) with the concept of priority (does the prior document support the claims across their whole width, as explained in *Biogen v Medeva* [1997] RPC 1, 46 - 49).

103. Mr Purvis, for Nicocigs, presented four separate reasons why the claims of the P are not entitled to priority of the PD.

104. The first was described as the "fits with/located in one end of the shell which is detachable" point. This is a reference to the final feature of claim 1 of the P[9] and it raises a question of construction and what this particular feature required.

105. Mr Purvis contended that this feature requires the liquid storage component to be detachable from the shell containing the atomiser assembly, and he argues this way since if he is correct, the Nicocigs' devices complained of do not infringe. Mr Purvis relied on the language of the claim purposively construed. But he was unable to identify the purpose sought to be achieved by this construction. It is true that one of the objects of the invention is a two part device but nowhere is it explained that there is a particular benefit if the liquid storage component is detached from the shell containing the atomiser or a particular disadvantage if both the liquid storage component and the atomiser are detached from the battery. My attention was not drawn to any evidence which shed meaningful light on this point.

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[9] see paragraph 28 above

106. In my judgment the claims of the P are not limited to devices wherein the liquid storage component is detachable from the shell containing the atomiser assembly. The language of the claim does not require such a limitation and, absent technical reasons, it is not a fair way to read the claim. I find against Mr Purvis on this point of construction.

107. Mr Purvis then submitted that to establish infringement, Fontem must contend that claim 1 of the P covers any arrangement in which a liquid storage component is (i) in some form of contact with the porous component of the atomiser assembly, and (ii) within a part of the e-cigarette which can be detached from the other part. It is convenient to proceed on this basis even though the expression "some form of contact" is too wide. There must be the sort of contact which permits liquid flow from the liquid storage component to the porous component of the atomiser for otherwise the device would not work.

108. Mr Purvis goes on to observe that, for Fontem to succeed on infringement, claim 1 must include a configuration in which the liquid storage component is in permanent connection with the atomiser unit, i.e. cannot be detached from it at all. It also includes a configuration in which the liquid storage component is not pushed into end to end contact with the atomiser assembly but is integrally formed with it (for example one wrapped around the other).

109. Mr Purvis submitted that such a broad claim is not supported by the PD and he relies particularly on Floyd J's example at paragraph 98 above. He pointed out that the PD disclosed only a three part assembly with the cigarette bottle assembly being an element separate from the atomiser assembly, with the former being inserted into one end of the latter in a detachable manner so that it could be replaced or recharged. That disclosure formed no basis of support for a claim which covered the alleged infringements[10]. He relied

[10] for the detail of the infringements, see paragraph 169 below

particularly on the fact that the teaching of EP 350 of the connection between the atomiser assembly and the cigarette bottle assembly is only of the cigarette bottle assembly being inserted into the end of the atomiser assembly. He contrasted that with the claims of the P which are entirely neutral as to the position of the cigarette bottle assembly with respect to the atomiser such that Fontem can and do contend that a system in which the 'cigarette bottle' is wrapped around the atomiser falls within the claims.

110. Mr Lykiardopoulos rejected Mr Purvis' approach. He pointed out that the PD contained a generalised disclosure (referring to paragraph 99 above) and that the fallacy of Nicocigs' approach was to suggest that the PD only taught an invention with the specific integers in the various preferred embodiments.

111. In my judgment Mr Purvis is right in his submissions. The disclosure in the PD does not support the breadth of claim contended for by Fontem. The skilled addressee would, in my judgment, not derive these generalisations directly and unambiguously from the PD. The teaching is simply not there.

112. Mr Purvis' second priority point was referred to as the "through-air-inlets/integral shell contains the battery and atomiser assembly" point. Mr Purvis submitted that claim 1 of the P plainly extends to the atomiser assembly and battery assembly being contained in a single integral shell. I accept this submission; the main example of the invention is described as having this feature.

113. Mr Purvis contended that the PD does not disclose or suggest this feature at all; that its disclosure is limited to two separate shells (one for the battery and one for the atomiser) and that they are connected by a thread electrode.

114. Mr Purvis also contended that the only limitation on the location of the through-air inlets is that they be positioned such that air will flow through the run-through hole when a user sucks on the device. By contrast, he submitted, the PD teaches through-air inlets only in the atomiser assembly.

115. Mr Lykiardopoulos criticised Mr Purvis' approach. He contended that the PD does not limit its invention to the particular shells described or to the position of the air inlets and that the skilled addressee would immediately understand that generalised teaching was being put forward.

116. I accept Mr Purvis' analysis for similar reasons to that with his first point. They arise from the fact that the PD discloses a three part device which is rather different from that of the P.

117. Mr Purvis' third and fourth points can be taken together. They were referred to as the "liquid storage component" and "support member" points. Mr Purvis' contention was that the only teaching in the PD in relation to the liquid storage component was of a fibre component inside a cigarette liquid bottle, and the only teaching in relation to a support member was of a porous support member that serves as a conduit for liquid from the reservoir.

118. Mr Lykiardopoulos was dismissive of both these points. In my judgment he was right so to be. The cigarette liquid bottle assembly is one element of the aerosol cigarette of the PD and although there is explicit disclosure only of porous fibre as the component holding the liquid, the skilled addressee would appreciate that this was one example only and he would recognise the generalisation directly and unambiguously from it. Likewise with the support member. The technical disclosure of the PD in relation to the relevant aspect of the capillary atomiser embodiment is of an item which can transfer liquid from the reservoir to the location of the heating element (for vaporisation) and support a run-through hole orientated so that air will pass through that hole over the heating element. There is sufficient support in the disclosure of the PD for the claims of the P.

119. My conclusion on this aspect to the case is that the P is not entitled to rely on the PD for its priority for two of the four reasons put forward by Nicocigs.

Validity – lack of inventive step

120. There was no dispute as to the correct approach. I was referred to the passage in *Regeneron Pharmaceuticals v Genentech* [2013] EWCA Civ 93, [68] – [71] where Kitchin LJ said this:

> 68 The judge began by considering the law. At [117] he cited the statement I made in *Generics (UK) Ltd v H Lundbeck A/S* [2007] RPC 32 at [72] which was approved by the House of Lords in Conor v Angiotech [2008] UKHL 49; [2008] RPC 28 at [42]:
>
> > "The question of obviousness must be considered on the facts of each case. The court must consider the weight to be attached to any particular factor in the light of all the relevant circumstances. These may include such matters as the motive to find a solution to the problem the patent addresses, the number and extent of the possible avenues of research, the effort involved in pursuing them and the expectation of success."
>
> 69 Then, at [121], the judge cited the following passage from the judgment of Jacob LJ in the Court of Appeal in *Conor* [2007] EWCA Civ 5; [2007] RPC 20 at [45]:
>
> > "In the end the question is simply "was the invention obvious?" This involves taking into account a number of factors, for instance the attributes and cgk of the skilled man, the difference between what is claimed and the prior art, whether there is a motive provided or hinted by the prior art and so on. Some factors are more important than others. Sometimes commercial success can demonstrate that an idea was a good one. In others "obvious to try" may come into the assessment. But such a formula cannot itself necessarily provide the answer. Of particular importance is of course the nature of the invention itself."
>
> 70 The judge also cited, at [122], Lord Hoffmann's apparent approval of that summary in Conor at [42]:
>
> > "In the Court of Appeal, Jacob LJ dealt comprehensively with the question of when an invention could be considered obvious on the ground that it was obvious to try. He correctly summarised the authorities, starting with the judgment of Diplock LJ in *Johns-Manville Corporation's Patent* [1967] RPC 479, by saying that the notion of something being obvious to try was useful only in a case in which there was a fair expectation of success. How much of an expectation would be needed depended upon the particular facts of the case."
>
> 71 Having reminded himself of these general principles, the judge then turned to address the question of obviousness in this case by using the structured approach explained by this court in *Pozzoli v BDMO* [2007] EWCA Civ 588; [2007] FSR 37:
>
> (a) Identify the notional 'person skilled in the art'.
>
> > (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) Ask whether, when viewed without any knowledge of the alleged invention as claimed: do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?"

121. I was warned of the dangers of hindsight and the passage in *Technograph v Mills & Rockley* [1971] FSR 188, 203:

> Once an invention has been made it is generally possible to postulate a combination of steps by which the inventor might have arrived at the invention that he claims in his specification if he started from something that was already known. But it is only because the invention has been made and has proved successful that it is possible to postulate from what starting point and by what particular combination of steps the inventor could have arrived at his invention. It may be that taken in isolation none of the steps which it is now possible to postulate, if taken in isolation, appears to call for any inventive ingenuity. It is improbable that this reconstruction a posteriori represents the mental process by which the inventor in fact arrived at his invention, but, even if it were, inventive ingenuity lay in perceiving that the final result which it was the object of the inventor to achieve was attainable from the particular starting point and in his selection of the particular combination of steps which would lead to that result.

122. Fontem also urged upon me that well prior to 2007 major tobacco companies were interested in developing cigarette substitutes and yet it was not until that time that the invention in suit was made. It was suggested there was a legitimate long felt want which was only satisfied with the P. That, it was submitted, was a true hall mark of an invention.

123. I consider that Fontem puts the matter too high but I accept that it is one of the matters I should take into account when assessing the evidence in the case.

124. There were two issues of construction in relation to the case of obviousness, both being relevant in connection with disclosures of prior art devices. The first issue was in relation to the location of the run-through hole of claim 1 of the P.

125. Nicocigs contended that the run-through hole could be in a position up or downstream the atomiser and that it did not matter which so long as, in use,

air was sucked over the part of the porous component wound with heating wire so that forced evaporation (convection) took place. It relied upon the absence of any restrictive language in the claim and on the fact that the specification uses the term to describe holes which are both upstream and downstream of the atomiser. It also relied upon the fact that the invention will work so long as there is forced evaporation from the porous component caused by the air flow through the run-through hole, and that any limitation imposed on its location of the kind contemplated would be unfair on the patentee.

126. Professor Shrimpton's evidence was that the skilled addressee would recognise that the run-though hole must be upstream the atomiser. In paragraph 61 of his first report he said this:

> The skilled engineer would consider that the "*atomizer assembly*" described in the Patent which uses a heating wire is not technically an atomizer because it would be better described as a heater / vaporiser and condenser which creates aerosol by an evaporation–condensation process. However, they would recognise that some atomization is probably taking place as a result of high speed air flow travelling through the run-through hole that is directed at the site of vaporisation. The run-through hole would be understood by the skilled engineer, as shown in Figure 18, to be an opening in the atomizer assembly upstream of the part of the porous component wound with a heating element that produces an increase in the speed of the air that is drawn into the device as a result of inhalation and directs that air onto that part of the porous component. This high speed air flow that is directed towards the site of vaporisation enhances the rate of phase transfer from liquid to vapour by forced convection. This high speed air also promotes the mechanical breaking up of the liquid on the surface of the porous component and / or the heating wire. The skilled engineer would consider that the "atomizer assembly" described in paragraph [0050] of the Patent has the advantage that it is very simple, with no moving parts.

127. He was cross examined on this evidence and my conclusion is that he was being far too pedantic. I consider the skilled addressee would understand that the atomiser assembly was properly so called because it had the effect of creating an aerosol. He would also understand that the aerosol creation was caused by forced evaporation and condensation. That is the teaching of the P and there is nothing complicated about it. As for the suggestion that there is a promotion of a mechanical break up of the liquid on the surface of the porous component, I am not satisfied that this would occur to the skilled

addressee (Mr Fox was dismissive of the point). It is not what the invention is about and its effect, if any, would be dependent on the diameter of the run-through hole chosen for any particular embodiment as well as the suction force applied by the user.

128. Professor Shrimpton gave no satisfactory reasons why an embodiment which produced a satisfactory aerosol and which had a run-through hole downstream the heated part of the porous component would not be understood by the skilled addressee to be a product in accordance with the invention. I consider Nicocigs' construction in relation to this point to be the correct one.

129. The second construction issue related to that part of the claim which uses the words "porous component is ... wound with the heating wire in a part that is on the side in the axial direction of the run-through hole".

130. Nicocigs contended that these words meant that at least one part of any side of the porous component which is exposed to the flow of air through the hole is wound with heating wire. An alternative formulation of that requirement is that a part of the porous component wound with heating wire is axially displaced from the run-through hole, the reason being that unless it is axially displaced, air passing through the run-through hole will not pass over that heated portion.

131. Professor Shrimpton and Fontem put forward a different construction. He referred to drawings of embodiments which were not of the invention and in which the porous component was orientated co-axially with the run-through hole. He concluded "that the words '*in the part that is on the side in the axial direction of the run-through hole (821)*' mean that at least part of the porous component, which is wound with a heating wire, is in an orientation other than co-axial with the run-through hole".

132. Professor Shrimpton was unable to give any satisfactory technical explanation for his construction and the actual reason he gave (that

embodiments outside the invention showed this feature) was a bad one. In the embodiments outside the invention which he relied upon, the porous components were not wound with heating wire at all. In my judgment the skilled addressee would understand this part of the claim in the way contended for by Nicocigs.

133. As far as inventive concept is concerned, there was some suggestion in Fontem's submissions and in the report of Professor Shrimpton that the invention in the P enjoyed some technical characteristics and benefits in terms of aerosol production over and above those of vaporisation from forced convection and subsequent condensation. I understood that these were related to the possibility of a high speed flow of air through the run-through hole and a break of up liquid held by the porous component thereby promoting vaporisation. Mr Fox commented that these alleged benefits formed no part of the teaching of the P and he doubted whether they existed at all.

134. There is nothing in the teaching of the P which informs the skilled addressee of these benefits or of how to achieve them and there is no restriction in the claims to devices which take advantage of these benefits. In my judgment the inventive concept is to a particular arrangement of parts as prescribed by the claims. There is no advantage to be gained by expressing the inventive concept any differently from that.

135. Three items of prior art were relied upon and the first was US 4,947,874 (Brooks). The title of Brooks is 'Smoking Articles Utilizing Electrical Energy' and columns 1 to 3 discuss the need for a cigarette substitute that provides the sensations of smoking. Mr Fox was of the opinion that Brooks would be of immediate interest to a skilled person looking to develop an electronic cigarette at the filing date and I agree with him.

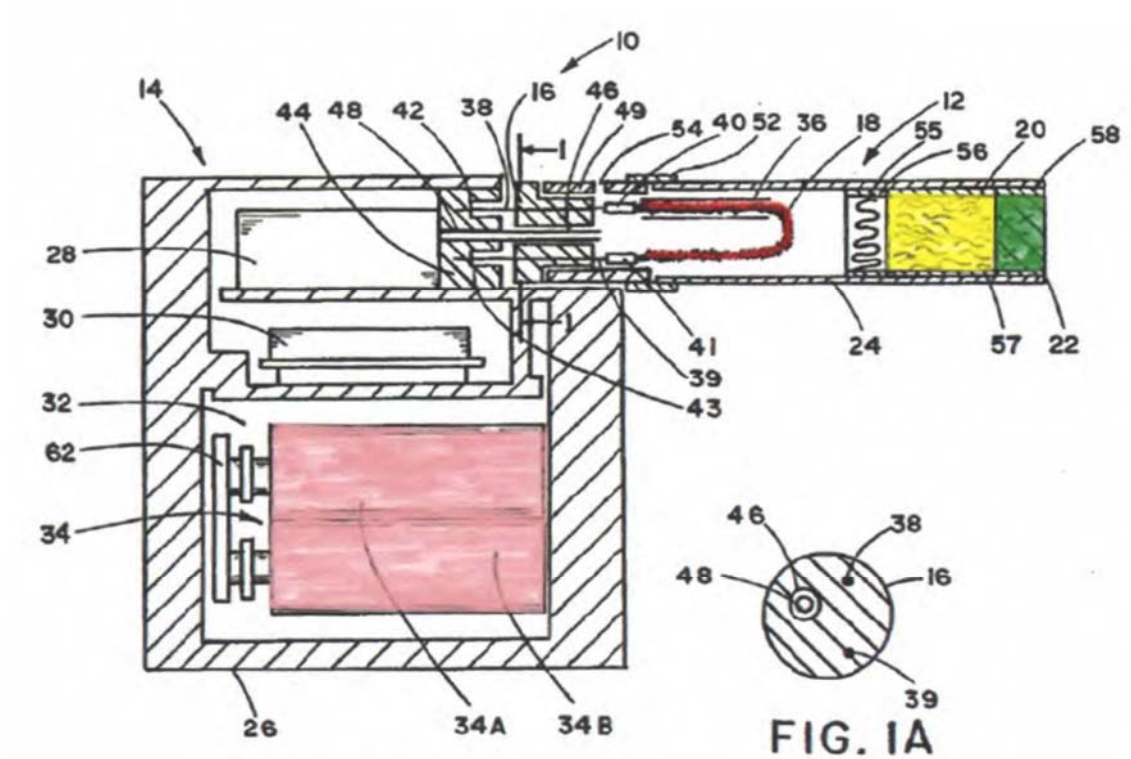
136. Mr Fox reviewed Brooks prior to him reviewing the P and he was asked to identify any limitations in the design which it teaches. He thought that the

most significant disadvantage was that the product only contained sufficient nicotine liquid and, therefore, would only work for between 6 to 10 puffs before the disposable part (the bit containing the mouth piece, atomiser and nicotine liquid – see below) needed replacing.

137. Mr Lykiardopoulos criticised Mr Fox's approach and pointed out that there was no corroborative evidence to suggest this might really be seen as a problem. He also relied on the fact that Mr Fox accepted that in real life market and consumer research would be undertaken, and that in the real world a company would not rely on a single person's input. I do not accept these criticisms. They are an invitation to the court to close its eyes to reality.

138. Having heard the evidence, I accept that the skilled person would recognise a limit of 6 to 10 puffs (and then disposal and replacement of some hardware) as a disadvantage and consider, albeit unimaginatively, ways to overcome that disadvantage. I do not consider there to be any hindsight in a solution which involves providing more nicotine so that the device will last longer. It is an obvious solution if the problem is that the device does not contain enough and I accept Mr Fox's evidence to this effect.

139. Turning to the detail, Brooks discloses an electrical cigarette and its mode of operation can be understood from these drawings:



140. The device shown in figure 1 consists of two parts and figure 1A is a cross section of the electrical connection plug (16). The first part in figure 1, labelled 14, is a reusable controller which houses the batteries (34, in pink), a pressure sensing switch (28) and plug in electrical connectors (42, 43). The second part is the cigarette, which has a resistance heating element (18, in red), a plug spacer member (55), a roll of tobacco (20 in yellow) and a mouth end filter (22, in green). The user sucks from the right hand end. Air inlets (54) allow air to flow into the atomiser unit which comprises a porous heating element (18) which is impregnated with a liquid aerosol forming substance (e.g. nicotine). The description includes alternative positioning of the air inlets including at the extreme inlet end of the cigarette (which is at the electrical connection plug 16) or elsewhere such that drawn ambient air passing through the cigarette to the mouth passes the heating element. If the suggestion of positioning the air inlet by plug 16 is adopted, that air passes through a hole or passage way (46) and over heating element (18) on its way

to being inhaled by the user. The heating element is supported by electrical connector pins or prongs (38, 39) which are part of electrical connector plug (16).

141. Brooks puts forward a number of examples of preferred heating elements including porous substrates in intimate contact with resistance heating components. The skilled addressee would understand that the teaching is of a device in which the resistance heating element creates an aerosol by evaporation from and condensation of the liquid absorbed in the pores either of or in intimate contact with the resistance heating element. Brooks referred to heating elements which could carry sufficient aerosol forming substances to provide for 6 to 10 puffs.

142. Fontem, supported by Professor Shrimpton, contended that the P works in a different way from Brooks. It was contended in Fontem's opening that rather than having a heating element coated with aerosol forming substances, instead liquid is wicked to the site of heating and the P requires that airflow is directed onto the heating element (and liquid) so as to effect vaporisation and atomisation of the liquid. In this way, visible 'smoke' is produced. In contrast, it is the use of a heater with a large surface area which both stores and heats liquid in Brooks that causes the vaporisation of the aerosol forming substance, which is then drawn up by the user.

143. Missing from Fontem's analysis is that Brooks is also arranged so that airflow passes over the heating element and induces vaporisation (by forced convection) and atomisation of the liquid (Brooks describes a configuration in which that occurs and the skilled addressee would understand why). I was not persuaded by Professor Shrimpton's argument that the P provides a fundamentally different solution – directing high speed air flow into a concentrated region where liquid and heat are also supplied – since both devices rely on forced convection.

144. In my judgment Nicocigs was right when it submitted that the essential difference between Brooks and the P is that, in Brooks, the porous heated element is preloaded with all the nicotine necessary to provide for 6 to 10 puffs and, in the P, the porous heated element is preloaded with sufficient nicotine to provide for puffs and there is extra nicotine containing porous material to replenish that which is lost by vaporisation.

145. In terms of the *Pozzoli* analysis, Fontem contended Brooks does not teach six relevant aspects, some of which can be taken together:

146. First, the use of a heating wire wound around a porous component. This is not expressly taught in Brooks but Mr Fox said it was an obvious implementation. Professor Shrimpton said that a wick and coiled around heating wire was a paradigm example of a porous substrate and resistance heating component. In my judgment implementing Brooks in this way is an obvious way to do it.

147. The second, third and fourth points relied on are: (i) a support member having a run-through hole, (ii) mounting the porous component on the support member, and (iii) orienting the porous component so that the part wound with heating wire is on the side in the axial direction of the run-through hole. Mr Fox said that these features were all disclosed in Brooks and he referred to what is described above. Eventually this was accepted by Professor Shrimpton in cross examination, albeit reluctantly in relation to this last aspect. In my judgment the skilled addressee would appreciate each of these points from the disclosure in Brooks.

148. The fifth point is a liquid storage component fitting with a porous component. The device in Brooks provides sufficient liquid in its resistance heating element for about 6 to 10 puffs and Professor Shrimpton said that there would be no incentive to change that. Mr Fox had a different opinion. He said that it would be immediately obvious to increase the capacity of the device since 6 to 10 puffs is self-evidently good enough only to simulate one

real cigarette and a user will want more than that and will not want to throw away a piece of hardware so quickly or readily. Professor Shrimpton accepted that there was nothing clever about increasing the volume/capacity of the porous component in Brooks to make sure it held enough liquid for purpose and he accepted that an obvious way to do it was to wrap more of the component around the ends to provide a reservoir. Mr Fox gave evidence to the effect that an obvious implementation of Brooks was to provide a separate reservoir in capillary contact with the heating device so that the latter could be replenished as required. Mr Fox's explanation of his reasons for his opinions seemed to me to be entirely in accord with common sense and I accept them.

149. The sixth point was a liquid storage component located in one end of the shell which is detachable. Fontem did not contest that the Brooks device comprises a shell (comprised of two shells joined together) with one end detachable. The detachable end includes the resistance heating element and, with it, the liquid storage component if it were modified in the way Nicocigs contended that it would be.

150. My conclusion, therefore, is that claim 1 of the P is obvious in the light of figure 1 of Brooks and the content of its specification.

151. Fontem also relied on claim 12 which is in accordance with any preceding claim and in which the liquid storage component is a fibre. The experts were agreed that there was nothing inventive in the use of fibre as a porous material for storing liquid and fibrous carbon is one of Brooks' preferred materials. There is nothing inventive in claim 12 of the P.

152. Nicocigs also relied on the configuration in figure 7 of Brooks. This is an implementation in the form of a pipe with the heating element in the bowl of the pipe and the run-through hole is downstream. This embodiment adds nothing to the debate and I do not consider it further.

153. Nicocigs also relied on Mr Fox's reaction to Brooks prior to Mr Fox having read the P. I understood that the purpose of this evidence was to persuade me that it was obvious to develop Brooks in some way. I did not find it particularly helpful since if Mr Fox were to adapt Brooks to something within claim 1 of the P then I would have to consider whether or not he was being inventive and if he did not I would have to consider the reasons for that. The exercise seems to me to introduce an additional level of difficulty for no reward and I decline to indulge in it.

154. The next item of prior art is an old (1936) patent (US 2,057,353 – Whittemore) for a vaporising unit for therapeutic apparatus. It was referred to in Brooks as an example of a device in which a wick carries liquid medicament by capillary action from a reservoir to a point where the liquid is vaporised by an electrical resistance element. On its own Whittemore adds little if anything to the common general knowledge.

155. The next and final item of prior art is EP 0893071 (Takeuchi) which describes a flavour generating device. It is another example of the battery, liquid storage and heated atomiser combination. Claim 1 of Takeuchi is in these terms:

> A flavor-generating device characterized by comprising:
>
> a chamber having an air inlet port for introducing the air thereinto and an inhalation port through which a user inhales a flavor, and defining a gas passageway between the air inlet port and the inhalation port;
>
> a liquid container for storing a liquid containing a flavor substance, and maintained at substantially an atmospheric pressure;
>
> at least one liquid passageway having a first end portion which is in a fluid communication with the liquid and a second end portion which is in a fluid communication with the gas passageway, for transporting the liquid from the liquid container to the second end portion by capillary force; and
>
> a heater mounted at the second end portion of the liquid passageway, for heating and gasifying the liquid transported from the liquid container.

156. Nicocigs rely particularly on the embodiments in figures 1 and 8 which accord with the generalised teaching of this claim.

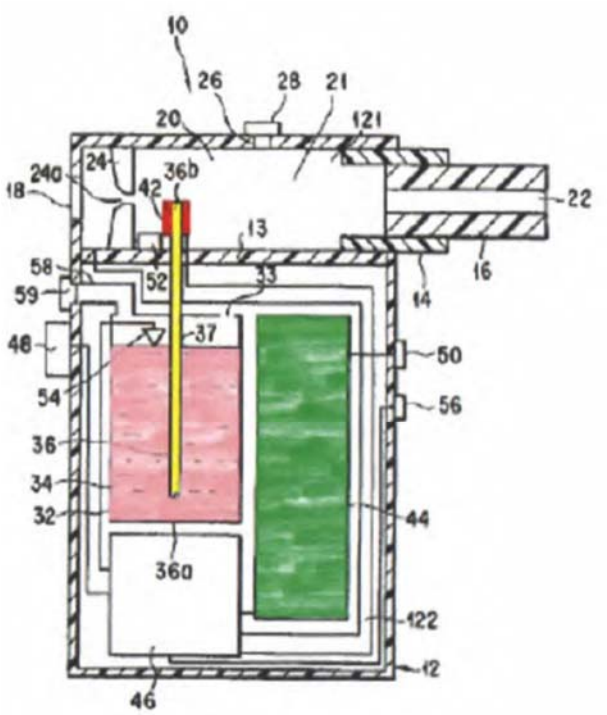

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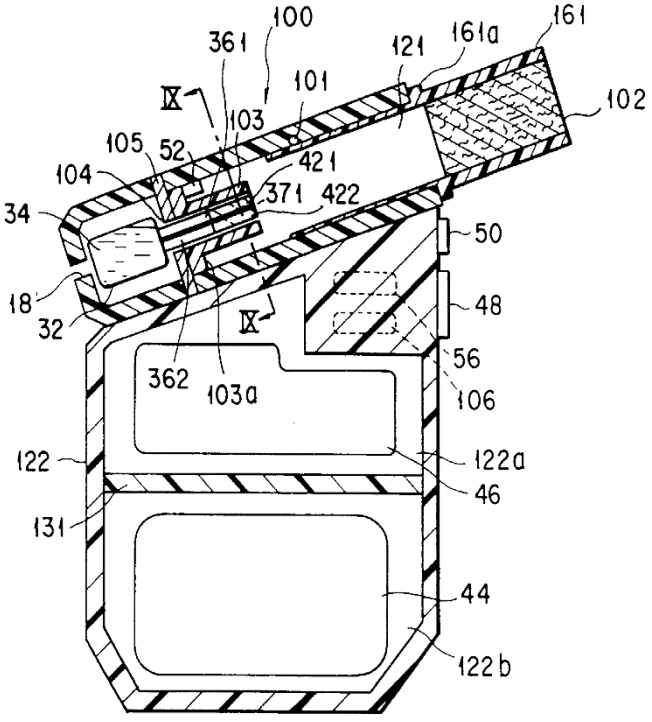
FIG. 1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122b

FIG. 8

157. Referring to figure 1, the device has two chambers, the lower contains the liquid reservoir (32, shown in pink) which can contain nicotine and the battery (in green). The user inhales from the right hand end of the upper chamber (22) and air passes into the chamber through inlet (18), through hole (24a) in squeeze plate 24 and over the top of tube (36b). Tube 36b (in yellow) is a capillary tube carrying liquid from the reservoir (in pink) to its top where it is surrounded by a cylindrical tubular heater (in red). Thus the incoming air picks up vaporised liquid which then condenses into an aerosol in chamber 21 for inhalation by the user. An alternative embodiment uses a pore structure instead of the capillary tube and the experts agreed this would be a mesh or honeycomb structure which transports liquid by capillary action. Various heater types are disclosed including a ring or plate heater on top of the pore structure.

158. In figure 1, the liquid storage reservoir is refillable; in figure 8 it is an exchangeable bottle. In figure 8 the capillary tube of figure 1 is replaced by a passage between 2 plates (361, 362) or the alternative pore structure may be used. The user of figure 8 inhales from the right hand end, air passes into the device through intake port (18), through an annular gap around the plate-like heaters (421, 422 mounted on plates 361, 362) to the end of the heated area of the liquid passageway 371 where it picks up the vapour.

159. Mr Lykiardopoulos contended that, unlike the P, Takeuchi did not work by forced convection and that there was no dispute about that. I do not agree. There was no dispute about how Takeuchi works and forced convection includes, for example, blowing over or above a liquid surface (for example when cooling tea – see the cgk above). To the extent that Professor Shrimpton's evidence was that the air flow in Takeuchi did not enhance the vaporisation process (and he came close to this in his second report although the illustration he gives does not support his thesis – removal of already produced vapour causes further vaporisation), I do not accept it. I prefer Mr Fox's evidence on the topic.

160. As regards the *Pozzoli* analysis, Fontem contends there are 6 aspects of the P which Takeuchi does not disclose and the P is to a fundamentally different design.

161. The first two are a heating wire as a heating element and a porous structure wound with heating wire. Mr Fox accepted that a ring heater is not a heating wire but pointed out that it surrounds the capillary tube or interconnecting porous structure. He also pointed out that heating wire is a very common form of resistance heater.

162. The second two are a support member with a run-through hole and a porous structure mounted on the support member. Nicocigs observed that, in figure 1, the porous component is supported by the close fit where it passes through the wall (13) of the upper chamber and the upper chamber has the run-through hole (24b), thus satisfying the requirements of the claim. It commented that in figure 8 no obvious means of support is shown but Mr Fox said that it must be attached somewhere for it to work, and the most obvious place is to the cylindrical body 103 which surrounds the component and through which passes the run-through hole.

163. The fifth point is the porous structure oriented in the manner claimed in claim 1 of the P. This refers back to Fontem's argument on construction which I rejected in paragraph 132 above.

164. The sixth point is a liquid storage component which is detachable (as distinct from being exchangeable or refillable). Takeuchi does not describe how the exchangeable storage bottle is exchanged. Mr Fox understood that the part of the housing at the left hand end of the device in figure 8 must be detachable or, at least, that was an obvious implementation of the teaching.

165. Having heard the evidence my conclusion is that the skilled addressee would understand that the liquid storage component of Takeuchi could either be refillable or exchangeable and that, for the purpose of the invention, it did not matter which disclosure was implemented. A detachable end of the

device (in the language of claim 1 of the P, the shell) is an obvious implementation of that teaching.

166. Fontem placed great emphasis on the changes it submitted were necessary to the heater configuration and to housing the reservoir in a detachable part of the shell. It submitted that Nicocigs' argument was tainted with impermissible hindsight. Fontem supported its contentions with construction arguments which I have dismissed. I consider the practical approach of Mr Fox to Takeuchi to be much more akin to that of the skilled addressee than the approach canvassed by Professor Shrimpton. I accept Mr Fox's reasoning and consider that claim 1 of the P is obvious in the light of Takeuchi.

167. As for claim 12, there is nothing inventive in that either. Professor Shrimpton accepted that it was common to store liquid in fibre to stop the liquid sloshing about and he accepted such was a straightforward design solution. Mr Fox thought the idea was obvious and that evidence went unchallenged.

Infringement

168. I need consider only claims 1, 8, 12 and 13. Claim 8 is to a product in accordance with claim 1 wherein the end of the shell containing the liquid storage component forms a cigarette bottle assembly comprising the liquid storage component inside a hollow cigarette holder shell. Claim 12 is to a product in accordance with claim 1 wherein the liquid storage component is a fibre liquid storage component. Claim 13 is to a product in accordance with claim 12 wherein the fibrous liquid storage component is made of PLA fiber, terylene fiber or nylon fiber.

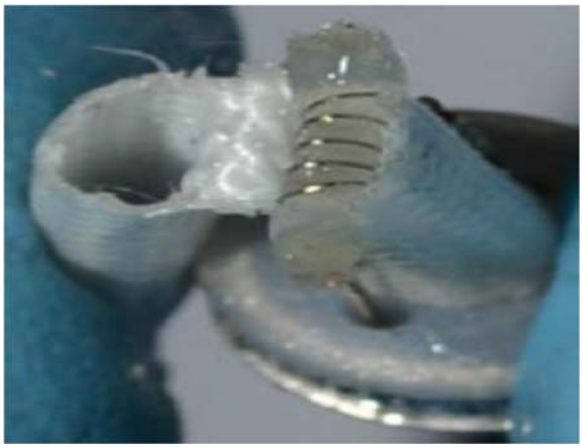
169. There are four products alleged to infringe and they fall into two groups. The first group, referred to as the Cartomiser design, includes Nicolites Rechargeable Electronic Cigarette, Vivid Rechargeable Electronic Cigarette and Nicocig Rechargeable Electronic Cigarette (Deluxe or Starter). The

second group, referred to as the Clearomiser design, has only one member and it is the Vivid E-Liquid Electronic Cigarette.

170. An example of a Cartomiser product is shown below:

The left hand portion (in white) is a metal container covered in paper and it includes the battery assembly. The right hand portion (in brown) is a metal container covered in paper and it includes an atomiser assembly and a reservoir for storing nicotine. The right hand portion screws into the left hand portion and can be detached by unscrewing. When the two portions are screwed together, there is electrical connection between the atomiser assembly and the battery assembly. Each of the containers at the left hand end and right hand end can properly be called a shell and there is also a shell when the two are joined together. The user draws air through the device by sucking on the right hand end. There are air inlet holes at the left hand end.

171. The following photographs show the atomiser assembly, the assembly bent against itself at the position of the protruding ears, the central portion of the atomiser assembly surrounded by a sheath of fibrous material and the heating wire in situ:



172. The white cylinder in the first picture is hollow and air is sucked down it when the device is in use. The coil of wire in the 4th picture is connected to the battery and is a heating element. It surrounds porous material which is in capillary contact with the fibrous sheath (shown in the 3rd picture) which surrounds the white cylinder. The fibrous sheath serves as a liquid storage member.

173. It will be seen that the configuration of the alleged infringement is different from that of the specific embodiment of the P in a number of respects including the fact that both the atomiser assembly and the liquid

storage component detach from the battery assembly and the run-through hole goes over and around the heated part of the porous component.

174. In my judgment, however, Fontem is right in its contention that each of the pre-characterising parts of claim 1 of the P is present in the Cartomiser product.

175. The hollow of the white cylinder of the first picture provides a run-through hole and that cylinder itself supports the porous material around which is coiled the heating wire. The ears of the porous material nestle in the surrounding sheath and they fit with each other so as to enable a capillary connection.

176. Nicocigs contended that the expression 'fits with' in the claim required a shaped engagement or push fit whereas Fontem contended that all that was required was a sufficient fit for fluid communication. Since the purpose of the fit is to enable fluid communication by capillary action, I consider that Fontem's construction is the right one.

177. In my judgment the Cartomiser products fall within claim 1 of the P. Claim 12 is also infringed. The fibre of the liquid storage component is terylene and claim 13 is also infringed.

178. Claim 8 requires the liquid storage component to be inside a hollow cigarette holder shell. In claim 1 the shell is described as hollow and it is clear that this is a reference to its condition before the other items are placed into it. Fontem contended that the use of the word 'hollow' in claim 8 was to indicate that the shell must be able to contain the liquid storage component. But that meaning would be achieved if the word 'hollow' were not used in claim 8 at all. Fontem gave no reason for its construction other than that the skilled person would read the claim in this way.

179. Claim 8 refers to a device in which the liquid storage component is the only item in an otherwise hollow shell. Since the liquid storage component

in the Cartomiser products is not inside an otherwise hollow shell, this claim is not infringed.

180. The Clearomiser has a different design and I am concerned only with claims 1 and 8. Instead of the porous component being surrounded by heating wire and having ears which nestle in fibre, it has two tails made of porous material. The following picture shows the heating coil in the centre and the two tails protruding therefrom. The tails extend into a cavity (enclosed by a combination of the mouthpiece, inner wall of the casing and atomiser assembly) which can be filled with liquid nicotine and can carry that liquid, by capillary action, to the heated portion.

181. Nicocigs contended that the Clearomiser did not have a liquid storage component within the meaning of claim 1 of the P, it merely had a cavity which, when the device was assembled and the cavity filled with nicotine, served as such. It contended that a cavity is pure empty space and is in no sense a component. It also contended that the liquid storage component could not be located in one end of the shell because, if it is there at all, it is made, in part, from the shell. I do not accept these arguments. The skilled addressee would understand that a component can be made on assembly of the device and that the Clearomiser is an example of this. He would also understand that a liquid storage component made, in part, from walls of the shell could still be located at one end of the shell, as shown by the Clearomiser.

182. Claim 8 of the P is not infringed for the same reason as with the Cartomiser. The liquid storage component is not inside a hollow cigarette holder shell.

183. Fontem also relied on s 60(2) infringement in respect of the various parts and re-fills sold together with the products or to those who have purchased the products. It contended the detachable Cartomisers, batteries and Clearomisers are essential elements of the products intended to put the invention into effect in the UK. I did not understand Nicocigs to contest this aspect of the case separately from the matters already considered. In these circumstances it succeeds to the extent the case succeeds on s 60(1) infringement.

Conclusion

184. My conclusion is that the P does not survive the attacks made upon it. Had it survived the devices complained of would have infringed claim 1 and the Cartomiser devices would also have infringed claims 12 and 13 but not claim 8. The Clearomiser infringes none of claims 8, 12 or 13.