Neutral Citation Number: [2021] EWHC 537 (Pat)

Case No: HP-2020-000012

IN THE HIGH COURT OF JUSTICE
BUSINESS AND PROPERTY COURTS OF ENGLAND AND WALES
INTELLECTUAL PROPERTY LIST (ChD)
PATENTS COURT

Rolls Building
Fetter Lane
London, EC4A 1NL
Date: 09/03/2021

Before :

MR JUSTICE MEADE

- -

Between :

(1) PHILIP MORRIS PRODUCTS, SA	**Claimant**
(2) PHILIP MORRIS LIMITED	**Fourth Party**
- and -	
(1) RAI STRATEGIC HOLDINGS, INC	**Defendant**
(2) NICOVENTURES TRADING LIMITED	**Third Party**

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- -

Iain Purvis QC, Tom Alkin and Edward Cronan (instructed by **Powell Gilbert LLP**) for the **Claimant and Fourth Party**
Adrian Speck QC, Nicholas Saunders QC and Kathryn Pickard (instructed by **Kirkland and Ellis LLP**) for the **Defendant and Third Party**

Hearing dates: 5, 8, 9, 11 and 12 February 2021

Approved Judgment

I direct that pursuant no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

Covid-19 Protocol: This Judgment was handed down remotely by circulation to the parties' representatives by email and release to Bailii. The date for hand-down is deemed to be 9 March 2021.

Mr Justice Meade :

Introduction

1. This action concerns a family of heat-not-burn ("HNB") tobacco products and devices called "IQOS" which are being brought out internationally by companies in the Philip Morris group.

2. It is alleged that the IQOS products infringe two patents, with priority dates of 18 October 2006, which are owned by the Defendant, and under which the Third Party is alleged to be an exclusive licensee. I will refer to them together as "the Patents" except where it is necessary to refer to them individually, in which case I will refer to them as "EP460" and "EP944". I give more details of them below.

3. I will refer to the companies in the Philip Morris group that are parties to this action as "PMI".

4. I will refer to the Defendant and Third Party together as "BAT", which stands for British American Tobacco, to which group they belong.

5. The proceedings began as a claim for revocation of one of the Patents, but by trial had taken on the shape of a conventional infringement claim and so the trial was organised with BAT in the role of claimant, going first.

6. Adrian Speck QC appeared for BAT with Nicholas Saunders QC and Kathryn Pickard, and Iain Purvis QC, Tom Alkin and Edward Cronan appeared for PMI. Mr Speck and Mr Saunders split the oral advocacy between them.

7. There are proceedings in numerous other jurisdictions, and at the European Patent Office. A trial on infringement in Germany was due to take place in March this year but has (since the end of the hearing before me) been postponed to November. This trial was expedited, in part because of the parallel proceedings, as well as the commercial situation.

Conduct of the trial

8. The trial was conducted fully remotely, supported by a third-party IT provider retained by the parties, and worked well apart from some brief internet outage and lag (not the fault of the third party provider). Mr Flinchum, BAT's expert, gave evidence from the USA and to accommodate this, and to allow him to watch the proceedings during PMI's evidence, the Court sat some time-shifted hours, outside the normal Court day.

9. I am grateful to the Court staff and the shorthand writers for helping with these extended hours, and to the parties for providing electronic bundles and putting them on the Caselines platform, which I found useful for bundle updates and electronic searching.

The issues

10. The issues narrowed considerably just before and at the start of trial. The remaining issues are:

    i) The nature of the skilled addressee (a very modest dispute, at most).

    ii) The scope of the common general knowledge (this is mainly relevant to obviousness).

    iii) Added matter. There are three main attacks against all the relevant claims of both Patents, and two subsidiary attacks against EP944 only.

    iv) Obviousness over prior art referred to as Morgan.

    v) An allegation by PMI in support of obviousness that a key claim feature was arbitrary or reflected no technical contribution.

    vi) Whether the IQOS products infringes. This depends purely on claim construction, there being no dispute of fact.

    vii) Whether the Third Party is an exclusive licensee. PMI made no admission as to this so I have to decide it.

The witnesses

11. BAT called one expert witness, Mr Gray Flinchum, who worked for the tobacco company R.J. Reynolds from 1983 to 2019. He worked on process design and handling of tobacco and on two HNB products called "Premier" and "Eclipse", of which I give more detail below. He did not, however, work on the initial design of those products.

12. Mr Flinchum was a good and knowledgeable witness who was clear and helpful when explaining things. He was fair and balanced. In closing submissions PMI compared him with its own tobacco expert Dr McLaughlin (see below), to the effect that the latter had more experience of actual initial product design. That is true but it is well established that the assessment of expert evidence in patent cases is not an exercise in determining which expert in fact approximates more closely to the notional skilled person. So I did not think the comparison was material.

13. Mr Flinchum expressed strong views about the nature of the invention of the Patents in his written evidence which were very different from the case argued for by BAT at trial. This was because of a tactical change of position forced on BAT by the added matter case, as I explain below. It is not in any way a personal criticism of Mr Flinchum that this happened but it does bear on how his evidence is to be weighed in the balance, and I return to it below.

14. PMI called two expert witnesses.

15. The first was Dr David McLaughlin, who worked for the tobacco company Gallaher from 1993 to 2009. Between 2004 and 2007 (the priority date, it will be recalled, being 2006) he worked in product research and innovation with a specific focus on HNB products.

16. Dr McLaughlin was also a good, knowledgeable and clear witness.

17. PMI submitted that Dr McLaughlin had an unduly narrow appreciation of the skilled team's focus and that he was wrongly affected by hindsight. These are not personal criticisms of Dr McLaughlin and they are best addressed in the context of the skilled team and obviousness issues, so I come back to them there. It was also said that Dr McLaughlin's hindsight was revealed by his considering the Patents obvious over every and any starting point in the prior art, but there was not enough exploration in his cross-examination of the art that was not pursued by PMI at trial for me to form a view on this.

18. PMI's second expert witness was Mr Mark Beard, an electronics engineer. He did not work on tobacco products generally or HNB specifically but did work on portable electronic therapeutic medical devices. His role was to explain the control and heating circuitry of the Patents and of the IQOS products. He did this very well and clearly. BAT criticised him for not drawing attention to what it said was a key paragraph in the PPD. I did not see the force or relevance of this as a criticism of Mr Beard since the contents of the PPD were clear and he did not and could not try to conceal them.

19. The reason BAT did not have a direct equivalent of Mr Beard is simply that Mr Flinchum was also able (and competently so) to deal with the topics that Mr Beard addressed. There is no dispute between them that I need to resolve.

The skilled team

20. It was common ground, as I understood it, that the skilled addressee would have skill and experience in the areas of technology identified above in relation to the expert witnesses (essentially: development of new tobacco products, and electronic heating control) in this case. Whether that would mean one person or a team is unimportant. I refer below to skilled team and skilled addressee interchangeably.

21. It was also common ground that the skilled team would have an interest in developing HNB products. As I will explain below, the HNB products previously commercialised had been off the market for some time because they had not been successful. However, it was agreed that at the priority date there was a real desire to progress the field and there were real teams working on it, for example that to which Dr McLaughlin belonged.

22. BAT sought to stress that HNB would not be the only area of interest to the notional skilled team, and that within HNB it was not only devices with electric heating that were of interest. I accept that of course there was continuing work on conventional cigarettes, but that is neither here nor there. I also agree, and this was the focus of BAT's point on this topic, that the skilled team would not have had an exclusive interest in electric heating for HNB products. This has a potential effect in the sense that it enlarges the choices open to the skilled team. But since it was common ground that the Accord device with electric heating would be of interest, and since the Morgan prior art correspondingly uses electric heating, it is not an important factor.

The common general knowledge

23. There was no dispute as to the applicable legal principles: to form part of the common general knowledge ("CGK"), information must be generally known in the art, and regarded as a good basis for future action.

Agreed common general knowledge

24. Much was agreed by the parties to be CGK. At my request they submitted a document setting out the agreed matters, which I have edited slightly, as follows.

Tobacco

25. Tobacco smoke is an aerosol, composed of both vapour and particulate phases. There are various types of tobacco, with different characteristics due to different seed varieties, growing conditions, post harvesting procedures, and so on. Different types of tobacco are often blended.

26. Tobacco can be processed into many forms. Cut filler is the most common processed form for tobacco rod forming for conventional combustible cigarettes.

27. Cut filler tobacco is predominantly made up from tobacco stem and/or tobacco leaf (or lamina). It can also contain some reconstituted tobacco and fine tobacco dust. Upon harvesting, the stem and lamina of the tobacco plant are separated. They are then aged and conditioned; additives, humectants (to add moisture) and flavourings are added during the conditioning process. The tobacco is then cut or shredded to form "cut filler".

28. "Reconstituted tobacco" is produced from portions of tobacco, including that which may otherwise be wasted (e.g. chunks of tobacco stem, pieces of tobacco scrap and fine tobacco dust). These are processed to create an artificial lamina.

29. The two most common ways of producing reconstituted tobacco are cast sheet or paper processes:

    i) The "cast sheet process": tobacco is ground up into a fine powder and mixed with water, binders, additives, humectants and optional wood pulp fibres. The slurry of these elements is 'cast' or poured out onto a surface to form a thin film and is then heated and dehydrated to produce a reconstituted tobacco sheet. Commonly, cast sheet reconstituted tobacco is used to make cut filler. A strong cast sheet can be re-wound around a bobbin and further processed.

    ii) The "paper making process": tobacco (often in the form of stems because of their fibrous nature) is refined (i.e. the fibres are separated) and extracted with water. The water-insoluble pulp is separated and further refined to a desired consistency and formed into a mat, which is then dried to provide a reconstituted tobacco sheet. Paper sheet reconstituted tobacco can be re-wound onto a bobbin and further processed or can be cut for making cut filler.

30. A third way of making reconstituted tobacco is by "extrusion". The tobacco and other ingredients are processed under controlled conditions of temperature, moisture and pressure to provide a reconstituted tobacco of a desired shape e.g. strands, sheets, rods or tubes.

31. Additives, humectants and flavourings can be added to tobacco to improve its properties, moisture content and flavour. Common humectants include propylene glycol and glycerol (or glycerin).

Conventional cigarettes

32. A conventional cigarette comprises tobacco circumscribed by a wrapping paper. Most commonly the form of tobacco used is cut filler.

33. Cigarettes may be filtered or unfiltered, although commercially available cigarettes are more commonly filtered. A filter acts as a spacer between the user and the tobacco portion of the cigarette, reducing the amount of tar inhaled. Typically filters are made from cellulose acetate tow, but papers or plastics can also be used.

34. Filters are manufactured using a gathering process. The filter material is pulled through a funnel or other guide, which folds it to fit into a plug (which is typically a cylinder). Certain specific machines were referred to in the evidence. I am not sure if there is a dispute about whether they were CGK, but in any event it was CGK that machines and techniques existed and could be found if not already known to the skilled team.

35. Wrapping papers come in different forms:

    i) Cigarette paper: this is formed from plant fibres, fillers and burn additives. It is typically used to circumscribe the tobacco and its porosity is designed to control the way the tobacco burns down during use;

    ii) Plug wrap: this is used to maintain the structure of the filter portion;

    iii) Tipping paper: this is used to join the filter and tobacco rod together.

Heat Not Burn products

36. The tobacco in a conventional cigarette is burned to produce a nicotine-containing aerosol. In contrast, in a heat not burn ("HNB") product, the tobacco is primarily heated instead. The aim is to generate a nicotine-containing aerosol with potentially lower toxicant emissions compared to a combustible cigarette.

37. Three HNB products had been commercialised by the priority date: the Premier and Eclipse (both from R.J. Reynolds) and Accord (from Philip Morris).

38. The Premier: this resembled a conventional cigarette and used a carbon heat source to heat the tobacco substrate. It comprised three main sections: (i) an insulated carbon tip heat source; (ii) a substrate section situated longitudinally behind the heat source; and (iii) a two part filter section. The substrate section included an aluminium capsule that contained alumina spheres impregnated with aerosol-forming material (glycerol) and

spray-dried tobacco. A tobacco roll in cut filler form surrounded the aluminium capsule. The filter section comprised a tobacco-paper filter section and a polypropylene filter section. The tobacco-paper section was a paper sheet reconstituted tobacco that had been crimped and gathered into a cylinder.

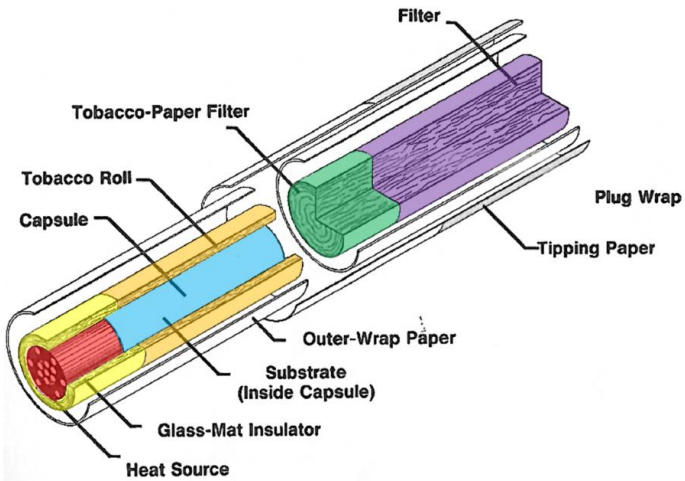
39. The Eclipse: like the Premier, this also resembled a conventional cigarette and used a carbon heat source to heat the tobacco substrate. The tobacco substrate was a roll of cast sheet reconstituted tobacco in shredded form, impregnated with glycerol. The filter was a paper sheet reconstituted tobacco in shredded form and a cellulose acetate tube mouth-end piece. The components were held together using cigarette papers and laminates of cigarette paper and aluminium foil.

40. The Accord: this was a two-part system comprising a battery powered device and a single use cigarette, that was inserted into the device. The Accord device had a multi-stage external heater: an array of longitudinal heating elements surrounded the Accord cigarette once it was inserted into the device. Each heating element was designed to heat a discrete, longitudinal section of the cigarette when activated. The Accord cigarette resembled a conventional burn-down cigarette. It contained cut filler tobacco, which was wrapped around by a mat of reconstituted tobacco containing aerosol-forming materials.

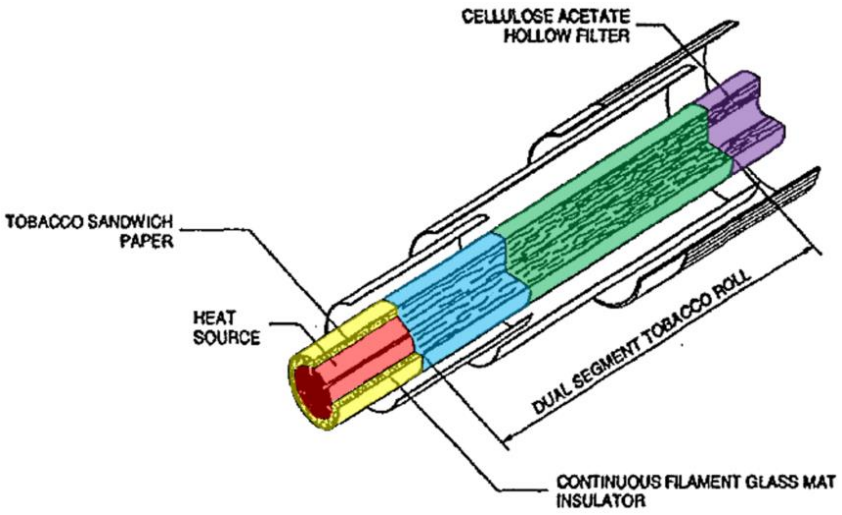
41. None of these HNB products gained wide consumer acceptance. Users did not like the flavour, taste or smell and, in addition, did not like the bulky heating device of the Accord.

42. Drawings of the Premier, Eclipse and Accord are useful to have and bear in mind the components and, in the case of the Accord, to see the similarity to it of Morgan's suggestions:

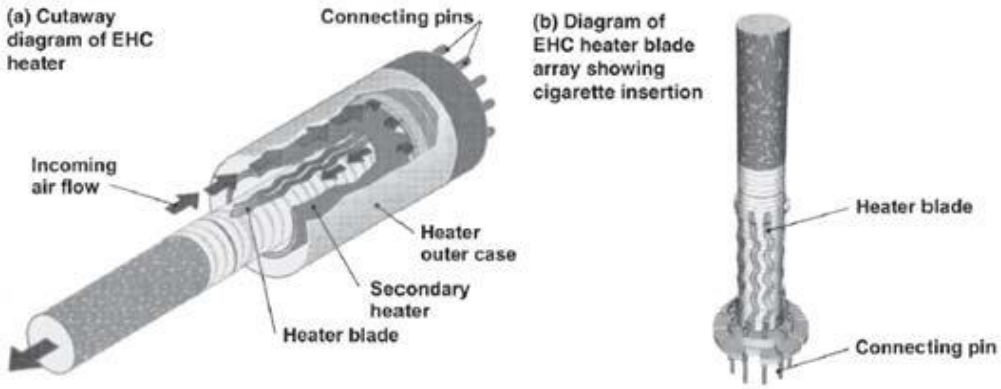
Premier:



Eclipse:



Accord (three cut-away/sectional drawings, cigarette):



Disputed common general knowledge.

43. As I have said, the areas of disagreement on the CGK were limited in scope and generally not very important to the arguments.

Ruyan e-cigarette

44. First, it was disputed whether the Ruyan-type e-cigarette referred to in the specification of the Patents was CGK. I hold that it was not; there was evidence that PMI and RJR

had obtained samples from China before the priority date, but that is not enough to make it common general knowledge, either as to how widely it was known, or as to its acceptance as a good basis for future action. Dr McLaughlin said that Gallaher knew about it, but it seems not until after the priority date. I did not detect that the CGK status of the e-cigarette made any difference to either side's arguments in any case.

Materials relating to gathered sheet reconstituted tobacco

45. Second, there was a dispute over the status of specific materials concerning gathered sheet reconstituted tobacco.

46. PMI had gathered together a number of R.J. Reynolds patent filings in which reference was made to the use of reconstituted tobacco in the form of a gathered sheet for the substrate of an HNB cigarette. However, I hold that these materials were not CGK. They are merely the patent filings of a single organisation and the fact that there are multiple such filings makes no significant difference. They are not shown to be nearly well known enough or to have achieved sufficient acceptance to have become CGK.

47. PMI sought to improve the position by reference to a publication called Tobacco Reporter, which included reports on patent activity in the industry. These had only passing and at best vague references to gathered reconstituted tobacco sheet, and it is clear that there were many such publications over the years, with a great deal of contents. It cannot be the case that everything in them was CGK and PMI provided no basis for thinking that the ones it was relying on stood out in any way. In any case, the Tobacco Reporters were not pressed in XX with Mr Flinchum.

48. Drawing these matters together, it is worth noting that the CGK in relation to gathered *reconstituted tobacco* sheet rests on a narrow basis: the filter in the Premier. However, I hold that although the Premier was not a commercial success and was only on sale some time before the priority date, the fact that there were so few commercial HNB products would have meant that the skilled team working on a new HNB product would have made a real effort to learn what it could about them. And that would include the gathered reconstituted tobacco sheet in the Premier (which is anyway included in the agreed CGK statement of the parties). The CGK basis for gathered *non-tobacco* sheet was much wider; it was very well known for filters.

49. BAT made something of a rear-guard action in closing submissions, to the effect that the skilled team might be at a small company which would not have its own gathering machinery, or would not be able to make, or get, reconstituted tobacco sheet of sufficient tensile strength to be gathered. I reject this. I think it is reasonable to infer from the Patents themselves that they envisage the skilled team being competent to achieve those goals without further help (see ***Horne v. Reliance*** [2000] FSR 90 at [11]), and it also emerged from the evidence that the smaller companies could buy in the necessary materials and/or expertise.

The Patents

50. The two patents in issue are European Patent (UK) 3 398 460 B1 and European Patent (UK) 3 491 944 B1, which as I have said I refer to as EP460 and EP944 respectively.

They are divisionals in the same family; they each emanate from the PCT Application WO 2008/108889, which I will refer to as "the Grandparent Application".

51. As I have also already said, the priority date, which is not challenged, is 18 October 2006.

52. The claims of EP460 relate to an aerosol-generating device with a housing and a cigarette. The claims of EP944 relate to a cigarette "for use with" an aerosol-generating device.

53. After consideration of their opponent's respective opening skeletons the parties agreed that the issues could virtually all be resolved by reference to the claims of EP460. This was because they agreed that "for use with" in the claims of EP944 required consideration of a specific, real aerosol generating device; I explain this claim construction point further below. This meant that prior art not disclosing or rendering obvious the device features referred to in the claims of EP944 was not relevant, and that there would only be infringement by IQOS cigarettes of EP944 if the IQOS devices had the relevant device features required by EP460.

54. It was common ground that the issue of added matter fell to be determined by reference to the specification of the Grandparent Application.

Claims in issue

55. Claim 1 of EP460 is as follows, broken down into integers:

Claim 1	
a	A powered aerosol generating device (10) comprising
b	a source of electrical power (36)
c	at least one electrical resistance heating unit (72) for forming a thermally generated aerosol that incorporates components of tobacco
d	a controller mechanism (50) including a sensor (60) that is capable of selectively powering the electrical resistance heating element (72) at least during periods of draw
e	wherein the device (10) comprises an outer housing (20)
f	and a cigarette (150) positioned within the outer housing (20),
characterized in that	
g	at least a portion of the electrical resistance heating element (72) is elongated, and at least a portion thereof extends downstream within the outer housing (20) such that at least a portion of the resistance heating element (72) can extend into the cigarette (150),
h	wherein the cigarette (150) comprises at least one form of tobacco (89)
i	and an aerosol-forming material employed in addition to the tobacco (89)
j	the tobacco (89) being wrapped in a paper wrapper (160)
k	wherein the tobacco (89) is present in the form of a gathered sheet that acts as a substrate for the aerosol forming-material

56. Claim 8 of EP460 is as follows. It adds the requirement that the gathered sheet tobacco is formed from reconstituted tobacco. In that respect it presents the same target for prior art as claim 1 of EP944 (see below), and if the decision were taken to use gathered sheet it would inevitably be of reconstituted tobacco, so the claim does not raise any additional issues on obviousness:

Claim 8	
a	The device (10) according to any one of the preceding claims,
b	wherein the tobacco (89) is formed from reconstituted tobacco

57. Claim 1 of EP944 is as follows:

Claim 1	
a	A cigarette (150) for use with a powered aerosol generating device (10) comprising
b	a source of electrical power (36)
c	at least one electrical resistance heating unit (72) for forming a thermally generated aerosol that incorporates components of tobacco
d	and a controller mechanism (50) including a sensor (60) that is capable of selectively powering the electrical resistance heating element (72) at least during periods of draw
e	wherein the device (10) comprises an outer housing (20) for a cigarette (150) to be positioned within the outer housing (20),
f	wherein at least a portion of the electrical resistance heating element (72) is elongated, and at least a portion thereof extends downstream within the outer housing (20) such that at least a portion of the resistance heating element (72) can extend into the cigarette (150),
g	the cigarette (150) comprising at least one form of tobacco
h	and an aerosol-forming material employed in addition to the tobacco
i	the tobacco being wrapped in a paper wrapper (160)
j	wherein the paper wrapper is a laminate of paper and metal foil
k	wherein the tobacco is present in the form of a web of reconstituted sheet gathered so as to possess a plurality of longitudinally extending passageways that acts as a substrate for the aerosol forming-material
l	wherein the aerosol-forming material is selected from glycerin, propylene glycol and mixtures thereof.

58. It will be noted that the requirement for the gathered sheet tobacco to be in reconstituted form is entirely in claim 1 of EP944 and there is therefore no equivalent to dependent claim 8 of EP460. In general the dependent claims no longer matter, but a minor added matter issue arises on claim 6 of EP944 (it is not alleged to be independently inventive), which is as follows:

Claim 6	
a	The cigarette (150) according to any one of the preceding claims,
b	having a length of at least about 30 mm and not exceeding about 60 mm, preferably not exceeding 50 mm.

Teaching of the specification

59. I will give references to paragraphs of EP460. The Grandparent Application has almost identical teaching, and I will give cross-references to it by page (and where appropriate, line) numbers.

60. In a Background section from [0002] to [0009] (Grandparent pages 1-5), the specification explains some very general matters about cigarettes and HNB alternatives, including referring to Premier, Eclipse and Accord. At [0009] (Grandparent page 4 line 30 – page 5 line 6) it gives a general indication of its objective:

> "Smoking articles that employ tobacco substitute materials and smoking articles that employ sources of heat other than burning tobacco cut filler to produce tobacco-flavored vapors or tobacco-flavored visible aerosols have not received widespread commercial success. Thus, it would be highly desirable to provide a smoking article that provides a smoker with an ability to enjoy using tobacco without the necessity of burning any significant amount of tobacco. In particular, it would be highly desirable to provide a tobacco-containing smoking article, such as an article having the general appearance of a cigarette, cigar or pipe, that possesses the ability to provide a smoker many of the benefits and advantages of conventional tobacco smoking without necessarily delivering considerable quantities of incomplete combustible and pyrolysis products"

61. Then, in a Summary of the Invention section from [0010] to [0013] (Grandparent pages 5-10), the specification refers to the "smoking articles" that will be described, the powered aerosol generating device, tobacco types, and aerosol generation. A key feature of the claims of the Patents, the controller mechanism, is described at this stage ([0012], page 6 lines 9-11). The text varies quite a lot between the Grandparent Application and EP460 in this section because of the different consistory clauses, as one might expect, but it is not material.

62. Thereafter, there is a very long section about the types of tobacco, additives and aerosol forming materials that can be used. I will come back to this when I deal with added matter. The materials referred to include gathered sheet reconstituted tobacco among many others. There are in general very few statements as to which tobacco forms are better than others, or why.

63. Although the specification refers at e.g. [0037] (page 21 line 25ff) to the sensory characteristics of the cigarettes to be used, there is no discussion of how to achieve good characteristics and it is not what the specification is really about.

64. Thereafter, there are 5 figures.

65. Figures 1 to 3 are embodiments of "electrically powered tobacco-containing smoking articles". It is said at [0014], in the Brief Description of the Drawings, that Figure 1 is not part of the present invention (i.e. outside the claims) (obviously there is no equivalent statement in the Grandparent Application). In fact, Figure 2 is also outside the claims because (as is the case with Figure 1) it does not have an elongated heating element, but the reader would readily appreciate this.

66. Figures 1 and 2 remain relevant for an understanding of the specification generally, and also because the text says that features of the earlier Figures may be carried through to the later. There is a dispute about what this means which is important to added matter.

67. Figures 4 and 5 are representative electronic control circuits.

68. Figures 1 to 3 are as follows (these are taken from PMI's opening skeleton and include annotations giving the names of components):

Figure 1:

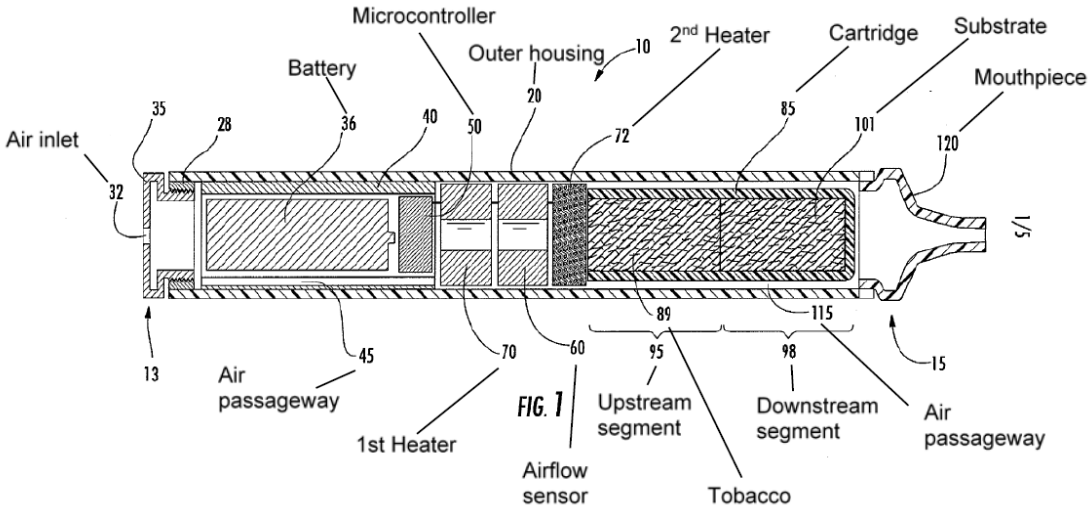


Figure 2:

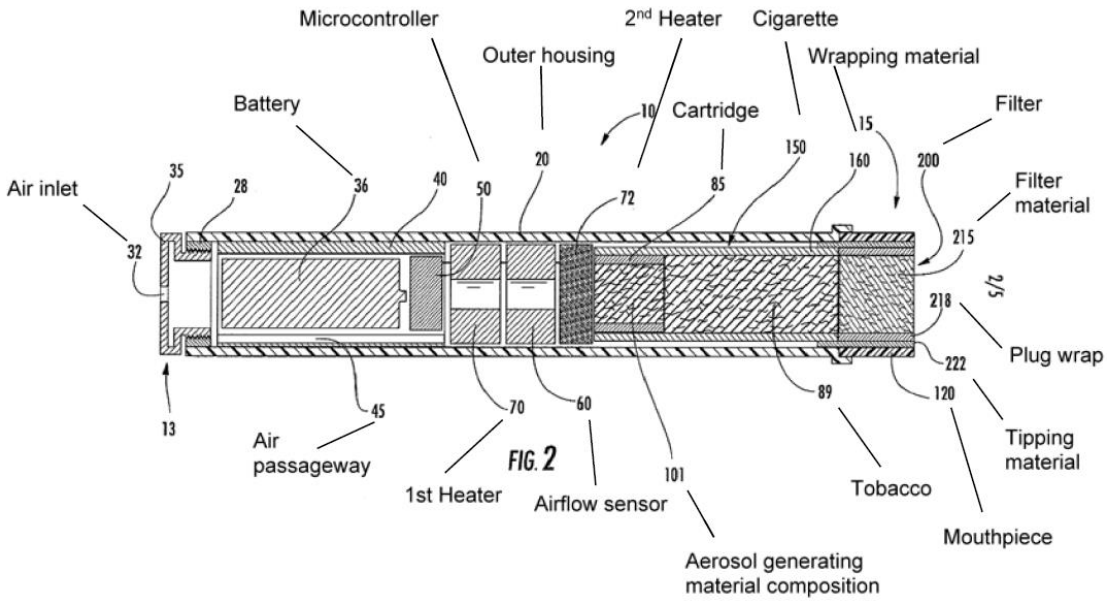
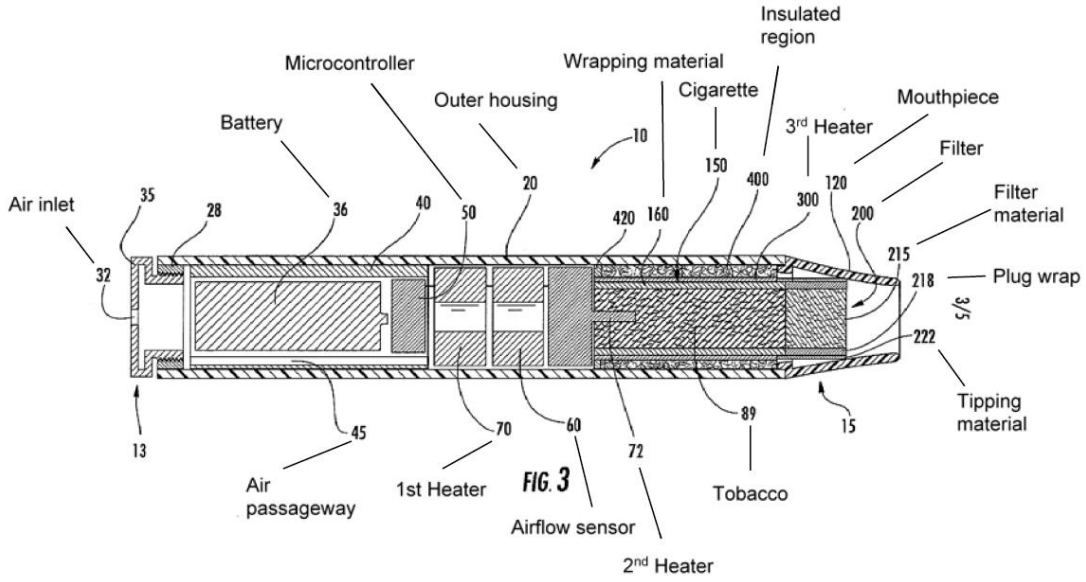


Figure 3:



69. Figure 1 is described from [0047] to [0062] (page 25 line 22 to page 32 line 21). As well as referring to the figure itself, the narrative refers on a number of occasions to a device from a company called Ruyan, which was an early e-cigarette/vaping device. The specification explains how various parts of the device may be based on the Ruyan product.

70. Figure 1 has two heaters, 70 and 72, and a sensor 60. The sensor is said at [0052] (page 27) to preferably sense draw and form part of a puff-actuated controller. Heater 70 is taught to be optional and, if used, to heat air before it reaches 72 - [0053] (page 27 line 23 – page 28 line 1). Further information about the control of the heaters is given at [0054] (starts at page 28 line 9).

71. The specification teaches that aerosol forming material, which is contained in cartridge 85 along with tobacco, may be "wicked or otherwise transferred" to heater 72 – [0055] (page 29 line 15). Cartridge 85 is sealed at the user end so flow has to be towards the heater 72 and then back towards the mouthpiece.

72. Figure 2 is described from [0063] to [0077] (page 32 line 22 onwards), with a statement at [0063] (page 32 lines 24-27) that it possesses components comparable to Figure 1 and operates in a comparable way (I paraphrase) save that it has a "cigarette".

73. Figure 3 is then described from [0078] to [0082] (page 36 line 20 onwards). There is a reference back to Figure 1 at [0078] (page 36 lines 21-24), reciting similarities in the same way as was done for Figure 2.

74. Figure 3 has a heating element 72 which is elongated and extends into the tobacco 89. This is a key feature for the issues before me.

75. Figure 3 shows three heaters – 70 and 72 as were possessed by Figures 1 and 2, and 300, a third optional heating element which surrounds the tobacco. There is no express statement as to whether heater 70 is optional, and this is a point of dispute between the parties in relation to added matter.

76. Figure 3 does not have a cartridge 85 (unlike Figures 2 and 3). Mr Flinchum agreed in cross-examination that the reader would understand that this was because the former two figures work by the movement by wicking of "wet" aerosol forming material whereas in Figure 3 there need be no such movement, and Figure 3 lacks the cartridge which would be thought to be needed to contain such material (although optional wicking inwards from paper material wrapped around the tobacco is described at [0079]).

77. As to Figures 4 and 5, it is only necessary to refer to the former, which was the focus of the oral evidence. Mr Flinchum agreed, and I find, that in Figure 4 there is an "upper circuit" which controls the heaters 70 and 300 (if the latter is present in Figure 3) by way of a timer, and a "lower circuit" which as well as having a timer controls heater 72 in an on/off puff-actuated way: on during draw, and otherwise off. This difference is relevant to the arguments on claim interpretation and added matter.

Issues of claim interpretation

78. There are two issues of claim interpretation that I need to deal with. The first is not a matter of dispute but the second is.

"a cigarette for use with a powered aerosol generating device …": EP944 claim 1

79. "For use" conventionally means *suitable* for use, at least in relation to claims where the article claimed is "for use" for a particular *purpose* or in a particular *process*.

80. However, claim 1 of EP944 is to an article (the cigarette) "for use with" *another article*, namely the powered aerosol device, which is then itself described in detail corresponding generally to the features of claim 1 of EP460.

81. In its written opening PMI identified three possible approaches to this claim form.

82. The first was what it called the "imaginary device construction", which would be to the effect that a cigarette was within the claim if it had the necessary physical features of the cigarette required, and could conceivably be used with some aerosol generating device with the required features that could be imagined, whether or not such a device existed. That would be a very broad construction both for infringement and for validity, and PMI had put forward prior art that it said would invalidate on this broad construction. However, PMI said it was not the right construction.

83. PMI's second putative approach was what it called the "intent construction" and required the existence of an actual device having the claim features with which the cigarette was intended to be used. This would be narrower than the imaginary device construction.

84. PMI's third putative approach was what it called the "system construction", which would require a system with all the features of the cigarette and powered aerosol device.

85. Under either the intent or system constructions, PMI said, its non-infringement argument on EP460, which depended on features of the aerosol device, would also

apply to EP944. But of course the claim scope for the purposes of validity would also be narrower.

86. In his oral opening Counsel for BAT made clear that his client did not argue for the imaginary device construction and that it was accepted that this meant the non-infringement point on EP460, if successful, also applied to EP944.

87. For his part, Counsel for PMI accepted that this meant that the prior art citations known as Barnes, Rudolph and Cantrell all fell away, because they did not provide or make obvious all the features of the aerosol device. They were directed only to the cigarette features of claim 1 of EP944.

88. Nothing turns on whether the right construction is the intent or the system construction and I do not need to decide it.

89. The parties' agreement that this claim form did not have the imaginary device construction was a pragmatic and realistic one which narrowed the issues to those that really were likely to matter and so I have accepted and worked with it. But I am not deciding that it is necessarily correct and if the point arises in a case where there is disagreement it will need to be fully argued.

"a controller mechanism including a sensor that is capable of selectively powering the electrical resistance heating element at least during periods of draw": EP460 claim 1 integer [d], EP944 claim 1 integer [d]

90. The meaning of this integer goes to infringement since PMI says that on its construction the IQOS devices lack the integer. There is also a squeeze on added matter as described below.

91. No issue of equivalence arises and there was no dispute about the principles of purposive interpretation to be applied.

92. Integer [d] has its textual basis in the very general teaching of [0012] of EP460.

93. PMI's argument was based heavily on the teaching of the preferred embodiments and I will say straight away that although I agreed with some steps in the analysis, overall it was very much an exercise in seeking to constrain the general words of the claim to what appears in the preferred embodiments, which is well recognised to be a fallacious approach.

94. As I have identified above, the preferred embodiments have multiple heaters, although the claim of EP460 requires only one.

95. Some of these heaters may be left on for a fixed time corresponding to the expected duration of "normal use" of the device, while others "can be controlled only during periods of draw" – PMI relied in particular on [0079] in this respect.

96. That paragraph also says that "*each heating element can be turned 'on' and 'off' in response to a signal provided by response to the sensing mechanism 60*".

97. Thus PMI submits that there is a distinction between control purely by timing for the whole period of normal use, and on/off control in response to the sensor so that the

heater is on during draw and off all the rest of the time. I agree with this, and with the proposition that follows that control based purely on timing for the entire likely duration of use does not satisfy integer [d]. However, it does not follow that the only thing that can satisfy integer [d] is on/off control so that the heater is on during draw and off at all other times. That would be wrongly to limit the claim to the preferred embodiments.

98. PMI also sought to bolster this argument by reference to the two different types of control for the different heaters that are shown in Figure 4, in which only the bottom circuit (for heater 72) is puff-controlled (and also has a timer) and the upper two (for heaters 70 and 300) are controlled by timers alone. This was just another way of seeking to limit the claims to the preferred embodiments, though.

99. Turning to construction, PMI argued that "selectively" does not mean selecting between two or more heaters. This is obviously correct since only one heater is required, and anyway BAT did not argue otherwise. PMI went on to argue that "selectively" means the heating element must be on during draw and off the rest of the time. I reject this for the reasons I have just given.

100. In closing written submissions PMI sought to say that "selectively powering" in its ordinary meaning meant selectively turning on/off because "powering" means turning on. I do not agree that this is the ordinary meaning and it would also be odd for the patentee to want to *require* a heater to have to come up from room temperature to aerosol generating temperature in the moment that draw began, every time there was a draw. One would certainly have thought that pre-heating, or maintaining a base temperature would be allowed.

101. Further, PMI's argument did not accommodate the words "at least" in integer [d]. Their natural meaning, I consider, is that the powering must be selective during draw, but that at other times it may or may not be selective. The words just serve the purpose of removing any ambiguity that would arise if the claim said that the powering had to be selective during draw but was silent about other times.

102. PMI offered two explanations for "at least". The first was that the controller could also have another selective facility, by which it could power at a different period of time, and it referred to [0079] lines 5-11. I found this rather hard to follow, but in any event the passage is broad and permissive and does not support the proposition that "selectively" is narrowly constrained as PMI argues.

103. PMI's second explanation for "at least" was that it catered for the possibility of a fixed pulse of power of up to 2 seconds when draw is detected, but which might be longer than the actual period of draw. It is certainly possible that this would be embraced by the "at least" formulation, but there is no reason to suppose that it is the entirety of what is covered. If anything, this explanation is rather inconsistent with, or at least blurs, PMI's strict construction requiring heating only during draw, and with the heater off at other times.

104. Neither of these explanations was satisfying or clear, or other than attempts to qualify general words by limiting them to the preferred embodiments.

105. I therefore conclude that BAT is correct on its interpretation of this integer, which is simply that the controller can alter the power ("selectively powering") in response to the sensor during periods of draw; and may also do so, but does not have to do so, at other times.

106. The alteration of the power is not limited to on/off and there is no requirement that the power be off outside periods of draw.

107. I consider that this corresponds to the ordinary meaning of the words used and since the integer is taught in the section of the specification that contains the broadest and most general disclosure, the reader would not be at all surprised that it was wider than the preferred embodiments.

108. The integer is indeed very broad and does include keeping the heater at a relatively constant temperature, for example simply bringing it back up to temperature by increasing the power when draw causes a drop that is detected by the sensor. But the patentee may perfectly well have intended a broad meaning, in the contemplation that the control was not very important to the overall invention, and that the main inventive idea was in the physical shape and arrangement of the heater and the choice of tobacco type (i.e. in the characterising portion of claim 1 of EP 460). The integer does not serve to exclude very much, but it does, for example, exclude a device in which power is supplied at a constant level regardless of temperature, for a fixed period.

109. A subsidiary issue came to the fore in PMI's written closing, which was that the "sensor" was required to sense draw itself, and that it was not met by sensing resistance in the heater (which would be affected by temperature and therefore in general by airflow during draw). I reject this. "Sensor" is a very general term and anyway it was established during the cross-examination of Mr Beard that the skilled team would be aware of the technique of hot-wire anemometry, which involves inferring airflow from measurements of resistance in a wire as it changes with temperature, the temperature change being caused by airflow. The skilled reader would not expect that to be excluded.

Validity

110. I will deal with added matter and then obviousness.

Added matter

111. Each side cited somewhat different case law in relation to the law on added matter, but in the end I did not discern any disagreement about the principles to be applied, other than perhaps in relation to the law applicable in the event that the invention of the claims of the Patents was to be regarded as no more than an alternative, and not a better, solution to providing an HNB device. This in its turn interfaced with the issue about whether the choice of form of gathered sheet tobacco was merely arbitrary and whether it provided a technical effect. I deal with those related issues at the end of this judgment.

112. The legal principles to be applied are conveniently drawn together by Floyd LJ in *Conversant v. Huawei* [2020] EWCA Civ 1292:

"**Relevant legal principles**

55. In *AP Racing Ltd v Alcon Components Ltd* [2014] RPC 27 I summarised the law on added matter in this way:

> "7. Section 72(1) of the Patents Act 1977 provides:
>
> > "(1) Subject to the following provisions of this Act, the court or the comptroller may on the application of any person by order revoke a patent for an invention on (but only on) any of the following grounds, that is to say –
> >
> > .. .
> >
> > (d) the matter disclosed in the specification of the patent extends beyond that disclosed in the application for the patent, as filed, . . ."
>
> This provision is based on art.138(1)(c) of the European Patent Convention, which provides so far as material:
>
> > "(1) Subject to Article 139, a European patent may be revoked with effect for a Contracting State only on the grounds that:
> >
> > .. .
> >
> > (c) the subject-matter of the European patent extends beyond the content of the application as filed . ..;"

8. The issue of added matter falls to be determined by reference to a comparison of the application for the patent as filed and the granted patent. As Aldous L.J. said in *Bonzel v Intervention Ltd* (No 3) [1991] R.P.C. 553 at p.574:

> "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 as granted.
>
> (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."

9. In the end the question is the simple one posed by Jacob J. (as he then was) in *Richardson-Vick Inc's Patent* [1995] R.P.C. 568 at p.576 (approved by him as Jacob L.J. in *Vector Corp v Glatt Air Techniques Ltd* [2007] EWCA Civ 805, [2008] R.P.C. 10 at [4]):

> "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."

10. The policy behind the rule against adding matter was also examined in *Vector v Glatt* at [5] to [6]. One of the reasons for the rule which was identified is that third parties should be able to look at the application and draw a conclusion as to the subject matter which is available for supporting a claimed monopoly. If subject matter is added subsequently the patentee could obtain a different monopoly to that which the application originally justified."

56. The *Bonzel* formulation was expanded on by Kitchin J (as he then was) in *European Central Bank v Document Security Systems* [2007] EWHC 600 (Pat) (in a passage subsequently approved by this court in *Nokia Corporation v IpCom GmbH & Co* KG (No. 3) [2013] RPC 5 at [7]):

> "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: i [2001] R.P.C. 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 para.[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 para.[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."

57. When 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. The form of the granted patent before amendment does not come into the comparison: see *Nokia v IpCom* at [8]. The parties argued the present case by reference to the disclosure of the granted patent, which I have summarised above because they were agreed that it was in all material respects identical to the disclosure of the application.

58. A particular type of added subject matter is "intermediate generalisation". In *Palmaz's European Patents* [1999] R.P.C. 47, Pumfrey J described this at p.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"."

113. I also found helpful the discussion by Kitchin LJ (as he then was) in *Nokia v. IPCom* [2012] EWCA Civ 567:

> "53 Then, in decision T 0331/87, *Houdaille/Removal of feature* [1991] E.P.O.R. 194, 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 Art.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 Art.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."

114. The EPO has since said that *Houdaille* ought not to be used in place of the "gold standard" test of disclosure, but can be used as a useful indicator in certain circumstances. See T1852/13 and T755/12.

115. The following passages from the EPO Case Law of the Boards of Appeal (9th Edition, July 2019) are also helpful, though in substance no different from the UK law.

At E.1.6:

> "The content of an application must not be considered to be a reservoir from which features pertaining to separate embodiments of the application could be combined in order to artificially create a particular embodiment (T 296/96, T 686/99, T 1206/01; T 3/06, T 1206/07, T 1041/07, T 1239/08, T 1648/11, T 1799/12, T 1853/13, T 1775/14). In the absence of any pointer to that particular combination, this combined selection of features does not, for the person skilled in the art, emerge clearly and unambiguously from the content of the application as filed (T 686/99, T 1853/13, T 1252/13). The fact that features in question have been mentioned in the description as "preferred" may act as a pointer (T 68/99, T 1869/11, T 394/11, T 1799/12; for counter-examples, see however T 2118/08 and T 1306/12)."

At E.1.9:

> "According to established case law (as summarised e.g., in T 219/09 or T 1944/10), it will normally not be allowable to base an amended claim on the extraction of isolated features from a set of features originally disclosed only in combination, e.g. a specific embodiment in the description (T 1067/97, T 714/00, T 25/03, T 2095/12)."

And:

> "The board in T 962/98 held that an intermediate generalisation was admissible only if the skilled person could recognise without any doubt from the application as filed that those characteristics were not closely related to the other characteristics of the working example and applied directly and unambiguously to the more general context (often cited, see e.g. T 144/08, T 313/09, T 879/09, T 2185/10, T 2489/13). In other words, in order to be acceptable, this intermediate generalisation had to be the result of unambiguous information that a skilled person would draw from a review of the example and the content of the application as filed."

116. The standard for added matter is quite different from the standard for obviousness and the tests serve different purposes. They should not be conflated or muddled up, although I think some of the arguments in this case did so, especially in relation to the arbitrary choice/no technical contribution issues. However, one interaction between obviousness and added matter which is important to the present case is well established, namely that a technical effect cannot be relied on for inventive step unless it is disclosed in the application as filed. PMI relied on T386/89, cited at 4.4.1 of the Case Law of the Boards of Appeal. Counsel for BAT accepted this and pointed to a statement of the same principle in *Generics v. Teva* [2013] EWCA Civ 925 at [49].

117. PMI also raised in its submissions, mainly by way of a cross-check, the issue of whether the Grandparent Application would anticipate the claims of the Patents. This has been a topic on which EPO attitudes and case law have varied over time. I received some submissions on it, but do not consider that it would add anything to my reasoning one way or another. It is not a point that could assist BAT in any event, and Counsel for BAT did not submit that it might.

118. The test for added matter is rooted in determining the disclosure of the application as filed and the patent as granted (or proposed to be amended). This means that it is a matter for the Court and not for expert witnesses, but it may, in my view, be relevant for an expert to explain at a scientific level how features of an embodiment interact, or would be expected to interact.

119. The above legal principles treat the disclosure of preferred embodiments in a particular way: the features of a preferred embodiment are presumed to be specific to that embodiment and interdependent unless overall there is a clear disclosure otherwise. Patent specifications also contain sections of more general teaching and these are to be treated differently because, by their nature and presentation in the context of the specification, they are disclosed to be more widely applicable. I do not consider that there is any absolute rule about this, however. There certainly is not a rule that anything from the general disclosure can be "plugged in" to any claim without adding matter. It depends on the overall disclosure. *How* general a piece of general teaching is depends on what it says, viewed in the context of the application as whole. I did not detect any disagreement about this.

120. Early sections of the Grandparent Application in the present case have the titles "FIELD OF THE INVENTION", "BACKGROUND OF THE INVENTION", "SUMMARY OF THE INVENTION" and "DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS". The last of these contains the description of Figures 1 to 5. Prior to that there are over a dozen pages describing, among other things, the tobacco that can be used. In my view the fact that this is under the section heading "DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS" does not itself mean that it is such. In fact, it is still very general. So I think taking aspects of its teaching is not *per se* subject to the rule against intermediate generalisation from a concrete, specific preferred embodiment. Again, I did not think there was a real dispute about this, and in fact PMI's complaint is really that those many pages about tobacco are too general, not too specific.

121. Counsel for BAT submitted in oral opening that it would be permissible (or, perhaps, more likely to be permissible) to take a feature from a list in the general teaching of a specification and combine it with other teaching if that feature was outside the CGK. I indicated that I would want to see authority in support of that proposition before I accepted it. However, none was provided, and I do not accept it, at least not at the broad level it was put. I can see that in the right case a feature in the general teaching might be individually striking as a result of being outside the CGK, and/or that which took it outside the CGK might make it clear that it had general utility. Those would just be case-specific factors in assessing a particular teaching. But I cannot see that merely being outside the CGK can make the difference in principle that was argued.

The allegations of added matter in this case

122. There was something of a dispute about how the added matter attacks run at trial corresponded to the pleadings. BAT said they went outside the pleadings and I have sympathy with that point of view. However, pragmatically BAT accepted that with one exception (in relation to which I accept BAT's objection, as addressed below) it was able to deal with the arguments and not prejudiced by their being outside the pleadings, if indeed they were.

123. The parties organised their submissions somewhat differently, but as I see it the objections were as follows:

    i) It was added matter to combine gathered sheet reconstituted tobacco as the substrate for the aerosol forming material with the elongated heating element, since there was no disclosure of that combination in the Grandparent Application.

    ii) It was added matter to remove the "puff-actuated controller" feature from claim 1 of the Grandparent Application, contrary to the *Houdaille* principle.

    iii) It was added matter by way of intermediate generalisation to take the elongated heating element feature from Figure 3 without taking other features, and in particular:

        a) The puff actuated controller (in the sense of a controller powering the heater during draw and not at other times). This is a squeeze on infringement since PMI's case is that on its proper interpretation claim 1 still requires a puff actuated controller in that sense (but I have rejected PMI's argument on claim interpretation).

        b) A distal end with air passageways through which air is drawn past the internal components, including both heaters and the air flow sensing region.

        c) Mandatory air heater (70).

        d) The air flow sensing region (60) for enabling flash heating of the second element in response to draw.

    iv) It was added matter to include integer [g] in claim 1 of EP460 because the teaching from which it was taken in the Grandparent Application also included the requirement that the elongated heater element was "hence … in close contact with a significant amount of substrate and aerosol forming agent within the tobacco" (a similar point would apply to EP944 claim 1 integer [f], but the argument was by reference to EP460). This was a sub-point of the intermediate generalisation argument, but I identify it separately because it is the one which I think was not adequately pleaded and whose introduction now would unfairly prejudice BAT. I explain further below.

124. There were also two added matter points against EP944 only. I will deal with those separately at the end of this section.

125. At my direction, BAT provided a document setting out from where in the Grandparent Application it said that the basis for the claims came. I have taken this into account, but

it was unhelpfully very long because it constantly and repetitively repeated the argument that the patentee was entitled to draw on the general teaching freely and without the constraints applicable to features of the preferred embodiments. It also contained an extensive narrative of the whole specification before getting down to identifying the basis for the claims. In the end, it identified the key passages that I address below, and relied in addition to the broad teaching about types of tobacco. I did not think them any more helpful to BAT than the best single reference to gathered sheet reconstituted tobacco that I address below (from page 19 of the Grandparent Application).

Combination of gathered sheet reconstituted tobacco and elongated heating element

126. I turn to the first point: the combination of gathered sheet reconstituted tobacco as the substrate and the elongated heating element.

127. There is a teaching of each feature in the Grandparent Application.

128. The elongated heating element comes from Figure 3 only, i.e. from a preferred embodiment.

129. The disclosure of gathered reconstituted sheet tobacco as the aerosol substrate is from the more general teaching. In particular, it is disclosed in a paragraph starting at page 19 line 3:

> The substrate material can incorporate tobacco of some form, normally is composed predominantly of tobacco, and can be provided by virtually all tobacco material. The form of the substrate material can vary; but most preferably that material is employed in an essentially traditional cigarette, cigar or pipe filler form (e.g., as cut filler). The substrate material can be otherwise formed into desired configurations. The substrate material can be used in the form of a gathered web or sheet, using the types of techniques generally set forth in US Pat. No. 4,807,809 to Pryor et al. The substrate material can be used into the form of a web or sheet that is shredded into a plurality of longitudinally extending strands, using the types of techniques generally set forth in US Pat. No. 5,025,814 to Raker. The substrate material can have the form of a loosely rolled sheet, such that a spiral type of air passageway extends longitudinally through the aerosol-generation segment. Representative types of tobacco containing substrate materials can be manufactured from mixtures of tobacco types; or from one predominant type of tobacco (e.g., a cast sheet-type or paper-type reconstituted tobacco composed primarily of burley tobacco, or a cast sheet-type or paper-type reconstituted tobacco composed primarily of Oriental tobacco).

130. However, that paragraph also says that the most preferable form is cut filler, and the overall message (see in particular the first sentence) combined with the rest of the very broad and extensive teaching in this section of the Grandparent Application is that many forms of tobacco may do.

131. So the feature taken (gathered sheet of reconstituted tobacco as the substrate) is more specific than the broadest teaching (any tobacco) and is different from the preferred form identified (cut filler).

132. The fact that gathered sheet tobacco provides a plurality of longitudinal passageways is disclosed in the context of the Figure 1 embodiment at page 29 lines 29-31, where it would be regarded as potentially important for wicking. But there is no such mention in connection with Figure 3, or in the general teaching.

133. BAT's argument is essentially that there is a general disclosure of gathered sheet reconstituted tobacco as the substrate, that by implication it can be combined with any of the preferred embodiments, and that by combining it with the elongated heating element from Figure 3 it is merely limiting the scope of protection.

134. The very long list of suitable tobacco types, the absence of any pointer to gathered sheet of reconstituted tobacco as being preferable, the pointer that in fact cut filler is the most preferred substrate, and the absence of any specific connection with the elongated heating element all point in favour of there being added matter.

135. In addition, it is a point against BAT that its own expert Mr Flinchum concluded that there was a synergistic interaction between the gathered sheet and the elongate heating element. The identification of this interaction must have been critically dependent on the fact that the two features were combined in the claims of the Patents, since it is not taught in the body of the specification. Of course, as I have said above added matter is not primarily for the experts and Counsel for BAT sought to deal with Mr Flinchum's evidence simply by disowning it, and by saying that Dr McLaughlin had not seen the same interaction.

136. In my view once the combination of gathered sheet reconstituted tobacco as the substrate and elongated heating element is specifically pointed out for the first time by way of the claims of the Patents, the skilled reader would, again for the first time, appreciate that there was an interaction between them, at least in the sense of there being a physical cooperation with the heater being able to slot into the longitudinal passages identified in the context of Figure 1. This is added matter. My view is reinforced by, but does not depend on, Mr Flinchum's impression.

Removal of puff-actuated controller from claim 1 of the Grandparent Application

137. As to the second allegation of added matter, removal of the feature of puff-actuated controller from claim 1 of the Grandparent Application, I can deal with it quite shortly because BAT simply did not rely on that claim as basis for the claims of the Patents. The mere existence of an earlier claim which could not provide the basis for the claim alleged to contain added matter is not a valid objection if there is basis elsewhere in the earlier application as a whole. It is of course well recognised that applications can contain more than one idea or invention and it is not inherently objectionable to seek to claim them separately in different divisionals.

Intermediate generalisation

138. I turn to the third allegation, of intermediate generalisation. I have identified above the features relied on by PMI.

139. What is key here, in my view, is that there is required to be a *clear disclosure* that the feature taken from the preferred embodiment *is* separate and distinct, and not dependent on, other features. It is not enough that the skilled reader would think that they might be, or were likely to be independent, or that the skilled reader would not know, or would not think about it.

140. In the present case there is, in my view, generally no real clarity about the interaction between the various heaters in Figure 3, their control, the airflow, or the way that the elongated heating element would affect the need for heating or control. The skilled reader would not have confidence what would happen if changes were made.

141. BAT's argument depended on the teaching of the Grandparent Application that certain features are optional. In principle this could perfectly well found an argument that it would not be added matter to leave them out.

142. So, I accept that upstream heater 70 is optional in the Figure 1 embodiment (as is said at page 27 line 33).

143. Further, a possible reading of page 32 lines 24 to 26:

> "The smoking article 10 possesses certain components comparable to, and in certain regards operates in a manner generally comparable to, that smoking article described previously with reference to FIG. 1. However, the smoking article is adapted to incorporate a cigarette 150."

is that the same applies to Figure 2 so that heater 70 is optional there too. But the passage is very general and not clear as to which components are common.

144. At the start of the narrative of Figure 3 there is a similar reference back to Figure 1 (page 36 lines 21-24):

> "The smoking article 10 possesses certain components comparable to, and in certain regards operates in a manner generally comparable to, that smoking article described previously with reference to FIG. 1."

145. This is also not clear, and for reasons that I have mentioned in dealing with the teaching of the specification in the context of the Patent, the Figure 3 embodiment is significantly different from the Figure 1 and Figure 2 embodiments in the respect that it does not use a cartridge or "wet" aerosol forming material. The reader would think that that might be connected with the heating and heaters provided.

146. So I do not consider there is a sufficiently clear disclosure of omitting the upstream heater from Figure 3. Much the same applies to the air flow sensing region, which is an aspect of controlling the overall provision of heating.

147. This general lack of clarity means there is added matter, but even if I were wrong about it, a more specific and in my view very plain added matter problem arises with the omission of a puff-actuated controller from Figure 3 (on my interpretation that claim 1 does not require it). In cross-examination Mr Flinchum clearly accepted that there was

a necessary technical connection between the elongated heating element and a puff actuated (i.e. heating on during draw and otherwise off) controller, because if the elongated heating element was powered all the time, the device would overheat.

148. For what it is worth, I was unable to see how the air passages being at the distal end made any real difference and I do not think the omission of that feature in itself constitutes added matter.

The pleading issue

149. I will now address the pleading point that I have referred to above.

150. The point that there was added matter by taking into integer [g] only part of the sentence on page 38 of the Grandparent Application from which it comes (lines 1 to 3) was set out in PMI's opening written submissions at paragraph 280(4). On a very generous interpretation the objection was perhaps *covered* by the words "inter alia" and "including" within the general allegation of intermediate generalisation at paragraphs 3(iii) (iv) and of PMI's Grounds of Invalidity. But on no view, as Counsel for PMI accepted, did that pleading *disclose* it so that BAT could consider and deal with it.

151. I have to say that I did not notice the point in PMI's opening skeleton (which was 116 pages long) until well into the trial and I do not think Counsel for BAT did either, for which I do not blame them.

152. At first blush the point looks like a strong one, since the part of the sentence that is omitted (close contact with substrate and aerosol forming material) looks potentially very material. But on reflection and after hearing Counsel for BAT's submissions I think it is less clear because the rest of integer [g] and integer [k] may very well achieve the same limitation. So if I refuse PMI permission to run the point, I will not be letting an obviously invalid patent stand, and that is a relevant factor.

153. More importantly, if the point had been identified properly in the pleadings, it is evident that BAT might have wanted to try to cure it by amendment (at least by a conditional application), just by putting in the missing part of the relevant sentence. I doubt it would have affected infringement or other aspects of validity, although Counsel for PMI did not expressly accept as much.

154. Counsel for PMI argued that BAT should have noticed the point in PMI's opening skeleton, and that it was for BAT to have applied to amend the Patents at that point. I disagree. The point was buried in a very long skeleton, and it is no small matter to amend a patent in litigation. Patentees ought to be able to make decisions about it with a clear understanding of the case against them and with adequate time for reflection. It would be unfair to have imposed it on BAT in the way and with the timing Counsel for PMI argued.

155. So I refuse to allow PMI to run the point. Had it done so earlier I strongly suspect, though cannot be sure, that an unobjectionable claim amendment would have fixed the issue, if there is one, so I do not think it very probable that there is any real prejudice to PMI. In addition, it can still take the point in the EPO if it wants to.

Added matter points specific to EP944

156. Since I have concluded that both Patents are bad for added matter, the points run against EP944 alone are not important, but I will address them briefly.

157. The first point is that integer [k] of EP944 requires the tobacco sheet to be gathered "so as to possess a plurality of longitudinally extending passageways that acts as substrate for the aerosol forming-material".

158. Such passageways are disclosed in the Grandparent Application at page 29 lines 27 to 30. It is a very specific disclosure made in the context of Figure 1, not in the general teaching, and not taught to be of general application, or to be of use in connection with a heating element extending into the tobacco (specific to Figure 3). So the addition of the feature into the claim discloses a new combination and is a worse form of the added matter that I have found with the combination of elongated heating element and gathered sheet. BAT's main answer was to rely on the general teaching about gathered sheet, but that is no answer since the general teaching does not refer to the longitudinal passageways. BAT also said that it was inherent to the gathered sheet format that there would be longitudinal passageways, which is true but no answer to the fact that calling them out as functionally important in the context of the invention, especially in combination with the elongated heating element, provides new technical information.

159. In addition, the passage on page 29 teaches the use of propylene glycol specifically, whereas integer [l] of claim 1 of EP944 allows propylene glycol or glycerin. The latter wicks more readily than the former, and the reader would think that the disclosure on page 29 was to do with wicking. So there is the disclosure of a new, wider class of aerosol-forming materials. Again BAT relies on the general teaching of such aerosol forming materials, but again that is not an answer when the only one disclosed with the longitudinal passageways and in the context of Figure 1 which depends on wicking, is propylene glycol.

160. For these additional reasons, feature [k] adds matter.

161. The second point on EP944 is against claim 6, which is directed to a cigarette according to the preceding claims having certain specified lengths. The Grandparent Application at page 32 discloses the same lengths, but refers to the lengths of the tobacco rod in the cigarette. Although a minor point, those lengths are not necessarily or clearly disclosed to be the same (I reject BAT's argument that they are one and the same, not least because aerosol forming material 101 does not seem to have to be part of the tobacco rod, but is part of the cigarette). The lengths of the cigarette itself are not disclosed in the Grandparent Application, so this is also an instance of added matter. Had it been the only added matter problem, it could have been cured by deleting claim 6.

Obviousness over Morgan

Legal principles

162. There was no dispute about the basic principles. I was referred to the decision of the Supreme Court in *Actavis v. ICOS* [2019] UKSC at [52] – [73], with its endorsement at [62] of the statement of Kitchin J as he then was in *Generics v. Lundbeck* [2007] EWHC 1040 (Pat) at [72].

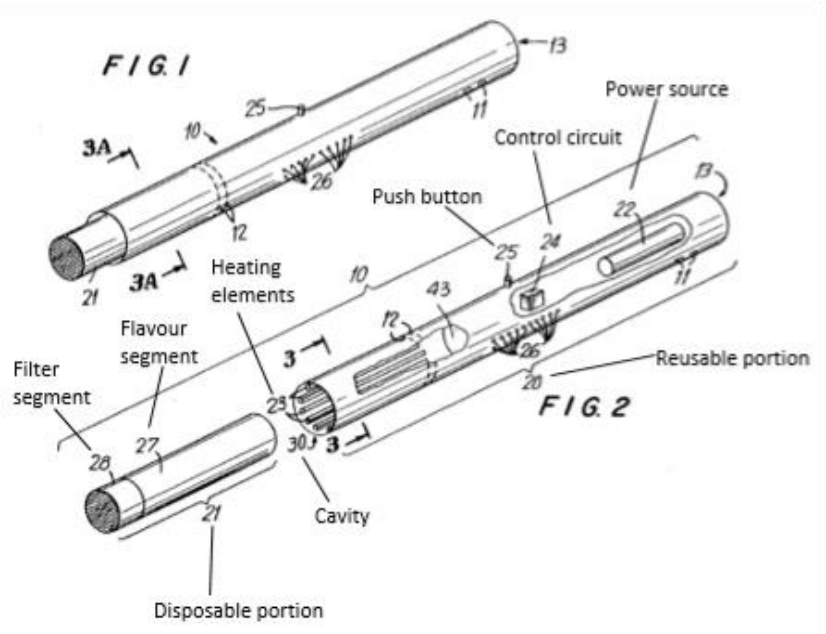
163. I was also referred to *Brugger v. Medicaid* [1996] RPC 635 at 661, approved by the Supreme Court in *Actavis v. ICOS* to the effect that an obvious route is not made less obvious by the existence of a number (even a large number) of other obvious routes. This does not exclude the variety of choices being a factor in obviousness (as Kitchin J said in *Generics*), so it must not be overdone, but it does restrict a patentee from saying that something is not obvious from a piece of prior art because it would not be the first thing the skilled person did.

164. There was a subsidiary, minor dispute about the applicable principles to allegations of obviousness over the common general knowledge alone which I will pick up when I come to it, and as to arbitrary features, which I have already said I will deal with separately.

Teaching of Morgan

165. Morgan is a patent application filed in 1993 by PMI. It is common ground that the skilled addressee would know that it related to the CGK Accord device.

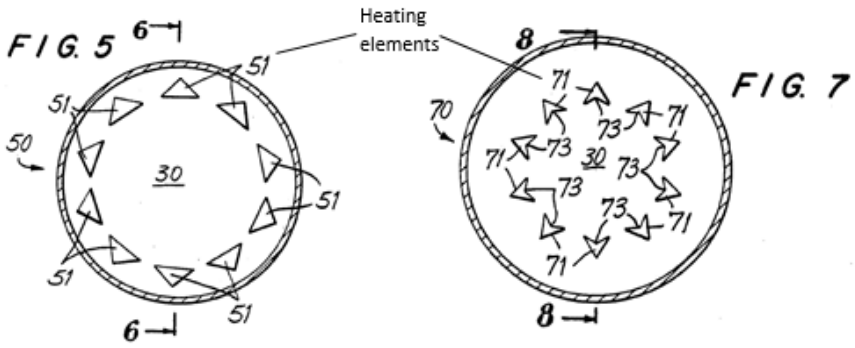
166. It has three main embodiments, each of which has a disposable cigarette that is plugged into and heated by a reusable electrical device. A general idea can be obtained from the following figure:



167. A further important common feature of the three embodiments is that they have a number of heating elements which are heated one at a time, so that there is not reheating of the same tobacco as the user smokes. The three embodiments are shown in figures 1-4, 5-6 and 7-8 respectively. Various means of controlling the heating are discussed, including a puff-actuated mechanism.

168. The first embodiment is most like the Accord and has a circular array of heating elements within which the cigarette is grasped. The second has a similar array of external heating elements but which are mounted only at one end. The third, on which PMI's attack focuses, has an array of prong-shaped elements onto which the cigarette is impaled.

169. Contrasting end-on views of figures of the second (left) and third (right) embodiments illustrate this difference:



170. In the third embodiment, the cigarette tobacco is taught preferably to be an open-cell extruded foam of reconstituted tobacco (column 6 lines 52-54, referring back to page 5 lines 32-34). An alternative mentioned in the specification is a tobacco slurry coated onto aluminium foil, but the experts agreed that would be rejected.

Pozzoli analysis

171. I will apply the *Pozzoli* analysis. In my view this is a case where it is not helpful to try to restate the inventive concept – I can just use the claim features.

172. As to *Pozzoli* questions 1 and 2, I have identified the skilled team and the common general knowledge above.

173. As to *Pozzoli* question 3, from the perspective of a specific focus on the third embodiment of Morgan the difference is that the requirement for a gathered sheet in integer [k] of EP460 is absent (BAT's opening skeleton also relied on integer [j] but it did not pursue the point and it was a bad one). The same difference arises with EP944.

174. However, simply taking the third embodiment of Morgan as the starting point for the *Pozzoli* analysis would not do justice to BAT's arguments. BAT raises the logically prior issues of whether the skilled team would choose to work on Morgan at all, and if it did, whether it would be obvious to progress the third embodiment. In addition, those issues engage the broad points that I mentioned in connection with the witnesses and the skilled team about hindsight, general approach of the skilled team to HNB, and the number of possible avenues of research open.

175. These matters all interact and go together, but for the sake of analysis and exposition I need to separate them somewhat.

176. First, would it be obvious to progress Morgan at all? BAT's case was that the skilled team would discard it entirely. This is an extreme position. It was certainly not accepted by Dr McLaughlin and, as PMI pointed out, it was not supported by Mr Flinchum in his written evidence. Since neither expert supported it, I reject it. It also makes little sense – the skilled team would recognise that Morgan was a filing related to the Accord device, which had worked but not been a commercial success. They would be interested, as a technical matter, in finding ways to improve it, including by

learning the thinking that had accompanied it. There is nothing in the Morgan disclosure to make the skilled team think that it was hopeless, or would not work.

177. Second, would the skilled team be interested in taking forward the third embodiment? This is more subtle and potentially has more substance. BAT points out that PMI had in fact commercialised Accord based on the first embodiment, so why, it asked, would the skilled team go backwards (as it were) and revisit the selection between the embodiments already made by PMI, who must have known what they were doing?

178. This was coupled with a strong attack, through the cross-examination of Dr McLaughlin, on the practicality of the third embodiment, given that it needs the provision of multiple relatively long, thin heating elements able to withstand repeated insertion and removal of the cigarette.

179. In my view, the skilled team would, without the exercise of any invention, be interested in the third embodiment. There would be no reason to think that merely because PMI had gone with the first embodiment for its commercial product, the third was a bad idea. No doubt PMI had to choose just one approach, but it would be perfectly possible that the others in Morgan were good ones. Further, by the time of the priority date of the Patents the skilled team would know that the Accord had not gone well commercially, and would be open to revisiting its design with the help of information about it, including Morgan.

180. In addition, and in my view importantly, the skilled team would know that a reason for Accord's relative failure was that it had given a "papery" taste, and I do not think it is hindsight for the skilled team to reason that heating the tobacco through the paper wrapper could well be a reason for it, which would be avoided by the third embodiment that heats from inside.

181. BAT's argument on this front also involved the assertion that the skilled team would infer from the commercial embodiment being based on the first embodiment that the third was unlikely to be better. I disagree with this for the reasons just given, but it also betrays a wrong approach to the legal test, as it implies that only the best suggestion in a document can be obvious. I refer to my comments above about *Brugger v. Medicaid*.

182. As to the task of providing suitable long thin heaters for the third embodiment, I did not think the cross-examination of Dr McLaughlin was convincing. He thought the problems were soluble, and Morgan provides potential solutions within the third embodiment, such as folding the heating elements to give them strength, and making them pointed. More generally, there would no doubt be detailed engineering issues of this general kind with any implementation of Morgan or any HNB device that the skilled team would need to be able to deal with, and the Patents themselves leave the exercise of making a sufficiently robust heating element to the reader, although admittedly not in the context of the more complex multi-element arrangement of Morgan's third embodiment.

183. I also note that Mr Flinchum did not comment on the difficulty or otherwise of implementing the third embodiment in his reports. That is because he took the approach of saying that the skilled team would focus on the first, and made no comment on the specifics of the other embodiments. So there was no support in his

evidence for BAT's case that the skilled team would reject the third embodiment as impractical.

184. Next in my consideration of the general issues that arise from Morgan, I will consider BAT's contention that Dr McLaughlin was influenced by hindsight. I think that he was, to some extent.

185. In particular I agreed with BAT that his envisaging the skilled team as already having to hand, at the start of the project, prototypes with external and internal heaters for HNB devices was not a fair reflection of the art since, among other things, no real world device with an internal heater existed. Dr McLaughlin said that the only options were to heat an HNB cigarette from the inside or the outside. While this is true, it does not mean that those in the art saw things that way. So there was some hindsight there. But simply because there was some hindsight does not mean I have to reject Dr McLaughlin's evidence outright. Rather, I need to take it into account to an appropriate degree and I will do so. Also, hindsight in relation to the possibility of an internal heater is not particularly serious in relation to Morgan where that idea is clearly taught in the third embodiment.

186. A further way in which BAT developed its hindsight point against Dr McLaughlin was by the assertion that he had not been specific about what the skilled team would do, or what device(s) it would come up with, but had simply addressed whether the features of the claims were obvious, at an abstract level. I agree that there is a difference between asking an expert witness the open question "what would the skilled team do?" and, for example, the question "would it be obvious to use a gathered sheet of tobacco?". The latter bears the risk of introducing hindsight.

187. Again, I think there is some force in this, but not nearly as much as BAT asserts. Dr McLaughlin's first report did say what the skilled team would set about doing, before later asking whether the claim features were inventive. He did not simply go to the features in the abstract. On the other hand, his description of what the skilled team would do was rather general, and he did not distinguish all that well between what the skilled team would do by way of prototyping and what it would be aiming for ultimately, or would arrive at. This was particularly significant on the question of whether the skilled team would make designs with one or multiple heating elements, and at what stage.

188. BAT went so far as to assert that Dr McLaughlin's approach was really no more than an attack over CGK alone, disguised by a veneer of reliance on Morgan. It referred to the dicta of Arnold J as he then was in *Conversant v. Huawei* [2019] EWHC 1687 at [258]. This was going too far and I reject it. Dr McLaughlin's analysis started from the specific designs of Morgan in the context of the real-world Accord device.

189. Overall therefore I think that Dr McLaughlin was influenced by hindsight to some extent, sufficiently that I must make due allowance for it, but by no means to the degree that I cannot rely on his evidence.

190. Before returning to the specifics of Morgan, I will also deal with the general assessment and weight of Mr Flinchum's evidence. While he was very fair in his oral evidence, his written evidence was very heavily dependent on the proposition that the invention of the Patents lay in the synergistic combination of the longitudinal heater, tobacco in the

form of a gathered sheet, and wicking. This was not maintained by BAT (no doubt because its advisers realised the disastrous effect it would have in relation to added matter) and is not justified in any event. Mr Flinchum's reliance on it was less marked in his reply evidence but still there. In addition, and as I have mentioned above, he expressed the view that the skilled team would be most interested in Figure 1 and paid little attention to Figure 3 and its implications.

191. Overall therefore, although it is not his fault and does not reflect on him personally, Mr Flinchum's evidence provided little support for the case BAT ran at trial.

192. I return to the specifics of Morgan and *Pozzoli* questions 3 and 4.

193. I have held that the skilled team would be interested in progressing the third embodiment. As to the physical device they would come up with, PMI's main case was that they would without invention opt for a multi-element internal heater like the third embodiment, and PMI's secondary case was that at the prototyping stage they would without invention make a single-element internal heater device.

194. Based on the evidence of Dr McLaughlin as a whole, both written and oral, I hold that the skilled team would at least do the former (develop the third embodiment as shown). It is true that he also said that the multi-element approach of the Accord device with sequential heating of different parts of the cigarette was unduly complex but that was, as he said, his personal perspective not shared by the authors of Morgan, and does not mean it would be inventive to retain it; Morgan clearly teaches retaining it. In any event, I would find it very hard to see that it could be inventive simply to do what Morgan actually teaches by way of the device of the third embodiment, recognising that that would require some workshop development to get the size and shape of the elements right, for example.

195. In relation to PMI's argument about making a single-element internal heating element prototype, I find that it is quite likely that the skilled team would do that, and it would not involve invention, but it would only arise if they have decided to go down the route of seeking to implement the third embodiment, so it does not add anything.

196. As to the cigarette part, the experts agreed that the skilled team would want to use reconstituted tobacco but would not like the specific proposal of Morgan to use the extruded foam format, so it would be obvious to seek to change that.

197. That brings me, after dealing with all the parties' more general points, to what is really the sole difference for the purposes of ***Pozzoli*** question 3, namely using a gathered sheet of reconstituted tobacco instead of the extruded form in the context of the third embodiment.

198. Would this be obvious? I think that it would, for the following reasons.

199. First, this is really just a question of how to get a type of tobacco (reconstituted) which the skilled team had decided to use, into cigarette form. Having rejected the extruded form, the other option would be sheet form.

200. Second, I agree with PMI that the ways of getting the sheet into cigarette form were very limited: rolling or gathering a sheet, or cutting it and using the result.

201. Third, the experts agreed that rolling, while usable for products such as luxury cigars, was not appropriate for mass manufacture of cigarettes.

202. Fourth, the skilled team would know of gathering as a technique from the CGK of using paper for filters in burn down cigarette filters. I consider that without any invention that would suggest the use of gathering for an improved cigarette to use with Morgan's third embodiment.

203. Fifth, the skilled team would know as a matter of CGK that gathered tobacco paper had been used in the filter of the HNB Premier. They would therefore appreciate that tobacco sheet could be gathered, and for that reason I reject BAT's argument that they would be deterred by uncertainties or difficulties associated with making tobacco sheet of the necessary tensile strength for gathering (in addition, I bear in mind the aptitude of the skilled team assumed by the Patents, addressed above by reference to *Horne v. Reliance*). I do not think there would be any insight or invention in the appreciation that the way that the tobacco paper was handled in the Premier could be applied in the context of Morgan.

204. It is true that the skilled person would not know of gathered reconstituted tobacco being used as the part of a cigarette that was actually smoked, or as the substrate for the aerosol forming material in an HNB device, but given my findings so far this is of no significance in the absence of some reason to think that there would be any problem using it for that purpose. My view on that is fortified by the fact that the Patents do not identify any such problem or contain any teaching about how to address it.

205. I accept that the skilled team might prefer, or think first of, cut filler made from reconstituted tobacco rather than gathered sheet, but that does not make the latter inventive.

206. I take into account also the fact that using a gathered sheet would not provide any unexpected result, but merely the desired and predictable one of putting the tobacco into a physical shape suitable for packaging in a cigarette.

207. Overall therefore I find that the step from Morgan to the claims of the Patents is no more than taking one of a very small number of obvious starting points (the third embodiment), which would be seen to need a minor change (to get rid of the unattractive extruded form) and to replace it with an obvious form (gathered sheet) supported by the CGK.

208. In the course of the argument about arbitrary choice and technical contribution, to which I turn next, there was some discussion of the way in which the case would be analysed applying the EPO's problem-and-solution approach. Although not necessary to my conclusion on obviousness, I think that my reasoning would work just as well in the EPO framework. Assuming Morgan as the closest prior art (since it was the only one argued before me), the problem would be that the extruded reconstituted tobacco in the third embodiment was unsatisfactory because it was difficult to form into a cigarette consistently. The solution would be to use a gathered sheet form instead, and that would be obvious from the common general knowledge.

Allegations of arbitrary choice and lack of technical contribution

209. PMI reinforced its obviousness attack by arguing that the choice of gathered sheet reconstituted tobacco was merely an arbitrary one, so that the corresponding claim feature was merely an arbitrary one, and that there was no technical contribution to the claims of the Patents.

210. Although mainly expressed as a support for the obviousness case, PMI's arguments on this front also touched on added matter, since they characterised the disclosure of the Grandparent Application as being one of all possible forms of tobacco, and the choice from that disclosure (rather than from some piece of prior art) as being merely arbitrary.

211. These points were to supplement PMI's cases on obviousness and added matter, rather than as necessary components of them. Since I have found the Patents invalid on both those grounds anyway, I do not think these back-up points need to be decided. But in case I am wrong or have misunderstood the subtleties of the arguments, I will deal with them briefly.

212. As to arbitrary features, Birss J (as he then was) considered them recently in *Optis v Apple* [2020] EWHC 2746 (Pat) at [207] – [208], which PMI relied on:

> "… Merely having an arbitrary feature in a claim is not a ground of invalidity. The point of Agrevo obviousness is that if a claim is found to contain an arbitrary limitation in it, then that limitation cannot assist the patentee in defending an obviousness case. The claims does still have to be obvious over something in the state of the art – perhaps common general knowledge or some cited prior art."

213. And he explained that in the long-used example of a 9 ½" plate, the limitation to the arbitrary measurement of 9 ½" is irrelevant to inventive step, and the claim as a whole lacks inventive step, assuming plates themselves to be obvious.

214. Since, in the present case, Morgan's third embodiment has all the features of the claims of the Patents except the gathered sheet form for the reconstituted tobacco, PMI argued, as I understand it, that it could bridge the gap between Morgan and the claims if the choice of that form of tobacco was an arbitrary one, even if there was no positive reason to use it.

215. As to lack of technical contribution, BAT did not dispute that a claim which lacks all technical contribution is uninventive in law; however, it said that there was a technical contribution in the present case. In the context of the obviousness case over Morgan its main argument initially was that there is no requirement in law that an invention be better than the prior art because a valid invention can lie in providing an alternative. PMI agreed with that general statement, but said that there still has to be a technical contribution which in the case of an alternative can lie in providing a new and inventive way to get to the same result.

216. When I asked him what the technical contribution of the Patents' claims was, Counsel for BAT said that it was the product claimed, which was new and not obvious. But when I asked in what sense the product was not obvious, Counsel for BAT said: simply

because the prior art did not suggest it. This seemed to me to be circular; it is to argue that because a choice is arbitrary and so would not be thought of, therefore it is non-obvious, and therefore a technical contribution of a new and non-obvious product is made. Counsel for BAT seemed to accept this problem.

217. I found all of this very abstract. Translated into the concrete context in which I have to decide the issue of obviousness, the question would be whether the change from extruded to gathered sheet reconstituted tobacco starting from the third embodiment in Morgan is the merely arbitrary substitution of one known form for another. In that context, PMI did not argue that the change was merely arbitrary. Its positive argument was that gathered sheet was better because it would be easier to get into the form of a cigarette (on which the experts agreed), but that that was obvious in the conventional sense of there being a readily apparent positive reason to make the change. I accepted this argument.

218. So I conclude that the argument that the feature is arbitrary fails. It certainly does not add anything to PMI's case.

219. In terms of technical contribution, the claimed product has the tangible (but minor and obvious) advantage over Morgan that it is easier to handle the tobacco for the cigarette. This is consistent with comments about application of the problem-and-solution approach.

220. A large part of the confusion over these additional points arose because of a conflation between the added matter and obviousness arguments. PMI's added matter case was that the Grandparent Application disclosed many forms of tobacco and that there was nothing to distinguish reconstituted gathered sheet so as to allow it to be combined with the elongated heater of Figure 3. I have dealt with this above. It is a different question from that which arises on inventive step over Morgan. The standard is different and while added matter concerns what choice (by way of claim narrowing) might be made from the earlier application, inventive step concerns what choice might be made from the prior art and CGK. Squeezes can arise, and I have recognised the EPO case law that a technical effect not disclosed in the application cannot be relied on for inventive step, but that does not justify a general mixing of the two issues.

Infringement

Infringement Facts

221. Certain detailed aspects of the IQOS devices are confidential. I have aimed to write this judgment to describe them in terms sufficiently general to avoid giving away what is confidential, while providing a full understanding of what is relevant to infringement, and thereby to obviate any need for a confidential annex to this judgment. This has the side-effect that I do not describe the points of difference between the various IQOS devices – but they do not matter and the parties did not say that they did. In general the matter alleged to be confidential consists of the specific numerical values of various time periods, and temperatures.

222. The only issue on infringement relates to the way that power to the single, blade-shaped heater is controlled.

223. This is described in the following paragraphs of the PPD, which I have edited slightly for brevity and to remove some numbers, including specific time and temperature values.

Control of the heating cycle

28. As explained above, the length of the heating cycle is predetermined, lasting for either … puffs or approximately … minutes, depending which limit is reached first. … .

29. The microcontroller and firmware of the Holder control the activity of the Heating Blade to maintain a series of predefined temperatures … during the heating cycle. … .

30. The heating cycle is divided into two sections:

a. The … "initial heating" period …; and

b. A further … seconds, during which the target temperature of the Heating Blade spends pre-set periods at pre-set temperatures between … and … according to a proprietary heating profile.

30A. The series of predefined temperatures referred to at paragraph 29 consists of an initial target temperature of … for about … seconds (which includes the initial … heating period). The target temperature then drops to …. for approximately …. seconds. Subsequently the target temperature increases in steps …. until it finally reaches … again. The target temperature profile is followed regardless of when a user might puff on the HEETS stick, or if there are no puffs at all.

31. The voltage across and current through the Heating Blade are measured and the values provided to the microcontroller. From these values, the microcontroller determines the resistance of the Heating Blade. During assembly of the Holder, each Holder is individually calibrated to account for the particular resistance of the individual Heating Blade used in each Holder. The resistance values corresponding to the target temperatures referred to in paragraph 30 above are then calculated to allow the Heating Blade to follow the heating profile during use.

32. The Control Circuity keeps the Heater Blade at the target resistance (and therefore target temperature) associated with each phase of the heating profile by toggling a transistor switch on and off in order to either send the maximum voltage or no voltage to the Heater Blade respectively. If the resistance of the Heater Blade is lower than the target resistance then the Heater Blade is switched on for one or more pulses of … duration. If the resistance of the Heater Blade is higher than the target resistance then the Heater Blade remains inactive.

33. … .

34. … .

35. … .

36. In addition to the target resistance values varying in a predetermined manner as described in paragraphs 30 and 31 above, the actual

> resistance of the heating blade may vary as a result of the user's actions. For example, when the user draws on the HEETS stick inserted into the Holder, ambient air is drawn into the device … . The ambient air causes the temperature of the Heating Blade to decrease, thereby reducing the resistance of the Heating Blade. The voltage and current measurements across and through the Heating Blade will be affected and the microcontroller will detect the drop in resistance. This will then trigger the Control Circuity to switch on the Heating Blade for one or more … pulses, until the resistance of the Heating Blade returns to the target resistance, and further pulses are provided in order to maintain the target resistance.
>
> 37. Any other actions by the user that cause the temperature of the Heating Blade to drop will also trigger the Control Circuity to switch on the Heating Blade for one or more 1 ms pulses until the resistance of the Heating Blade returns to the target resistance, such as, for example, blowing into the device or removing the HEETS stick.

224. As explained in paragraph 36 if the user drawing on the device causes the temperature of the Heating Blade to fall sufficiently (as it generally or at least often will) this is detected and extra power applied to bring the temperature back up to the target point relevant for that time in the cycle.

225. Two additional points about this should be noted:

    i) The controller is not a perfect puff-detector. On the one hand, it is possible that if a user draws on the device at a time in the cycle when the target temperature has just dropped, the draw will not result in any additional power because the temperature will not drop to the new target. And on the other hand, external events such a change in ambient conditions or (as the PPD mentions) a user blowing into it may result in a drop in temperature, and so extra power being provided, even if the user has not drawn on the device.

    ii) The heater is on, and under control so that the power is varied, outside periods of draw.

Analysis

226. On my finding as to claim interpretation, the IQOS devices would, if the Patents were valid, fall within their claims. The heater is controlled during periods of draw so as to provide extra power to bring it up to a target temperature (or to withhold power to let it fall to one) in dependence on measurements from the sensor, which themselves are dependent on resistance varying with airflow.

227. Neither the fact that the controller is not a perfect puff-sensor nor that heating is selectively controlled outside periods of draw makes any difference. I have dealt with the latter already in relation to claim construction, and as to the former there is nothing in the specification to require perfect puff detection; the powering is clearly selectively based on temperature and the fact that temperature drop is not a perfect proxy for draw would be understood by the skilled reader.

Whether the Third Party is an Exclusive Licensee

228. BAT asserts that the Third Party, Nicoventures Trading Limited ("NTL"), is an exclusive licensee under the Patents.

229. PMI put BAT to proof of this in its Defence to Counterclaim.

230. Accordingly, BAT filed documentary evidence of the position, which consisted of a Licence Deed of August 2019 between the Defendant and NTL, and IPSUM extracts from 21 October 2020.

231. At trial, PMI declined to take any position at all on the issue. I found this needlessly unhelpful. Presumably it was brought about by some tactical consideration arising in the litigation.

232. In any event, on the basis of the documents to which I have referred, I hold that NTL is an exclusive licensee under the Patents: EP460 is expressly listed in the Licence Deed and EP944 is covered by virtue of a clause embracing patents granting from the Grandparent Application's family. The licence is exclusive within the meaning of s. 130(1) of the Patents Act 1977 because it licenses NTL to the exclusion of all others, including the patentee. The territory of the licence includes the UK.

Conclusions

233. My conclusions are:

    i) Both Patents are invalid for added matter.

    ii) Both Patents are obvious.

    iii) Had the Patents been not invalid, they would have been infringed,

    iv) The Third Party is an exclusive licensee.

234. I will hear Counsel as to the form of Order if it cannot be agreed. I direct that time for seeking permission to appeal shall not run until after the hearing on the form of Order (or the making of such Order if it is agreed).