



Neutral Citation [2021] EWHC 1977 (Pat)

Claim No: HP-2020-000011

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

Sitting remotely at:
Royal Court of Justice
Rolls Building
7 Rolls Buildings
London EC4A 1NL

Date: 14 July 2021

Before:

THE HONOURABLE MR JUSTICE MARCUS SMITH

BETWEEN:

NICOVENTURES TRADING LIMITED

Claimant and First Part 20 Defendant

-and-

PHILIP MORRIS PRODUCTS SA

(a company incorporated under the laws of Switzerland)

Defendant/Part 20 Claimant

-and-

BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED

Second Part 20 Defendant

Mr Adrian Speck, QC and **Ms Kathryn Pickard** (instructed by **Kirkland & Ellis International LLP**) appeared for the Claimant/First Part 20 Defendant and the Second Part 20 Defendant

Mr Andrew Lykiardopoulos, QC, Mr Tom Alkin and **Mr Edward Cronan** (instructed by **Powell Gilbert LLP**) appeared for Defendant/Part 20 Claimant

Hearing dates: 18, 19, 20, 24 and 25 May 2021

Approved Judgment

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

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Mr Justice Marcus Smith:**A. INTRODUCTION**

1. In these proceedings, the claimant, Nicoventures Trading Limited, seeks declarations of invalidity (and orders that they be revoked, if invalid) in relation to the following patents (collectively, the **Patents**):¹

- (1) European Patent (UK) No 3,248,483 (the **483 Patent**);
- (2) European Patent (UK) No 3,248,484 (the **484 Patent**);
- (3) European Patent (UK) No 3,248,485 (the **485 Patent**);
- (4) European Patent (UK) No 3,248,486 (the **486 Patent**).

The proprietor of all these patents, and the defendant to the claim, is Philip Morris Products SA.

2. By an additional claim brought under Part 20 of the Civil Procedure Rules (the **CPR**), Philip Morris Products SA counterclaims for infringement in relation to all four patents. The defendants to this counterclaim are the claimant, Nicoventures Trading Limited, and a third party, British American Tobacco (Investments) Limited. The products said to infringe the Patents are referred to herein as the **glo device**.
3. Nicoventures Trading Limited and British American Tobacco (Investments) Limited are part of the same group of companies. No-one drew any distinction between the companies for the purposes of these proceedings. I shall refer to them together and without differentiation as **British American**.
4. I shall refer to the defendant, Philip Morris Products SA as **Philip Morris**.
5. The Patents share a common, uncontested, priority date of 29 October 2009 (the **Priority Date**). They were prosecuted as "divisional applications" divided out from a common parent application, EP 2,850,956 A1 (the **Parent Application**), which was itself divided out of WO 2011/050964 (the **Grandparent Application**).
6. In its written opening submissions, British American was critical of Philip Morris' approach to its patent portfolio. Without in any way adopting what British American says, I quote the following paragraphs:
- “9. The specifications of the Patents are essentially the same. The only differences lie in the claims, the integers of which have been arranged in different combinations with only slight changes (if any) between them to create numerous variations on the same theme.
 - 10. All four Patents were applied for on 1 June 2017, some 6 months after the first glo device was launched in Japan. They all derive from the [Grandparent Application], which was published as WO 2011/050964 on 5 May 2011.

¹ To use the order as they are listed in the Amended Claim Form. The terms and abbreviations used in this Judgment are listed in Annex 1, which identifies the paragraph in the Judgment where each term/abbreviation is first used.

11. It is apparent that in formulating its various Patents and their claims sets, Philip Morris has not been guided by what it considers its true invention (if any) to be. Instead, Philip Morris' motivation is to maximise its chances of a finding of infringement by mining its Grandparent Application for individual features, which it then crafts together in a myriad of different ways to create a claim set that (so far as possible) maps onto the resistive-heating glo device.
 12. Philip Morris is continuing to pursue that approach, both by proposing additional features by way of amendment and by spinning out further patents from the original Grandparent Application. On the latter point, on 23 April 2021, the European Patent Office published its notice of intention to grant a fifth patent, European Patent (UK) No EP 3,248,487 (EP 487). EP 487 is to [be] yet another combination of the integers making up the claims of [the Patents] but, as it has not yet been granted, [British American] cannot yet apply for its revocation.
 13. In approaching its patent portfolio in the way that it does, Philip Morris is taking advantage of the system of "divisionals". The divisionals system was put in place as a way to permit a patentee who has included more than one invention in its original application the opportunity to correct that and avoid the objection of multiplicity of inventions that would otherwise be raised by the patent office.
 14. The system of divisionals allows a patentee who has filed a patent application to file further patent applications based on the original application and to claim the priority date of the original application. Provided that the original application is still pending (e.g., it has not proceeded to grant or been withdrawn), there is no limit to the number of divisional applications that the patentee can file.
 15. The system also permits divisional applications to be based on applications which themselves are also divisional applications, leading to the monikers "Grandparent", "Parent", etc..."
7. It is thus clear that – given the number of divisional patents – some care needs to be taken when referring to the relevant specification and claims. The parties were agreed that although there were differences between the specifications in the Patents, the Parent Application and the Grandparent Application, primary reference could be made to the specification in the 486 Patent. Save where the contrary is stated, all references in the Judgment to the specifications is to the specification in the 486 Patent.
 8. As I have stated, these proceedings began as an action by British American for revocation of the Patents. Philip Morris defends the validity of the Patents, but has also made an application for the conditional amendment of the Patents. The amendments advanced are conditional in that they are only put forward if they are needed to save the Patents. These amendments are objected to by British American, who also contend that the amendments (even if not objectionable) would not save the validity of the Patents in any event. For its part, Philip Morris contends that British American are infringing the Patents, if they are valid and not revoked.
 9. This Judgment considers the following matters in the following order:
 - (1) Section B describes the evidence that was before me.
 - (2) Section C describes the relevant technology. This Section, intended by way of background, describes the heat, not burn approach and technology; the heat, not

burn products actually marketed before the Priority Date; the prior art relied upon by British American; and the technology described in the Patents. This Section make no findings as to:

- (a) What constituted common general knowledge.
- (b) What might (or might not) be obvious in light of this common general knowledge, and/or the prior art pleaded and relied upon by British American.
- (c) The true meaning and construction of the Patents.

These are all matters considered in later sections of the Judgment.

- (3) Section D considers the nature and characteristics of the skilled person or skilled team in this case.
- (4) Section E sets out the law regarding obviousness and the approach that I take given the facts and circumstances of this particular case. The following sections then consider various matters relevant to obviousness, notably the disclosure in the Patents (Section F), the claims in issue (Section G), the inventive concepts in this case (Section H), collocation (Section I), culminating in the question of obviousness itself (Section J).
- (5) Section K deals – very briefly, given my conclusions on obviousness – with the other matters in issue, and states how the claim and counterclaim are to be disposed of.

B. THE EVIDENCE

10. I heard evidence from two experts, Mr Jason Hopps, who was called by Philip Morris and Mr Martin Wensley, who was called by British American. Although British American was technically the claimant, the parties were agreed that the proceedings should be conducted as if Philip Morris were the claimant.
11. Accordingly, Mr Hopps was called to give his evidence first, which he did on Day 1 (18 May 2021) and Day 2 (19 May 2021). Mr Hopps is a research scientist with 15 years of experience in tobacco, tobacco product and electronic cigarette research and design. Although clearly knowledgeable across the multiple fields that this area of research entails, Mr Hopps' expertise was greatest in relation to tobacco and the manner in which – when heated or burned – it could create a pleasing sensation to the user, typically a smoker used to combustible cigarettes.
12. Mr Hopps provided two reports on which he was cross-examined:
 - (1) His first expert report (**Hopps 1**) dated 19 March 2021; and
 - (2) His second expert report (**Hopps 2**) dated 30 April 2021. This second report was responsive to Mr Wensley's first report, which I shall come to describe shortly.
13. Mr Wensley gave his evidence on Day 2 (19 May 2021) and Day 3 (20 May 2021). Mr Wensley is an engineer. He qualified with a degree in physics in 1980, and (from a career

that started in architectural design and construction management) in 1990 transitioned into an engineering role. Mr Wensley has held a variety of positions of increasing seniority as an engineer, but none of them have been in the tobacco industry. Like Mr Hopps, he was cross-examined on two reports:

- (1) **Wensley 1** dated 19 March 2021; and
- (2) **Wensley 2** dated 30 April 2021.

14. That was the totality of the witness evidence before me. British American served, in the course of the proceedings, a product and process description in relation to the Glo Products (the **PPD**).² The PPD was produced and signed by Mr Tom Woodman, a senior manager in product development in British American. Philip Morris indicated that it did not need to cross-examine Mr Woodman, and he did not attend to give evidence before me. I accept the PPD as accurate.
15. Both Mr Hopps and Mr Wensley were not merely expert in the fields that I have described, but were sufficiently well informed about patents to address in a competent way the patent law issues that arose in the proceedings. Both Mr Hopps and Mr Wensley had a number of patents to their name. They gave evidence completely in accordance with their duties as experts and did their best to assist the court. I am very grateful to them. Whilst – as is clear from the substance of this Judgment – I do not accept the evidence of either expert unqualifiedly, that is in no way a reflection of the integrity of their evidence or their qualification as experts. In closing, both sides made criticisms of the other side’s expert: I do not consider that there was anything in these criticisms. As will be seen, a great deal of this Judgment focusses on the engineering aspects of heat, not burn devices, as opposed to the properties of the tobacco that would be heated by such a device (although that is, obviously, a point of some importance to the success of the device). I rely rather more on Mr Wensley in relation to these engineering aspects – in particular, in relation to the technical aspects considered in Section C below. That is, in part, because this reflects Mr Hopps’ different expertise; but it is also because Mr Wensley set these matters out in greater detail in his reports, and was not challenged on this detail.
16. Considerable reference was made to the evidence in proceedings before Meade J and Meade J’s decision in *Philip Morris Products SA v. RAI Strategic Holdings Inc.*³ I was not assisted by this. Whilst the issues before me and before Meade J were – in some respects – similar, these common issues were factual in nature. Both Meade J and I are obliged to decide the issues before us on the evidence adduced before us. Mr Hopps, in particular, was often cross-examined through the prism of evidence that was produced (not by him) in the earlier *Philip Morris* case before Meade J. Whilst Mr Hopps did his best to answer questions so put, and whilst I have, of course, paid full account to Mr Hopps’ answers to these questions, given the complex and nuanced nature of the evidence

² This was amended once, but nothing turns on this. It was also, in material parts, confidential. I have sought, in the course of this Judgment, to ensure that it is capable of being published openly and without redactions.

³ [2021] EWHC 537 (Pat).

before Meade J (in the earlier *Philip Morris* case) and me (in this case), I was not assisted by selected gobbets of earlier evidence being placed before Mr Hopps for his comment.

C. THE RELEVANT TECHNOLOGY

(1) Conventional, combustible, cigarettes

17. Conventional, combustible, cigarettes supply smokers with nicotine. When lit, the combustible cigarette burns, and produces heat. This heat vaporises chemicals in the tobacco – like nicotine, but other chemicals, also – to form a gas. As the smoker inhales, the gas travels along the interior of the cigarette, where it cools and forms a condensation aerosol with smoke particles. An aerosol is a liquid or solid suspended in a gas phase. The aerosol then enters the smoker's lungs, where the nicotine is absorbed.⁴

(2) Heat, not burn

18. The technology in this case concerns “heat, not burn” products, intended to produce a similar effect and experience to smoking combustible cigarettes. In the case of heat, not burn products, the tobacco is heated, rather than burned. The aim is to create a process that still produces a nicotine-containing aerosol for inhalation, but where this aerosol contains fewer of the undesired byproducts that would otherwise result from the combustion of tobacco. In other words, heat, not burn products involve producing an aerosol that is, or at least is intended to be, less harmful than the aerosol produced by combustible cigarettes, whilst providing the smoker with a similar experience.⁵
19. Providing a smoker with a similar experience involves seeking to replicate the experience of smoking a combustible cigarette. There are many aspects to this:⁶
- (1) *Nicotine delivery.* It is necessary to mimic the pharmacokinetics of nicotine delivery, so that users of the heat, not burn product experience the same nicotine “hit” that they would experience with a combustible cigarette.
 - (2) *The draw experience.* Users will want to have a similar “draw” experience (that is, resistance to inhalation), including exerting a comfortable amount of force drawing the aerosol into their mouth and lungs.
 - (3) *The sensory experience.* Users will want a similar sensory experience to a combustible cigarette, including flavour and “throat hit” (the feeling produced at the back of the throat by the smoker when smoking a combustible cigarette).
 - (4) *Convenience.* The heat, not burn product should seek to provide the same convenience as a combustible cigarette. Thus, the device needs to be portable, and quickly, easily and conveniently activated on demand.

⁴ Wensley 1/§35.

⁵ Wensley 1/§36.

⁶ I have derived this paragraph chiefly from Wensley 1/§37. Mr Hopps’ evidence was not inconsistent with this, although his emphasis was different. Mr Wensley was not seriously challenged in his evidence in this regard, and I accept it.

- (5) *Rituals*. This is intended to refer to the other intangible benefits a smoker is perceived to derive from smoking – the overall experience needs to feel like that of smoking.

(3) Heating

20. A – perhaps the – critical aspect of heat, not burn smoking is the question of how the product is to be heated. In the case of the combustible cigarette, this is straightforward. The tobacco inside the cigarette burns in a consistent manner along the long axis of the cigarette. When the user puffs, air flow accelerates the burning, and liberates more aerosol. The process has been finely tuned over the years, and is not specifically relevant for present purposes.
21. In the case of heat, not burn products, heat is applied to tobacco that has been impregnated with propylene glycol, vegetable glycerin and/or other appropriate carriers to assist with aerosol generation. Factors that must be considered are (in addition to the composition of the tobacco):⁷
- (1) The form of the tobacco. Thus, tobacco can be formed into “rolls” or “mats”, amongst other things, and these mats can be made up of tobacco differently formed, including shredded tobacco.
 - (2) The temperature to which the tobacco needs to be heated. Of course, this temperature will be lower than in the case of the combustible cigarette, but it will still be up to several hundred degrees Celsius.
 - (3) The positioning of the heater. Heat could be applied to the tobacco either externally (by surrounding or wrapping the tobacco) or internally (through the use of some kind of heat probe). As will be seen, a variety of different configurations has been used.
 - (4) The manner in which heat is applied (i.e., its speed and consistency) and how the heating process is commenced or activated, which are all factors related to the control of the heat.
 - (5) The power supply to supply energy for heating. Heat might be provided by electric power (which implies batteries, if the device is to be portable) or chemically (which implies a gas heater).
 - (6) Safety factors and factors of convenience. Safety issues are various. For example, it would be necessary to avoid “off-gassing”. Off-gassing is the production of a gas from a material, which is generally greater on heating. This is undesirable, and presents toxicity concerns. It would be important to avoid off-gasses emanating from the construction of the heat, not burn device. Equally, as I have described, heat, not burn devices involve the application of heat – perhaps for relatively short bursts, but perhaps longer – which could injure or seriously discomfort the user, unless appropriately protected. Thermal insulation – as well as having a

⁷ Wensley 1/§§38ff.

safety/convenience aspect – would also ensure that the heat remained where it was supposed to be: by the tobacco product.

22. As is clear, application of heat to the tobacco product is critical, and so the component(s) used to generate and apply such heat are similarly important. There are several categories of heater, and within those categories, many individual products. For present purposes, it is necessary to identify and describe three classes of heater:⁸
- (1) *Electrical resistive heaters.* The electricity would be supplied by a battery, most likely (if portability was an issue) a Lithium battery. A resistive heater relies on electrical resistance to generate heat. Electric current passing through a material encounters resistance, the amount of the resistance being dependent (amongst other things) on the materials involved. The resistance converts some of the electrical energy into thermal energy.
 - (2) *Electrical inductive heaters.* Induction heaters rely on electromagnetic induction. The induction heater applies a high-frequency alternating current to a coil to produce an oscillating magnetic field. The field itself does not directly heat anything, but rather induces an electric current in electrically conductive material, thereby causing the conductive material to heat.
 - (3) *Chemical heaters.* Chemical heaters rely upon a chemical reaction to produce heat, for example by burning a carbon fuel element. The chemical reaction, which gives off heat, can be used to heat the tobacco. Of course, given the nature of the device here under consideration (heat, not burn) the tobacco would have to be isolated from the burning fuel element so as to prevent the tobacco itself from burning.
23. Of course, the control systems needed to control the heat source (and so the heat) will vary according as to the heat source.
- (4) Heat, not burn products actually marketed before the Priority Date**
24. Before the priority date of the Patents, a number of heat, not burn products were produced and marketed. These products are described in the following paragraphs.
- (a) Premier and Eclipse*
25. Premier and Eclipse were two single-use (i.e., disposable), heat, not burn products launched by RJ Reynolds Tobacco Company in the late-1980s and early-1990s. The Premier product looks very much like a combustible cigarette, but is very different in construction and operation. Describing it from its tip, and then proceeding down the device's long axis:⁹
- (1) At the very end of the cigarette is a heat source, wrapped in a glass-mat insulator. The heat source was a chemical heat source, lit by the smoker in a conventional way.

⁸ Wensley 1/§§52ff.

⁹ My description derives from Wensley 1/§§95ff.

- (2) Next down the long axis is a hollow aluminium capsule, containing a substrate, and surrounded by a tobacco roll.
- (3) Thereafter, there is a tobacco-paper filter and a filter.

The entire device is wrapped in outer-wrap paper or tipping paper.

26. Diagrammatically, the device looks like this:

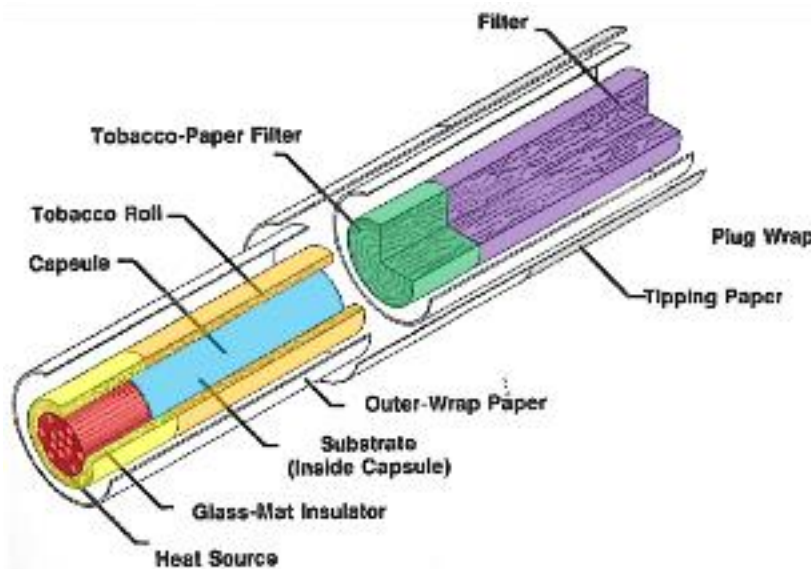


Figure 1: Diagram of the Premier heat, not burn product

27. The Premier device works in the following way:

- (1) As the smoker lights the cigarette, the heat source (coloured red) ignites and begins to burn. With each puff, a portion of the incoming air is drawn through the passageways in the heat source and heats the aluminum capsule (coloured blue). The heat is transferred to the tobacco roll (coloured orange) and the alumina substrate (coloured blue) both during puffing and between puffs.
- (2) Another portion of the incoming air is heated by the heat source (coloured red). It passes through the glass mat (coloured yellow) and heats the tobacco roll (coloured orange) directly. The heat transferred to the alumina substrate (coloured blue) is sufficient to vaporise the glycerol, added flavour and the natural flavours, including nicotine, of the spray-dried tobacco. The heat transferred to the tobacco roll (coloured orange) is sufficient to vaporise its natural flavors, including nicotine.
- (3) As the hot vapours exit the rear of the capsule and the tobacco roll (coloured orange), they enter the tobacco-paper filter (coloured green), where they begin to cool. The less volatile components condense to form very small liquid particles. These small particles and the vapour in which they are entrained constitute the smoke that then passes through the polypropylene filter (coloured purple) and out of the cigarette. This smoke provides the taste, sensations and enjoyment of other cigarettes without burning tobacco.

- (4) During smoking, the only parts of the cigarette that burn are the carbon heat source (coloured red) and a small amount of paper around the end of the cigarette. When the carbon burns, the major products are water and carbon oxides. Therefore, after the lighting puffs, virtually no sidestream smoke is emitted from the lit end of the device when compared to other cigarettes. Since the tobacco and other components do not burn, the device does not burn down and produce loose ash as do other cigarettes.
- (5) The insulator mat (coloured yellow) and paper that surround the heat source (coloured red) simulate the ash and fire cone of other cigarettes. The insulator mat (coloured yellow) also insulates the heat source (coloured red), improving performance and lowering the propensity for this cigarette to accidentally ignite combustible substances it may contact.
28. Premier was not a commercially successful product, and was shortly discontinued after its launch.¹⁰
29. Eclipse was a next generation version of Premier, broadly similar in concept.¹¹ Diagrammatically, it is set out below:

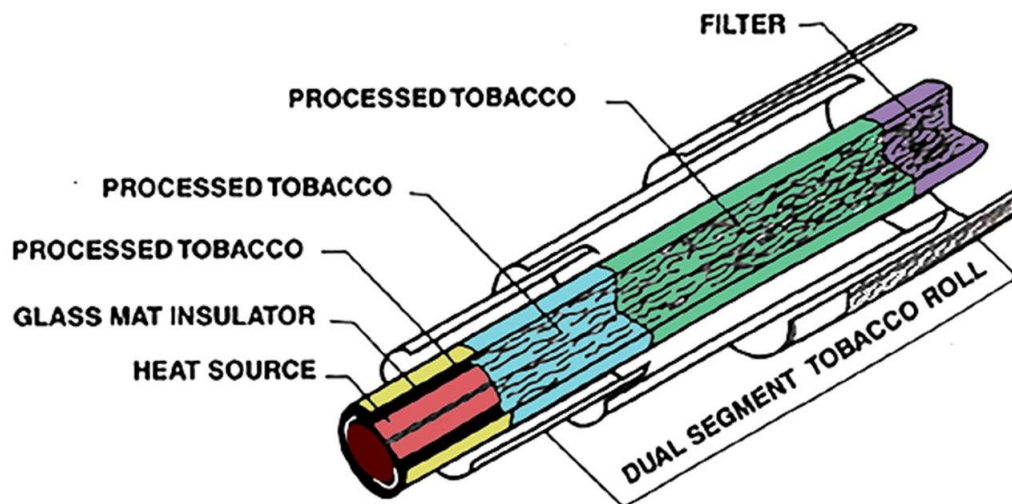


Figure 2: Diagram of the Eclipse heat, not burn product

30. The device works in a manner similar to that of the Premier product, save that the aluminium capsule and tobacco mat have been dropped from the design, in favour of two segments of processed tobacco (coloured blue and green).
31. Like Premier, Eclipse was not a commercial success.

(b) Accord and Heatbar

32. Accord and Heatbar were two, later, heat, not burn products launched by Philip Morris in the late-1990s and mid-2000s respectively.¹² These devices were not single use, but

¹⁰ Wensley 1/§97.

¹¹ My description derives from Wensley 1/§§98ff.

¹² My description derives from Wensley 1/§§100ff.

were intended to be reusable. The heating was electrical, powered by battery. The concept involved the insertion of a cigarette-like stick (but shorter and differently composed) into a heating device, that heated parts of the surface of the cigarette-like insertion sequentially and for relatively short bursts.

- 33. Unlike the Premier and Eclipse devices, these devices were not disposable, but were designed to heat (disposable) cigarette-like insertions.
- 34. The relevant parts of the Accord device looked like this:

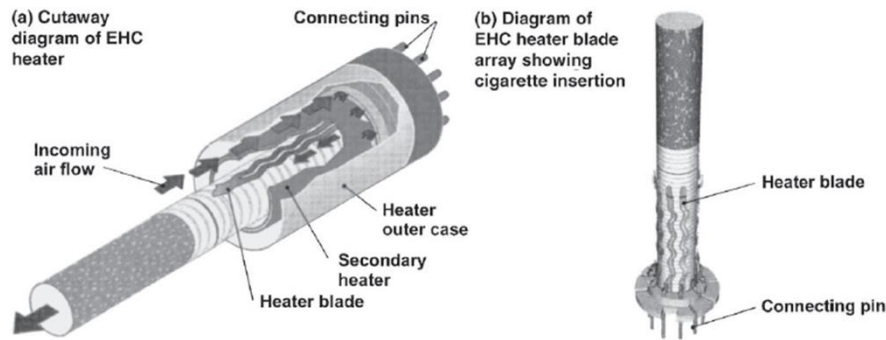
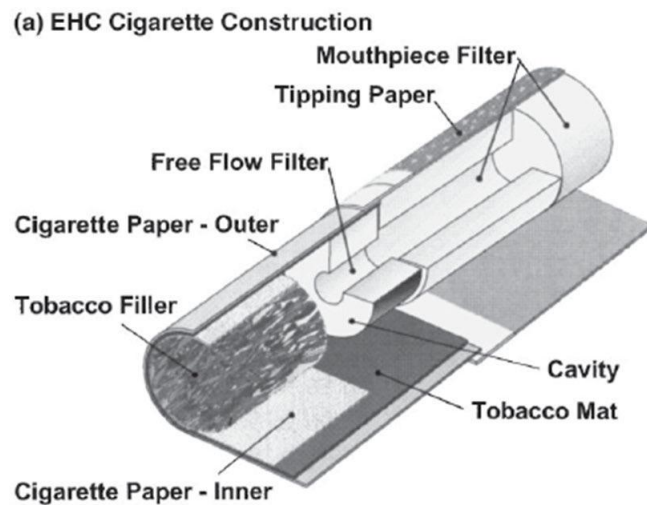


Figure 3: Diagram of the Accord heat, not burn product

- 35. The disposable insert looked a lot like, but was very different from, a conventional, combustible, cigarette:



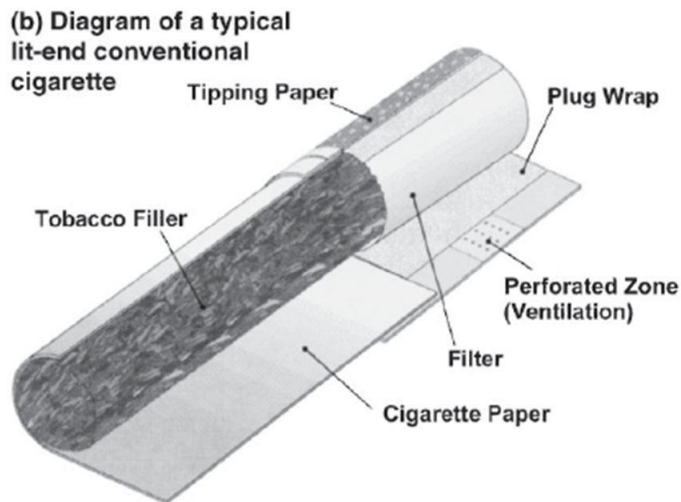


Figure 4: Diagram of the Accord "cigarette" compared to a conventional cigarette

36. The heating process was as follows. The heater contained an array of eight heater blades made from an iron-aluminide alloy, one blade for each of the eight possible puffs per cigarette. The heater was puff activated and the sequence of blade firing and energy delivery to the heater blades was controlled electronically. The energy to each blade was delivered in 1.93s, with different energy rates for the two heating phases. In the first heating phase, the most rapid heating occurred with 63% of the total energy being delivered in 41% of the heating period.
37. The Accord – which (like the Premier and Eclipse devices) was also not commercially successful – was succeeded by the Heatbar, which had a similar design, and which also failed commercially.

(5) **Pleaded prior art**

38. Two pieces of prior art were relied upon by British American. These were Deevi (US Patent No 5,322,075) (**Deevi**) and Monsees (US Patent Application No 2007/0283972) (**Monsees**). Deevi is dated 21 June 1994 (this is the date of the patent publication, not the priority date), whereas Monsees is dated 13 December 2007 (the date of the application publication, not the priority date).

(a) **Deevi**

39. Deevi is a patent for a heater for an electric, flavour-generating article, in which a flavour-generating medium – e.g., tobacco – is heated electrically to produce a flavour-containing aerosol for delivery to a consumer. The heat is provided by way of an electrical resistance heater.
40. The summary of the invention provides:

“...an electrical resistance heater manufactured by printing conductive and resistive materials on a flexible substrate. The heater can be manufactured using mass-production printed circuit techniques. The flexibility of the substrate allows the heater to be shaped into a tubular form suitable for incorporation into a smoking article of the same size and shape as a conventional cigarette.

The heater may include several heating elements which are connected in a two-dimensional array configuration. The two-dimensional array requires a minimum number of electrical connections to selectively concentrate power on an individual heater element.”

41. In the “Detailed description of the preferred embodiments”, Deevi discloses that the heater may be used in an electric flavour-generating article that includes a source of electrical energy, electrical or electronic controls for delivering electrical energy from the source of electrical energy to the heaters in a controlled manner, and a flavor-generating medium in contact with the heater. Deevi goes on to explain that the action of the heater on the flavour-generating medium causes a vapour or aerosol to be generated or released, which can be drawn in by the user. The flavour-generating medium can be any material that, when heated, releases a flavour-containing substance and includes tobacco and other aerosol-forming material, which give the user the perception of smoking a conventional cigarette.
42. The flavour-generating medium is deposited as a coating onto the heating elements. The device described in Deevi is, thus, a disposable unit at least so far as the heating elements are concerned. Once the coating on the heating elements has been vapourised, it cannot be replaced. By dividing the flavour generating medium into individual charges, each charge can represent one puff of the smoking article.
43. Below is a diagram of the device envisaged by Deevi in its “simplest form”:

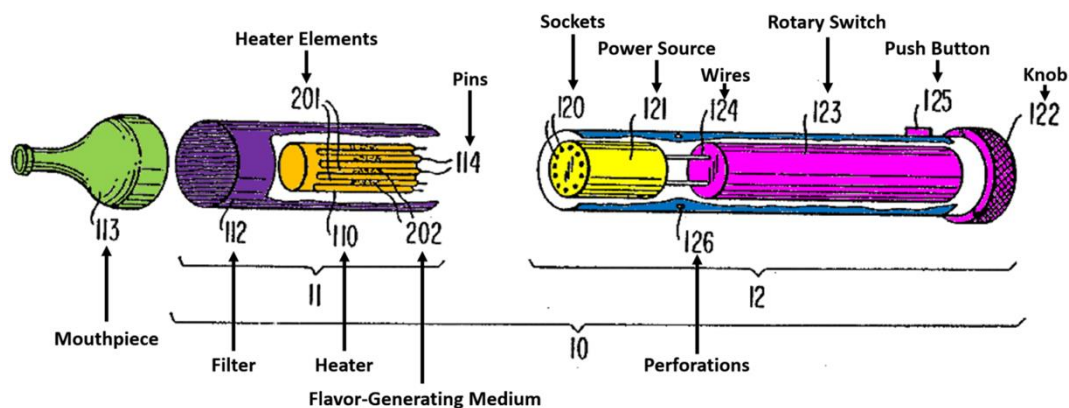


Figure 5: The device envisaged by Deevi in its “simplest form”

More specifically as to the operation of this device:

- (1) The device is effectively in three distinct sections, comprising (from the left):
- (a) An optional mouthpiece (number 113, coloured green).
 - (b) A heater section (number 11), comprising various components, in particular a heater (number 110, coloured orange), in which the heating elements (number 201) are coated with a flavor-generating medium (number 202). The several heating elements (number 201) sequentially heat different portions of the medium to produce an aerosol. The aerosol then passes through the filter material (number 112, coloured purple) and the optional mouthpiece (already described) to the user.

- (c) Deevi also discloses that section 11 is wrapped in a tube, which Deevi states can be made of heavy paper, to allow it to be inserted by a user into the next section (number 12), which is the power section. This contains, amongst other things, a power source (number 121, coloured yellow) and controls.
- (2) Air enters the device via perforations (number 126) in the outer wrapper of sections 11 or 12, which could be conventional cigarette or tipping paper. In addition to air entering the device via these perforations, Deevi also discloses that air may enter through the (upstream) end of section number 12 and that channels may be provided for that purpose, which carry air around the power source (number 121, coloured yellow) and around other internal components of section number 12.
- (3) Deevi discloses that it is important that the air enters section number 11 at a point at which it can fully sweep heater number 110 (coloured yellow) to carry the maximum amount of flavour-generating substance to the user's mouth.
- (4) Section number 12, as stated, contains the power source (number 121, coloured yellow) and control components (coloured pink). The control components are made up of a push button (number 125), knob (number 122), and rotary switch (number 123). Deevi also discloses that section number 12 may be opened to replace the battery (to the extent rechargeable batteries are not used).
- (5) In operation, the user connects section number 11 to section number 12 via a set of pins (number 114) in the heater (number 110) and a set of sockets (number 120) in the power source (number 121). The knob (number 122) controls the rotary switch (number 123) to select which heater element (number 201) to power. When the user presses the push button (number 125), the selected heater element (number 201) energises to heat the corresponding flavour-generating medium (number 202).
- (6) When all ten charges in section number 11 have been heated, section number 11 is spent and can be unplugged from section number 12. A new section number 11 can then be plugged in.
- (7) While the control system in this diagram is manual, Deevi notes that an automatic system may be used. Specifically, a “more preferred embodiment of an article according to the present invention includes controls that automatically select which charge will be heated, initiate heating in response to a certain stimulus (for example, the user's inhalation), and control the duration of the heating of each flavor charge”.
44. Turning more specifically to the design of the heater within the device described by Deevi, the heater is set out in the two diagrams below. The first (Figure 6) shows the layout of the heater, whilst the second (Figure 7) shows a cross-section of Figure 6:

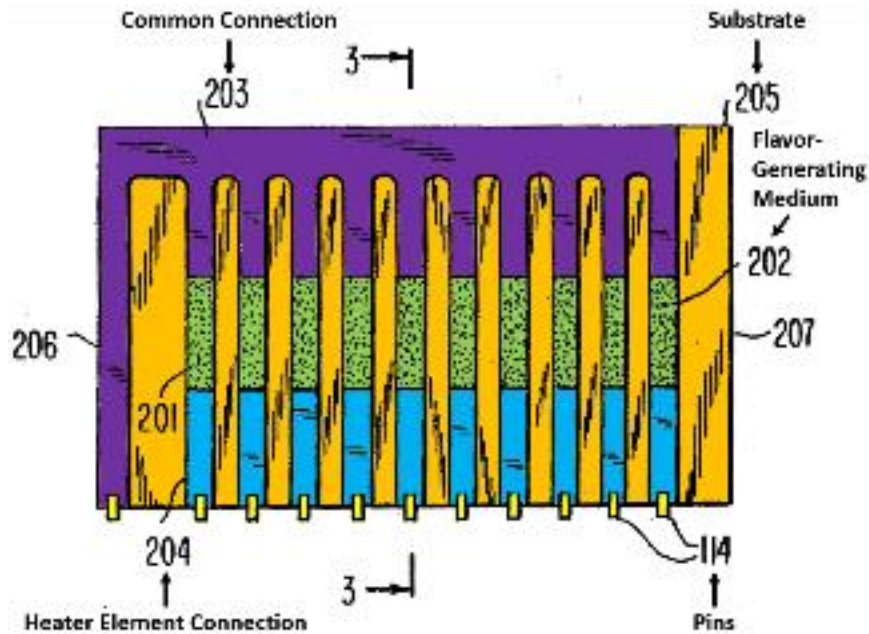


Figure 6: Layout of the heater in Deevi

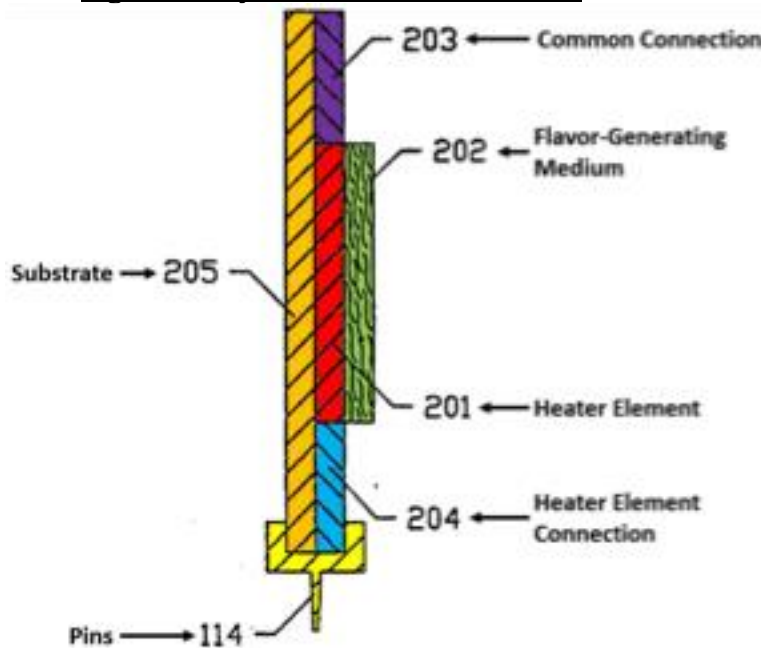


Figure 7: Cross-section of the heater in Deevi

As to this:

- (1) The heating elements (number 201, coloured red) are formed on the flexible substrate (number 205, coloured orange). Deevi states that the flexible substrate typically is a non-conductive, heat resistant material, with a low dielectric constant. Deevi also states that the substrate must withstand 400-450°C temperatures to extract tobacco aerosol without releasing undesirable volatiles or otherwise degrading. Deevi discloses that “certain polyamide polymers have been found to remain stable and flexible under these extreme temperature conditions” and identifies two specific brands (Upilex by ICI; and Kapton by DuPont) as providing such stability at temperatures upwards of 500°C. Upilex and Kapton are both

polyimides. Deevi further discloses that certain fibrous materials are suitable for use and identifies Nomex, a DuPont brand pure cellulose paper and cloth, and paper coated with an inorganic salt or sol-gel.

- (2) Deevi discloses that the heater element (number 201, coloured red) is generally made of conductive ink with a resistance such that it produces heat when a voltage is applied (i.e., a resistance heater¹³). Deevi goes on to describe how a heater can be manufactured using a flexible substrate and conductive ink. The ink is made from a conductive material such as graphite, carbon black, or metal powder (with gold and silver being preferred). The ink also contains an adhesive, such as epoxy resin, to bind it to the substrate (number 205, coloured orange). Similarly, the ink contains a solvent such as alcohol to dissolve and disperse the ingredients into a solution.
- (3) Deevi also describes insulating the substrate from the heater if a heat resistant substrate cannot be found. The insulator would serve to protect the substrate by reducing heat transfer to the substrate. Alternatively, Deevi describes using a thermally conductive support for the substrate should heating exceed a critical value. For example, aluminized paper could be used as a substrate with the aluminum sub-layer being used to conduct heat away from the paper and dissipating it, thereby keeping the paper from exceeding the critical value.
- (4) As an alternative to a heater element made of conductive ink, Deevi discloses that a resistor may be deposited onto a polymeric substrate by thermal spraying onto the substrate a variety of transition metals, alloys, or oxide ceramics.
- (5) Deevi discloses, by reference to the figures set out above, that a tubular shaped heater can be formed: "an edge 206 of substrate 205 could, for example, be bent over so as to come into proximity with edge 207 of substrate 205, and thus form a tubular-shaped heater shown as unit 110...".
- (6) Each heater element (number 201, coloured red) is connected to a common connection (number 203, coloured purple) and heater element connection (number 204, colour blue). Pins (number 114, coloured yellow) provide electrical contacts for each heater element connection (number 204, coloured blue). Likewise, the common connection (number 203) and heater element connections (number 204) are electrically conductive. In operation, voltage is applied across the common connection (number 203, coloured purple) and one of the heater element connections (number 204, coloured blue), thereby causing the corresponding heater element (number 201, coloured red) to heat.
- (7) Each heater element (number 201, coloured red) is covered with a flavour-generating medium (number 202, coloured green). Deevi discloses that the flavour-generating medium can be any material that, when heated, releases a flavour-containing substance and includes tobacco and other aerosol-forming material.
- (8) When a heater element (number 201, coloured red) is activated, the corresponding flavour-generating medium (number 202, coloured green) vaporises to produce an aerosol. In operation, Deevi contemplates spiking the temperature to at least 450°C

¹³ See paragraph 22(1) above.

during a pulse of less than one second. Ten such heater elements are shown in Figure 6, thereby providing ten charges. When all ten charges are spent, the user discards and replaces section number 12 (i.e., the heater portion and charges are disposable).

(b) *Monsees*

45. Monsees describes a heat, not burn design that can use chemical, alternatively, electrical heat. The focus in Monsees is on the use of chemical heating, in the form of a butane heater. Figure 8 below shows the general design of the device with chemical heating:

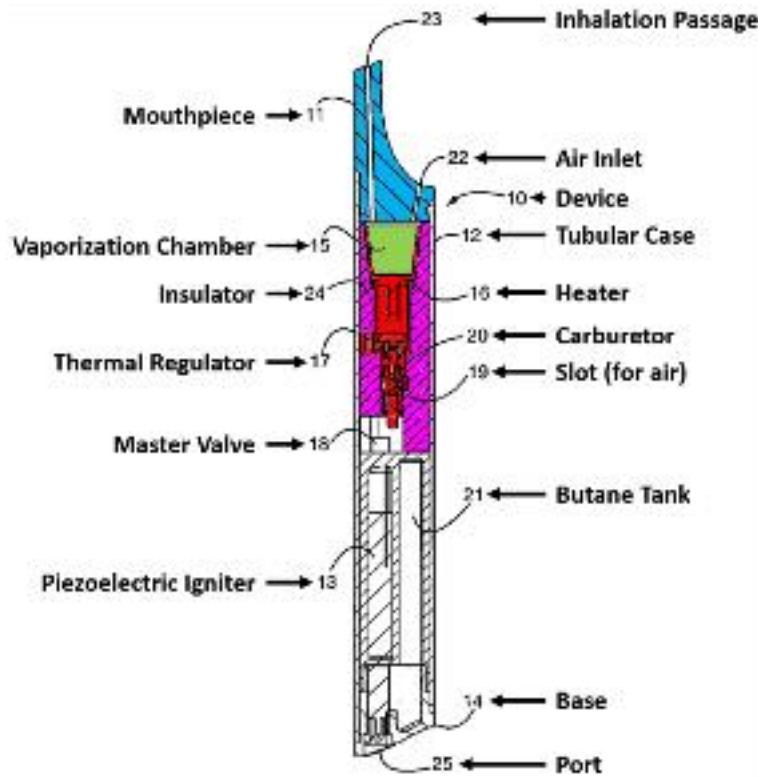


Figure 8: Monsees design

- (1) The tubular case (number 12) includes a vaporization chamber (number 15, coloured green), in which the user can introduce a removable tobacco cartridge (number 30). The cartridge is heated using the heater (number 16, coloured red). The desired operating temperature is below 204°C, and preferably below 177°C. Monsees thus relates to a heat, not burn system.
- (2) As the cartridge heats, vapour generates within the cartridge and in the space immediately above it. When a user inhales on the mouthpiece (number 11, blue), air enters via the air inlet (number 22), mixes with the vapour, and is delivered to the user via the inhalation passage (number 23). Once the cartridge is consumed, it is removed and disposed of.
- (3) This configuration uses chemical heating. Specifically, the heater burns butane, which is stored in a tank (number 21). According to Monsees, “[b]utane was found to be the most energy-dense and practical fuel source. In alternate embodiments of

the invention, the butane heating system is replaced by a battery-powered electric heater or other compact heat source”.

46. Monsees also disclosed various control systems, as well as insulation.

(6) The Patents

47. The Patents are entitled “[a]n electrically heated smoking system with improved heater”. As I have noted, the specifications of the Patents are substantially the same,¹⁴ and (unless the contrary is stated) all references are to the 486 Patent.

48. Each of the Patents relates to “an electrically heated smoking system including a heater for heating an aerosol-forming substrate”,¹⁵ preferably at a temperature that does not burn the aerosol-forming substrate.¹⁶ Clearly, therefore, the Patents relate to a heat, not burn system.

49. The heating system described is unequivocally electrically powered.

50. The Patents disclose two “aspects” of the invention. The first aspect¹⁷ describes an electrically heated smoking system in which the heating element acts as both a heater and a temperature sensor. This is achieved by using a heater that comprises one or more electrically conductive tracks on an electrically insulating substrate where the temperature coefficient of resistance of the electrically conductive tracks is such that they can act as both a resistive heater and as a temperature sensor. The Patents disclose a number of advantages of this first aspect in terms of: (i) reducing the number and size of components required and therefore the overall size of the system; (ii) the ability to incorporate all of the necessary electronics, wiring and connections on the same electrically insulating substrate as the heater; (iii) more straightforward and cost effective manufacture of the heater compared with some prior art heaters that required each heating element to be individually formed; and (iv) flexibility in the heater design.

51. The second aspect¹⁸ describes a thermally insulating material for use in an electrically heated smoking system. This serves to reduce heat loss from the heater and also protect the user from burning. As to this, the specification provides:¹⁹

“...The thermally insulating material is preferably positioned around the aerosol forming substrate so as to provide the greatest thermal insulation. The thermally insulating material must be a material which will not degrade in the high temperatures reached in the electrically heated smoking system. Not all thermally insulating materials will be suitable. Preferably, the thermally insulating material comprises a metal or another non-combustible material. In one example, the metal is gold. In another example, the metal is silver. A metal is advantageous as it may reflect heat back into the electrically heated smoking system.”

¹⁴ See paragraph 7 above.

¹⁵ [0001].

¹⁶ [0012].

¹⁷ [0007]ff.

¹⁸ [0014]ff.

¹⁹ [0016].

52. It goes on to say:²⁰

“Preferably, the thermally insulating material comprises a plurality of air cavities. The air cavities are arranged in a regular pattern. In one preferred embodiment, the air cavities are hexagonal and arranged in a honeycomb structure. The thermally insulating material may be provided on the electrically insulating substrate in addition to the electrically conductive tracks. This allows the electrically conductive tracks and thermally insulating material to be manufactured as one element. For some methods of manufacture, the electrically conductive tracks and the thermally insulating material may be made as part of the same process. Alternatively, the thermally insulating material may be provided in the electrically heated smoking system as a separate element.”

53. The Patents go on to refer to three manufacturing methods for the heater by reference to Figures 1, 2 and 3. The first is a technique similar to a screen printing process; the second is based on PCB (printed circuit board) manufacturing technology; and the third is based on photolithography technique. The Patents disclose that the second, PCB, manufacturing method can also be used to make the honeycomb structure of the thermal insulator.

D. THE SKILLED PERSON OR THE SKILLED TEAM

54. The person “skilled in the art” is expressly referred to in the statutory provisions relating to obviousness and insufficiency. The correct identification of such a person or team of persons can have important consequences for the identification of the common general knowledge in the art, the construction of the specification, and therefore for the issues of infringement and/or validity.²¹ As Jacob LJ explained in *Technip France SA's Patent*:²²

“The “man skilled in the art” is invoked at many critical points of patent law. The claims of a patent must be understood as if read by that notional man – in the hackneyed but convenient phrase the “court must don the mantle of the skilled man”. Likewise, many questions of validity (obviousness and sufficiency for instance) depend upon trying to view matters as he would see them.”

55. As Terrell notes,²³ disputes as to the identity of the person skilled in the art often involve the following questions:

- (1) What is the relevant art?
- (2) Should the “person skilled in the art” be taken as comprising a team, each member bringing a particular skill, and if so then what is the composition of that notional team?
- (3) What are the attributes and qualification, and in particular the level of skill, of the notional skilled person or team?

On all such matters, evidence is admissible.

²⁰ [0017].

²¹ Drawing on Birss *et al*, *Terrell on the Law of Patents*, 19th ed (2020) at [8-02].

²² [2004] RPC 32 at [37].

²³ *Terrell* at [8-23].

56. The general characteristics or attributes of a person skilled in the art were described by Lord Reid in *Technograph v. Mills & Rockley*²⁴ and expanded upon by Jacob LJ in *Technip France SA's Patent*:²⁵

“It is settled that this man, if real, would be very boring – a nerd. Lord Reid put it this way in [*Technograph*]:

“...the hypothetical addressee is a skilled technician who is well acquainted with workshop technique and who has carefully read the relevant literature. He is supposed to have an unlimited capacity to assimilate the contents of, it may be, scores of specifications but to be incapable of a scintilla of invention. When dealing with obviousness, unlike novelty, it is permissible to make a "mosaic" out of the relevant documents, but it must be a mosaic which can be put together by an unimaginative man with no inventive capacity.”

The no-mosaic rule makes him also very forgetful. He reads all the prior art, but unless it forms part of his background technical knowledge, having read (or learnt about) one piece of prior art, he forgets it before reading the next unless it can form an uninventive mosaic or there is a sufficient cross-reference that it is justified to read the documents as one.

He does, on the other hand, have a very good background technical knowledge – the so-called common general knowledge. Our courts have long set a standard for this which is set out in the oft-quoted passage from *General Tire v. Firestone Tire & Rubber*, which in turn approves what was said by Luxmoore J in *British Acoustic Films*. For brevity I do not quote this in full – Luxmoore J's happy phrase "common stock of knowledge" conveys the flavour of what this notional man knows. Other countries within the European Patent Convention apply, so far as I understand matters, essentially the same standard.

The man can, in appropriate cases, be a team – an assembly of nerds of different basic skills, all unimaginative. But the skilled man is not a complete android, for it is also settled that he will share the common prejudices or conservatism which prevail in the art concerned.”

57. Both Mr Hopps and Mr Wensley gave evidence as to the nature of the skilled person or skilled team in this case:
- (1) Subject to one minor point – which I discount – the experts agreed that the skilled person, in this case, would be a team of nerds, not a single nerd. Mr Hopps took the view that the Patents were directed to a team involved in the research and development of heat, not burn products. The development and design of such products would require expertise in various fields, including cigarette/tobacco development, material science and mechanical and electronic engineering. The team would be a specifically assembled skilled team within a tobacco company.²⁶
 - (2) Mr Wensley identified the skilled person as a lead product engineer seeking to develop a heat, not burn device.²⁷ That person would be part of a larger team bringing a heat, not burn product to market:²⁸

²⁴ [1972] RPC 346 at 355.

²⁵ [2004] RPC 32 at [7] to [10]. Quoted in *Terrell* at [8-42].

²⁶ Hopps 1/§29

²⁷ Wensley 1/§24.

²⁸ Wensley 1/§25.

“This team could include, for example, tobacco chemists, graphical designers, tool designers, industrial engineers, electrical engineers, mechanical engineers, software engineers, etc. The Skilled Person would lead this multidisciplinary team in developing a [heat, not burn] product. For the purposes of the Patents, it is the lead product engineer (rather than the team) who is the Skilled Person.”

- (3) With absolutely no disrespect to Mr Wensley, I found this distinction between a skilled person leading a team, and the skilled team, to be unhelpful. It seems to me that there should be no difference between a team lead by a non-heating engineer (say a technically unskilled manager) and a team lead by a heating engineer. The fact is that the team is a construct – just as is the skilled person – and to focus on who leads the team would begin to place a premium on precisely those sort of skills (inventiveness; curiosity; good communication) that an assembly of skilled persons might not have. It seems to me, therefore, better to suppose the assembly of nerds, having all the characteristics of the single skilled person, but walking in lockstep and communicating and pooling their common general knowledge as appropriate, but without originality and without the true hallmarks of leadership.²⁹ Mr Wensley did not particularly disagree with this approach.³⁰

Q (Marcus Smith J) ...is there any particular magic in who leads the team? I mean, you have defined the skilled person, in paragraph 24 of [Wensley 1], as the lead product engineer. Now, if we delete "skilled person" and insert "skilled team", really all I am interested in, and I raise this to see whether you disagree, is the qualities of the people in the team, and I am taking as read that whoever leads the team, whether they are an engineer or a tobacco specialist or, frankly, a management guru, they will use the team in an effective way to extract from the team the relevant knowledge that they need to achieve the goal, which in this case is the evolution of an innovative new product?

A (Mr Wensley) My Lord, I think that is a very good description of it, and I agree with you.

- (4) There can be no doubt that to develop an effective, commercial, heat not, burn product requires a team with a range of skills. The commercial failures of the sophisticated heat, not burn products that made their way to market, but failed, is testimony to this.³¹ However, given the subject-matter of the Patents, there is no doubt in my mind that it is the common general knowledge vesting in the "product engineer" that would be critical in this case. That is not, in any way, to diminish the general importance of (for example) tobacco chemists. It is simply – given the fact that this case turns on the engineering questions of heating and insulation – the primary focus must be on the product engineer and his or her knowledge.

²⁹ Thus, the notion of the “team” assisting the skilled person – addressed in Wensley 1/§27, where Mr Wensley describes the tobacco chemist “assisting” the skilled person he (Mr Wensley) has defined with tobacco blends and formulation – does not, as it seems to me, assist.

³⁰ Transcript Day 2/pp.304-305.

³¹ I am referring to the Premier, Eclipse, Accord and Heatbar devices described in Section C above.

- (5) Of course, the common general knowledge of the product engineer would be supplemented by the other members of the team but – for the reasons I have given – I pay particular attention to Mr Wensley's description of this particular skilled person within the skilled team.³²

“The Skilled Person would have at a minimum a Bachelor’s degree in the physical sciences, such as physics, mechanical engineering, electrical engineering, or a closely related subject. The Skilled Person would also have at least 10 to 15 years of experience developing high-volume small consumer devices incorporating heaters. For example, heaters may be found in medical equipment (e.g., inhalers), laboratory equipment (e.g., sample heaters), outdoor equipment (e.g., access card readers), kitchen equipment (e.g., toaster ovens), clothing (e.g., heated gloves), etc. The Skilled Person would be familiar with small heaters, control circuitry, power supplies, casings and other components sufficient to put a product into the hands of a consumer.”

- (6) Mr Hopps disagreed with aspects of Mr Wensley’s evidence. He did not accept Mr Wensley’s approach of a skilled person within a team.³³ That is, at the end of the day, a matter for me, but (as I have described) I have reached the same conclusion as Mr Hopps. Mr Hopps also did not accept that the team would be led by this person.³⁴ and, for reasons I have given, I agree that this is not an approach that assists.

- (7) Mr Hopps emphasised the skills of the other team members – and I am happy to accept his evidence on this, and will refer to those skills as necessary – but disagreed with the level of expertise of the product engineer described by Mr Wensley:³⁵

“I agree that such a multidisciplinary team would include people with expertise in the physical sciences, such as physics, mechanical engineering, electrical engineering or a closely related subject, but in my experience such individuals would not have “at least 10 to 15 years of experience developing high-volume small consumer devices incorporating heaters”, including from a wide range of fields outside [heat, not burn], including medical, kitchen and outdoor products. Certainly no-one on the team at JTI working on [heat, not burn] products at the Priority Date had anything like the extensive heater experience to which Mr Wensley refers.”

- (8) On this point, I prefer the evidence of Mr Wensley. Constructing a heat, not burn device requires (amongst other things) engineering expertise, and I am satisfied that the product engineer described by Mr Wensley would be part of this team in this case. I am also satisfied that such a person would have a general engineering expertise, and not a tobacco industry specific one.³⁶ I consider that the skilled team would have, as an element of its expertise, someone with a knowledge of the engineering aspects of heating and insulation generally. The fact is that heat, not burn products involve seeking to deploy technology from other fields to enable

³² Wensley 1/§24.

³³ Hopps 2/§8.

³⁴ Hopps 2/§8(d).

³⁵ Hopps 2/§8(c).

³⁶ That might be an advantage, but it is not one I consider necessary to assume on the part of this particular member of the team. Tobacco/tobacco industry specific expertise would be provided by other members of the skilled team, to the extent necessary.

development of products intended to replace (and not develop) combustible cigarettes. Almost by definition, in terms of engineering, one will have to seek a person skilled in the art of applying heat from outside the tobacco industry.

58. It follows that, whilst I consider that both Mr Hopps and Mr Wensley would have a deserved place in any skilled team put together by a tobacco company for these purposes, it is Mr Wensley who had the greater relevant expertise in terms of this particular member of the team. However, as Mr Wensley himself accepted, his knowledge and certainly his inventiveness (Mr Wensley had a number of patents to his name) means that I must approach his evidence with a degree of caution, because it may go beyond what knowledge the skilled person would actually have. I stress that I say this with no disrespect to Mr Wensley, nor to the evidence that he gave. Mr Wensley did his best to “dial-back” his knowledge and originality – but, at the end of the day, these are matters to which I must apply a critical eye.
59. I consider this to be a case where a skilled team is the prism through which questions of common general knowledge, etc, must be understood. I shall refer to the **Skilled Team** as such. I should, however, make clear that – because of the pre-eminence of the product engineer in relation to the questions that arise, when I refer to the Skilled Team, I will generally be considering the product engineer within that team. Where the knowledge of some other member of the Skilled Team is relevant (for instance, the tobacco chemist) I endeavour to say so expressly.

E. LACK OF INVENTIVE STEP OR OBVIOUSNESS: LAW AND APPROACH

(1) Introduction

60. What is obvious – and what is not obvious – is not a matter than can be further deconstructed or defined. The word “obvious” means what it says.³⁷ The question of obviousness is approached in the following way. In light of the common general knowledge of the person skilled in the art, and the pleaded prior art, and having construed the inventive concept of the claim in question:
- (1) What, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim?
 - (2) Viewed without knowledge of the alleged invention as claimed, do these differences constitute steps which would have been obvious to the person skilled in the art (i.e., the Skilled Team) or do they require any degree of invention?
61. Unless the prior art can properly be seen as part of a mosaic, each piece of prior art must be considered separately, to see if the invention claimed by the patent is actually inventive or whether it is, in light of the prior art, obvious.

³⁷ *Windsurfing International Inc v. Tabur Marine (Great Britain) Ltd*, [1985] RPC 59 at 73 to 74.

(2) British American's case

62. As regards all of the Patents, British American's case on obviousness was as follows:³⁸

- (1) The alleged technical contribution comprised the bringing together of two features into an electrically heated smoking system, namely:
 - (a) At least one heater comprising one or more electrically conductive tracks on an electrically insulating substrate; and
 - (b) A thermally insulating material for insulating the at least one heater wherein the thermally insulating material comprises a metal.

British American referred to these two features as **Feature A** and **Feature B**, which is terminology that I shall adopt.

- (2) Feature A was disclosed in Deevi. Feature B was disclosed in Monsees.

63. British American contended that these two aspects or features – Feature A and Feature B – were distinct:

- “iv. There is no interaction between Feature A and Feature B within the electrically heated smoking system of [the 484 Patent]. Each of Feature A and Feature B performs its own proper function independently of the other. There is no synergy between them.
- v. Accordingly, in assessing the question of inventive step, it is legitimate to consider separately whether an electrically heated smoking system with Feature A or Feature B would have been obvious to the skilled person at the priority date. In light of the prior art, the Claimant will say that the person skilled in the art would have considered the combination of Feature A and Feature B in the electrically heated smoking system of the claims to be no more than a collocation of known features and therefore obvious at the priority date.”

In short, British American contended that this was a case of collocation.

64. It will, accordingly, be necessary to consider the question of whether, as British American contended, Feature A and Feature B are aspects of the same (alleged) invention or separate (alleged) inventions.

(3) General points regarding obviousness**(a) Introduction**

65. In the course of their submissions, and notwithstanding the fact that obviousness is a matter not particularly susceptible of further deconstruction, a number of points emerged on the question of obviousness, which I consider more specifically in the following paragraphs and sections. These points were as follows:

³⁸ See paragraph 1 of British American's Re-Re-Amended Grounds of Invalidity. These particulars relate to the 484 Patent, but there is no material difference between this plea and the similar pleas in relation to the other Patents.

- (1) The “patent bargain” that underlies the grant of a monopoly by way of a patent, and the control of the monopoly to avoid excessive anti-competitive effects. This is considered further in Section E(3)(b) below.
- (2) The correct approach to the question of obviousness, and the factors that might be relevant to such a consideration. This is considered further in Section E(3)(c) below.
- (3) The significance of collocation in terms of the Patents and – in particular – in relation to the prior art pleaded by British American (that is, Deevi and Monsees). This is considered further in Section E(3)(d) below.
- (4) The significance of the dates for the prior art relied upon by British American and its interrelationship with the common general knowledge also relied upon by British American. This is considered further in Section E(3)(e) below.
- (5) The significance, in the context of obviousness, of the use by Philip Morris of divisional patents. This is considered further in Section E(3)(f) below.

(b) *The patent bargain*

66. What is obvious is, rightly, coloured by the conflicting interests that arise where a monopoly is created. Monopolies are, as a general proposition, anti-competitive and so must be justified. The point was put very clearly by Arnold LJ in *E Mishan & Sons v. Hozelock*:³⁹

“There is a good deal of scholarly literature on the justifications for the patent system. In simple terms, however, the patent system aims to incentivise technical innovation and investment in and disclosure of such innovation, by conferring limited monopolies. Monopolies are generally contrary to the public interest, however, because they prevent competition. Patent law contains a number of mechanisms which are designed to strike a balance between these conflicting considerations. Amongst these mechanisms are the requirements of novelty and inventive step (i.e., non-obviousness): in order not to fetter competition unduly, the public is deemed to have the right to do anything which is disclosed by, or obvious in the light of, any item of prior art, no matter how obscure, which was made available to the public anywhere in the world before the relevant date, without infringing a patent. For that reason, when attacking the validity of a patent, the party doing so is allowed to select the prior art used as the foundation for the argument with 20/20 hindsight. To that extent (but only to that extent), hindsight is not merely permitted, but an inherent feature of the current design of the European patent system (and, indeed, of most patent systems worldwide). It inevitably follows that some patents turn out to be invalid because, unbeknownst to the inventor, or indeed other persons skilled in the relevant art, prior art emerges when sufficient searches are carried out which anticipates or renders obvious the claimed invention.”

67. It is clear from this – and trite in any event – that the inventive step (i.e., non-obviousness) is a requirement that relates to technical obviousness, not commercial obviousness.⁴⁰

³⁹ [2020] EWCA Civ 871.

⁴⁰ *Hallen v. Brabantia*, [1991] RPC 195 at 213; *Koninklijke Philips v. Asustek Computer Corp*, [2019] EWCA Civ 2230

(c) Approaches to obviousness

68. A common approach to the question of obviousness is to approach the matter through the *Pozzoli* stages of inquiry, which may be described as follows:⁴¹
- (1) Identify the notional “person skilled in the art” and identify the relevant common general knowledge of that person. I have already considered the former question, and my conclusions as to the skilled team are set out in Section C above. I will come to the question of common general knowledge of this team in due course, as I will with the other *Pozzoli* stages described below.
 - (2) Identify the inventive concept of the claim in question or, if that cannot readily be done, construe it.
 - (3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed.
 - (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?
69. The *Pozzoli* stages culminate in what is the statutory test of obviousness, and the first three questions are a means of disciplining the court’s approach to that statutory fourth question.⁴²
70. I shall approach the question of obviousness structured in this way. I shall also bear in mind the EPO’s problem/solution approach. The problem/solution approach involves:
- (1) Determining the closest prior art;
 - (2) Establishing the objective technical problem to be solved; and
 - (3) Considering whether the claimed invention would have been obvious starting from the closest prior art and given the objective technical problem.
71. Neither approach can be applied in a literalist or mechanistic way. Obviousness involves a multifactorial assessment. Without in any way seeking to list all of the factors that the court may take into account, or even set out a limited number of particularly relevant factors fully, the following may be relevant to take into consideration:
- (1) Whether something was obvious to try, in circumstances where the success of the trial was not guaranteed.⁴³

⁴¹ *Pozzoli SpA v. BDMO SA*, [2007] EWCA Civ 588 at [23].

⁴² *Actavis v. ICOS*, [2019] UKSC 15 at [60].

⁴³ *Terrell*, [12-127]ff.

- (2) Hindsight and *ex post facto* analysis is to be avoided when considering what is, and what is not, obvious.⁴⁴ Lord Russell, in *Non-Drip Measure Co Ltd v. Strangers Ltd* put the point thus:⁴⁵

“Whether there has or has not been an inventive step in constructing a device for giving effect to an idea which when given effect to seems a simple idea which ought to or might have occurred to anyone, is often a matter of dispute. More especially is this the case when many integers of the new device are already known. Nothing is easier than to say, after the event, that the thing was obvious and involved no invention. The words of Moulton LJ in *British Westinghouse v. Braulik* may well be called to mind in this connection: “I confess” (he said) “that I view with suspicion arguments to the effect that a new combination, bringing with it new and important consequences in the shape of practical machines, is not an invention, because, when it has once been established, it is easy to show how it might be arrived at by starting from something known, and taking a series of apparently easy steps. This *ex post facto* analysis is unfair to the inventors and, in my opinion, it is not to be countenanced by English patent law...””

- (3) The age of the cited art and the question “why was it not done before”?⁴⁶ As Terrell notes,⁴⁷ “[t]he age of a piece of prior art may have a bearing on the issue of obviousness, though the weight to be attached to such consideration will depend on the circumstances. Where a piece of prior art was only available shortly before the priority date of the invention, then this may of itself explain why it had not already been taken up and modified by others; even obvious developments do not happen overnight. On the other hand, if sufficient opportunity to make a worthwhile invention had been available to others, then this raises the question: “why was it not done before?”” I shall, of course, be considering obviousness specifically in the context of the Patents’ claims, the common general knowledge and the pleaded prior art in due course. It is, however, worth noting at this stage that this factor was one on which Philip Morris placed particular weight, given the very early date of Deevi (1994). Thus, by way of example, paragraph 11 of Philip Morris’ written closing submissions states:

“This is a case where the secondary indicia of obviousness, (1) “what was done by others at the time?” and (2) the question of “why was it not done before if it was all in the [common general knowledge] anyway?” are particularly valuable. This is not a field in which an obvious development might be overlooked, for a lack of interest in the technology. The world’s largest tobacco companies have been engaged in [heat, not burn] product development for decades. In the present case, the prior art is effectively ignored in the analysis.”

(d) Collocation

72. It is clear from British American’s plea of obviousness, set out in paragraphs 62 to 64 above, that it is British American’s case that Feature A and Feature B are distinct, and do not comprise aspects of the same invention. In short, the plea of obviousness contains within it a plea of collocation.

⁴⁴ *Terrell*, [12-145]ff.

⁴⁵ (1943) 60 RPC 135 at 142.

⁴⁶ *Terrell*, [12-154]ff.

⁴⁷ At [12-154].

73. In *Sabaf SPA v. MFI Furniture Centres Ltd*,⁴⁸ Lord Hoffmann said:

“[24] ...there is no law of collocation in the sense of a qualification of, or gloss upon, or exception to, the test for obviousness stated in section 3 of the Act. But before you can apply section 3 and ask whether the invention involves an inventive step, you first have to decide what the invention is. In particular, you have to decide whether you are dealing with one invention or two or more inventions. Two inventions do not become one invention because they are included in the same hardware. A compact motor car may contain many inventions, each operating independently of each other but all designed to contribute to the overall goal of having a compact car. That does not make the car a single invention.

[25] Section 14(5)(d) of the Act provides (following Article 82 of the EPC) that a claim shall “relate to one invention or to a group of inventions which are so linked as to form a single inventive concept”. Although this is a procedural requirement with which an application must comply, it does suggest that the references in the Act to an “invention” (as in section 3) are to the expression of a single inventive concept and not to a collocation of separate inventions.

[26] The EPO guidelines say that “the invention claimed must normally be considered as a whole”. But equally, one must not try to consider as a whole what are in fact two separate inventions. What the Guidelines do is to state the principle upon which you decide whether you are dealing with a single invention or not. If the two integers interact upon each other, if there is synergy between them, they constitute a single invention having a combined effect and one applies section 3 to the idea of combining them. If each integer “performs its own proper function independently of any of the others”, then each is for the purposes of section 3 a separate invention and it has to be applied to each one separately. That, in my opinion, is what Laddie J meant by the law of collocation.”

74. A good example of collocation arose in *Williams v. Nye & Co.*⁴⁹ In that case, Williams took out a patent for an improved mincing machine which was, in effect, a combination of a mincing machine and a filling machine, both of which were old technology. He brought an action for infringement against Nye & Co, who disputed the validity of the patent on the ground that the alleged invention consisted simply in joining two well-known machines, and was not in itself an invention. Cotton LJ said this:⁵⁰

“Then in Nye's patent, when the cutting operation is entirely completed, there is simply a screw, which does nothing whatever except to force the meat forward, when cut, and is entirely separated from the cutting or mincing operation – for the same purpose as the screw which is used by the Plaintiff in his machine. In my opinion there is no invention in that. There is no difficulty said to have been experienced in continuing the shaft of this screw, and putting on the further side, that is to say, on the side furthest from the knives, that screw which is continued in Nye's patent without any actual break or division or any diaphragm existing, but still continued after the cutting and mincing process had been entirely at an end. If there had been any difficulty overcome by the Plaintiff in putting this continuation of the shaft so as to continue the screw, not for the purpose of being useful towards the cutting, but for the purpose only of being used for forcing the minced meat into the sausage skin, then the matter would stand, to my mind, on an entirely different footing. But here, as there is no difficulty at all said to have been overcome by the Plaintiff in putting the continuation of this shaft with a screw upon it after the cutting process had been performed, and therefore necessarily on the further side of the diaphragm with these holes,

⁴⁸ [2005] RPC 10.

⁴⁹ (1890) 7 RPC 62.

⁵⁰ At 67.

in my opinion, although this is a new machine –that is to say, a machine in the sense that it had never been seen in its actual form by the public at the time when the Plaintiff produced it – it is not new in the sense of being a substantial exercise of invention. Therefore, in my opinion, it is not a proper subject matter of a patent. It is difficult to express in words with preciseness what is meant by ingenuity and what is meant by invention ; but I express my opinion that in order to maintain a patent there must be a substantial exercise of the inventive power or inventive faculty. Sometimes very slight alterations will produce very important results, and there may be in those very slight alterations of very great ingenuity exercised and shown to be exercised by the Patentee. That is my opinion.”

Lindley LJ was of the same view:⁵¹

“Therefore what has the Plaintiff done? He has simply taken, so far as I can see, Gilbert and Nye's invention, and has substituted Donald's cutter for Gilbert's cutter. That is the whole of what he has done. I do not think a patent can be granted for that considering that the object was perfectly well known; that the utility of the forcing nozzle was known; that the object of it had been attained before, and there is nothing which amounts to what is understood to be an invention.”

75. There can be many permutations: the combination of two non-inventions may be inventive; or an invention may be inventively combined with a non-invention; or there may be a single, non-divisible, invention. As Lord Hoffmann said in *Sabaf*, you have to decide what the invention is. This is reflected in the EPO Guidelines:⁵²

“The invention claimed must normally be considered as a whole. When a claim consists of a “combination of features”, it is not correct to argue that the separate features of the combination taken by themselves are known or obvious and that “therefore” the whole subject-matter claimed is obvious. However, where the claim is merely an “aggregation or juxtaposition of features” and not a true combination, it is enough to show that the individual features are obvious to prove that the aggregation of features does not involve an inventive step (see G-VII, 5.2, last paragraph). A set of technical features is regarded as a combination of features if the functional interaction between the features achieves a combined technical effect which is different from, e.g. greater than, the sum of the technical effects of the individual features. In other words, the interactions of the individual features must produce a synergistic effect. If no such synergistic effect exists, there is no more than a mere aggregation of features...”

76. The success or otherwise of British American’s plea of collocation rather fundamentally affects the question of obviousness. If that plea were to succeed – a point that is considered in Section I below – then Feature A and Feature B would have to be considered separately, and the question of obviousness considered separately in relation to each Feature. In particular – as British American’s pleading makes clear – if this is a case of collocation, then:

- (1) Deevi is relevant only to Feature A, and is not relied upon by British American in relation to Feature B.
- (2) The converse is the case as regards Monsees, which is relevant only to Feature B and is not relied upon by British American in relation to Feature A.

⁵¹ At 68 to 69.

⁵² Part G, Chapter VII, §7.

77. The question of collocation is thus important in terms of the focus of the question of obviousness, and is considered, as I say, in Section I below.

(e) *Prior art and its inter-relationship with common general knowledge in this case*

78. In Philip Morris' written closing submissions, considerable stress was placed by Philip Morris on what was said to be British American's lack of reliance on its pleaded prior art. Thus, Philip Morris' written closing submissions say this about the prior art (Deevi and Monsees) relied upon by British American:

“12. In reality, both pieces of prior art were used simply as hooks to run a case that it was all obvious over what was commonly known. We discuss the problems with this approach below. However, it is important from the outset for the Court to be very clear as to *why* pleaded starting points are required in the assessment of obviousness. Without a specific starting point for an obviousness attack it is easy to make things look obvious in hindsight, when they were anything but obvious at the time.

13. Floyd J (as he then was) explained that starting from the [common general knowledge] is often favoured by parties attacking a patent because "the starting point is not obviously encumbered with inconvenient details of the kind found in documentary disclosures, such as misleading directions or distracting context". Accordingly, where a party wishes to advance a case of obviousness on the [common general knowledge] alone, they have to plead a starting point in the [common general knowledge]. That was not done in the present case. Plainly, the only real [common general knowledge] starting point in the present case would have been Accord. That would have been hopeless.

14. So instead, [British American] cited Deevi and Monsees but then proceeded to ignore or to remove every "inconvenient detail" in order to run a case based just on the [common general knowledge]. The *dicta* of Arnold J (as he then was) in *Conversant v Huawei* [2019] EWHC 1687 at [256]-[258] are entirely apposite to the present case (emphasis underlined):

“[256] In approaching the Defendants' case on obviousness over Terry [the cited prior art], the starting point is that the Defendants do not allege that claim 1 of the Patent is obvious over common general knowledge.

[257] The case which was put to Prof Marshall in cross-examination, however, was ultimately based on "what you would do once you have thrown Terry away". This case was that the skilled person would appreciate from their common general knowledge that a simpler way to proceed was to have discontinuous transmission in the downlink. This would require the receiver to know when to listen for transmissions, and the skilled person would know from their common general knowledge that this could be done by having a cyclic series of defined starting points for transmissions. Furthermore, the skilled person would appreciate that they could take the same approach to the uplink. Accordingly, so it is said, Uplink DRX is obvious; and if Uplink DRX is within claim 1, then claim 1 is obvious.

[258] In my judgment this will not do. If the claimed invention is not obvious over the common general knowledge, it cannot be obvious for the skilled person who has read Terry to throw Terry away and arrive at the claimed invention by applying common general knowledge concepts. Counsel for the Defendants also sought to rely upon evidence given by Dr Brydon that Terry disclosed a "high level idea" as well as detailed implementations of that idea, but the "high

level idea” was the common general knowledge concept described above, and so the result is the same. At best this is an approach based on hindsight.”

79. The point is best understood by reference to the chronology. Deevi is dated 21 June 1994 and thus pre-dates a good deal of the common general knowledge that would be derived from, for instance, the Premier, Eclipse, Accord and Heatbar devices – which, all accepted, would have been carefully scrutinised by the Skilled Team and would have formed part of the Skilled Team's common general knowledge. Thus, assessing what would be obvious over Deevi runs the risk of being distorted by the subsequent common general knowledge. That is something to which I must be alive. The point is less extreme in the case of Monsees, which is more recent, and is dated 13 December 2007.
80. However, I must also be alive to the fact that the application of an obviousness test is by no means as straightforward as it might be, given the manner in which Philip Morris has chosen to frame the invention(s) it claims. I turn to that point next.

(f) *Philip Morris’ approach to its patent portfolio*

81. I have described the criticisms made by British American of Philip Morris’ approach in paragraphs 6 and 7 above. Whilst it seems to me that Philip Morris cannot be criticised for its deployment of the rules regarding divisional patents – and to that extent I reject the points made by British American – what is true of the Patents is that it is singularly difficult to identify precisely what it is that is being claimed. This is in part a question of construction (and such issues that arise, I will of course resolve) but also a consequence of the manner in which Philip Morris has “parcelled up” the same specification so as to create similar, yet different, claims. Clearly, defining the inventive concept at play is (as *per Pozzoli* stage 2, described in paragraph 68(2) above) a critical matter that affects what differences exist between that inventive concept and the state of the art for the purposes of *Pozzoli* stage 3 (described in paragraph 68(3) above).

(4) *Synthesis*

82. Although, as I have noted, the question of obviousness is not something that can be further deconstructed,⁵³ obviousness in this case is rendered more complex because of the (related) issues of collocation,⁵⁴ division,⁵⁵ and (in some cases at least) “long-in-the-tooth” prior art.⁵⁶ In light of these issues, I approach the question of obviousness in the following way:
- (1) First, in Section F below, I describe the disclosure in the Patents.
 - (2) Secondly, in Section G below, I describe the claims in issue, together with the conditional amendments advanced by Philip Morris.
 - (3) Thirdly, in Section H below, I identify the invention or inventions here at issue. I am very conscious that (contrary to the order set out in *Pozzoli* and described in paragraph 68 above) this involves considering the inventive concept before

⁵³ See paragraph 60 above.

⁵⁴ See Section E(3)(d) above.

⁵⁵ See Section E(3)(f) above.

⁵⁶ See paragraph 71(3) and Section E(3)(e) above.

considering the state of the art. I take this approach, because of the collocation argument advanced by British American which, in my judgment, needs to be determined sooner rather than later, in order to properly determine the question of obviousness. Fortunately, there was a high measure of common ground between the parties as to the “inventive concept” in this case, although of course it was British American’s contention that what was claimed was not inventive at all, but obvious.

- (4) Fourthly, in Section I below, I consider the question of collocation and whether this is a case of one invention or two.
- (5) Fifthly, in Section J below, I consider the question of obviousness over the state of the art, including both the common general knowledge and the pleaded prior art. In doing so, I have well in mind the points made by Philip Morris, as set out in paragraph 71(3) and Section E(3)(e) above.

F. THE DISCLOSURE IN THE PATENTS

83. The Patents are for “[a]n electrically heated smoking system with improved heater” and the focus of their disclosure is on a heater for a heat, not burn device. Consistent with this, the background prior art referred to in the specification⁵⁷ is concerned with heaters and the problem that the patentee seeks to solve is the provision of “an electrically heated smoking system which is easier to manufacture and also requires fewer components in its construction”.⁵⁸

84. The specification discloses two aspects of the solution to that problem:

- (1) The first aspect is a heater for use in a heat, not burn system which comprises one or more electrically conductive tracks on an electrically insulating substrate in which the temperature coefficient of resistance characteristics of the electrically conductive tracks are such that one or more of the tracks can act as both a resistive heater and as a temperature sensor. The advantages of such a heater are described as follows:⁵⁹
 - (a) By using a heater that functions as both a resistive heater and a temperature sensor, the number and size of components in the electrically heated smoking system can be reduced, allowing the overall size of the system to be reduced.
 - (b) The electrically insulating substrate can be very thin, allowing for further size reduction.
 - (c) Some or all of the necessary electronics, wiring and connections may be incorporated on the same electrically insulating substrate as the heater.

⁵⁷ [0003].

⁵⁸ [0005].

⁵⁹ [0010].

- (d) The heater may be manufactured more straightforwardly and cost-effectively than some prior art heaters that require each heating element to be individually formed.
 - (e) The heater allows a great deal of flexibility in the design, as the electrically conductive tracks can be arranged on the electrically insulating substrate as desired to give the desired heat distribution.
- (2) The second aspect is also a heater comprising one or more electrically conductive tracks on an electrically insulating substrate but, this time, there is provided a thermally insulating material to reduce heat loss from the heater and protect a user from burning. It is disclosed that the thermally insulating material should be capable of withstanding high temperatures and is preferably a thermally insulating material comprising a metal or another non-combustible material. A preferred thermally insulating material is said to be one that comprises a plurality of air cavities, preferably in a hexagonal honeycomb structure, that can be arranged on the electrically insulating substrate of the heater.⁶⁰
85. Further details of a thin-film heater are then provided, including that the electrically conductive tracks may comprise a plurality of portions with each portion separately connectable to the power supply. Three advantages of such an arrangement are postulated:⁶¹
- (1) Different portions can be heated for different durations which is said “may enhance the smoking experience, depending on the nature of the aerosol-forming substrate”.
 - (2) Different portions can be heated at different temperatures which it is said “may also enhance the smoking experience, depending on the nature of the aerosol-forming substrate”.
 - (3) A particular portion can be activated at any one time, which “may be advantageous as it means that each portion of the aerosol-forming substrate may be heated only once, and not reheated”.
86. The description discloses how to produce a “plurality of portions” by arranging a single track of electrically conductive material so that the power supply is connected to both ends, with the option to connect to one or more central portions of the single track to provide a plurality of portions.
87. Various configurations of the heater are disclosed including a rigid heater (for inserting into the aerosol-forming substrate); a tubular heater with tracks arranged on the inside of the substrate; a tubular heater with tracks arranged on the outside of the substrate, and an end heater.
88. A long list of materials from which the electrically conductive tracks may be made is set out. Metal alloys including stainless steel are identified as non-preferred “possible” materials for such use. It is said that preferably the electrically insulating substrate comprises one or more of: paper, glass, ceramic, anodized metal, coated metal, and

⁶⁰ [0016-17]ff.

⁶¹ [0022]ff.

Polyimide. It goes on to say that other suitable materials may be used. Polyimide is only used in one of the three specific embodiments, that which uses the PCB-type manufacturing process.

89. Three methods for forming the heater are disclosed: these are screen printing, PCB manufacturing and photolithography techniques respectively and are dealt with in more detail when describing the specific embodiments.
90. The Patents then go on to disclose the aerosol-forming substrate that can be used in the system. This disclosure is at a very high level with a large array of options being disclosed: e.g., the aerosol-forming substrate may be solid, liquid or gas or a combination; it may comprise a tobacco or non-tobacco material; it may be provided on or embedded in a carrier.
91. Finally in the general disclosure, there is a very high-level description of the heated smoking system as a whole. This is no more than a conceptual description.
92. The description then turns to the specific embodiments. The description of figures 1-3⁶² is a description of three processes for forming a heater. Figures 4 and 5 are specific embodiments of a heater and a heater + thermal insulator:
 - (1) Figure 1 illustrates the screen printing type method.
 - (2) Figure 2 illustrates the PCB manufacturing type method: it is disclosed that this method may also be used to create a thermally insulating reflective layer.
 - (3) Figure 3 illustrates the photolithography technique.
 - (4) Figure 4 is a flat, rigid heater that can be inserted directly into a plug of aerosol-forming substrate. It can be used in accordance with either the first or second aspects of the invention (i.e. with one or more electrically conductive tracks that can act as both a resistive heater and a temperature sensor or combined with a thermally insulating material).
 - (5) Figure 5 is a tubular heater, with one or more electrically conductive tracks on the inside and a thermally insulating honeycomb (formed on the same electrically insulating substrate as the heater track) on the outside. Such a heater can be used as an external heater and can also be used in the first aspect of the invention (i.e. the one or more tracks act as both a resistive heater and a temperature sensor). It is disclosed that the "honeycomb structure may then be used to thermally insulate the heater and is preferably metal". Although figure 5 shows the thermally insulating reflective honeycomb structure as an integral part of the heater it is also disclosed that it can be formed separately and used as an independent element.

⁶² It is unnecessary to set these out in this Judgment.

G. THE CLAIMS IN ISSUE

93. The following claims in the Patents are in issue.⁶³ The conditional amendments are marked by way of underline.

483 Patent	484 Patent	485 Patent	486 Patent
<p>[1]</p> <p>An electrically heated smoking system for receiving an aerosol-forming substrate (407), the system comprising:</p> <p>at least one heater for heating the aerosol-forming substrate to form an aerosol, and a power supply for supplying power to the at least one heater, wherein the at least one heater comprises one or more electrically conductive tracks (203) on an electrically insulating substrate (201), wherein the electrically insulating substrate is formed from polyimide and is tubular, and further comprising a thermally insulating material (507) for insulating the at least one heater, wherein the thermally insulating material comprises a metal- <u>wherein the system comprises an aerosol-forming substrate wherein the aerosol-forming substrate is solid and is in the form of a cylindrical plug comprising shreds containing one or more of: herb leaf, tobacco leaf, fragments of tobacco ribs, reconstituted tobacco, homogenised tobacco, extruded tobacco and expanded tobacco.</u></p>	<p>[1]</p> <p>An electrically heated smoking system for receiving an aerosol-forming substrate (407), the system comprising:</p> <p>a housing for receiving the aerosol-forming substrate; at least one heater for heating the aerosol-forming substrate to form an aerosol, a power supply for supplying power to the at least one heater, electronic circuitry arranged to control a supply of power from the power supply to the at least one heater, and a thermally insulating material provided as a separate element (507) for insulating the at least one heater, wherein the thermally insulating material comprises a metal, wherein the at least one heater comprises one or more electrically conductive, stainless steel tracks (203) on an electrically insulating substrate (201), wherein the one or more electrically conductive tracks comprise a plurality of portions, each portion being separately connectable to the power supply, wherein the electrically insulating substrate (201) is formed from polyimide and is rolled into a tube, and wherein the housing is designed to be grasped by a user and houses the at least one heater,</p>	<p>[1]</p> <p>An electrically heated smoking system and a solid aerosol-forming substrate received in the electrically heated smoking system, the solid aerosol-forming substrate being in the form of a cylindrical plug and comprising a tobacco-containing material <u>comprising shreds containing one or more of: herb leaf, tobacco leaf, fragments of tobacco ribs, reconstituted tobacco, homogenised tobacco, extruded tobacco and expanded tobacco</u> containing volatile tobacco flavour compounds which are released from the aerosol-forming substrate upon heating, the electrically heated smoking system comprising:</p> <p>at least one heater for heating the substrate to form the aerosol, the at least one heater comprising one or more conductive tracks on an electrically insulating substrate, wherein the electrically insulating substrate is tubular;</p> <p>a power supply for supplying power to the at least one heater; and</p> <p>a thermally insulating material, provided as a separate element, positioned around the heater for insulating the heater, wherein the thermally insulating material comprises a metal.</p>	<p>[1]</p> <p>An electrically heated smoking system for receiving an aerosol-forming substrate (407), the system comprising:</p> <p>at least one heater for heating the aerosol-forming substrate to form an aerosol, a power supply for supplying power to the heater, the heater comprising one or more electrically conductive tracks (203) on an electrically insulating substrate (201), the one or more electrically conductive tracks comprising a plurality of portions, each portion being separately connectable to the power supply, electronic circuitry arranged to control supply of power from the power supply to the at least one heater, <u>in dependence upon a desired temperature,</u> so that different portions of the one or more electrically conductive tracks are heated for different durations, or to different temperatures, or both for different durations and different temperatures- <u>wherein the system comprises an aerosol-forming substrate wherein the aerosol-forming substrate is solid and is in the form of a cylindrical plug comprising shreds</u></p>

⁶³ Philip Morris' written opening submissions, paragraph 17; British American's written opening submissions, paragraph 83.

	<p>the thermally insulating element, the power supply and the electronic circuitry- <u>wherein the system comprises an aerosol-forming substrate wherein the aerosol-forming substrate is solid and is in the form of a cylindrical plug comprising shreds containing one or more of: herb leaf, tobacco leaf, fragments of tobacco ribs, reconstituted tobacco, homogenised tobacco, extruded tobacco and expanded tobacco.</u></p>		<p><u>containing one or more of: herb leaf, tobacco leaf, fragments of tobacco ribs, reconstituted tobacco, homogenised tobacco, extruded tobacco and expanded tobacco.</u></p>
<p>[3] An electrically heated smoking system according to claim [2], further comprising electronic circuitry arranged to control supply of power from the power supply to the at least one heater, <u>in dependence upon a desired temperature</u>, so that different portions of the one or more electrically conductive tracks (203) are heated for different durations, or to different temperatures, or both for different durations and different temperatures.</p>	<p>[2] An electrically heated smoking system according to claim [1], further comprising electronic circuitry arranged to control supply of power from the power supply to the at least one heater, <u>in dependence upon a desired temperature</u>, so that different portions of the one or more electrically conductive tracks (203) are heated for different durations, or to different temperatures, or both for different durations and different temperatures.</p>	<p>[2] An electrically heated smoking system and a solid aerosol-forming substrate according to claim [1], wherein the one or more electrically conductive tracks are on the inside of the tubular electrically insulating substrate.</p>	<p>[3] An electrically heated smoking system according to claim [1] or [2], wherein the one or more electrically conductive tracks are on the inside of the tubular electrically insulating substrate.</p>
<p>[5] An electrically heated smoking system according to any one of the preceding claims, wherein the one or more electrically conductive tracks (203) are on the inside of the tube of electrically insulating substrate.</p>	<p>[4] An electrically heated smoking system according to any one of the preceding claims, wherein the one or more electrically conductive tracks (203) are on the inside of the tube of electrically insulating substrate (201).</p>	<p>[7] An electrically heated smoking system and a solid aerosol-forming substrate according to claim [6], further comprising electronic circuitry arranged to control supply of power from the power supply to the at least one heater, <u>in dependence upon a desired temperature</u>, so that different portions of the one or more electrically conductive tracks are heated for different durations, or to different temperatures, or both for different</p>	<p>[5] An electrically heated smoking system according to any preceding claim, further comprising a thermally insulating material provided as a separate element for insulating the at least one heater, wherein the thermally insulating material comprises a metal.</p>

		durations and different temperatures.	
[9] An electrically heated smoking system according to claim [8] wherein the aerosol-forming substrate is solid and is in the form of a cylindrical plug.			

Figure 9: Claims in issue

94. A patentee is permitted to make an application to amend its patent in the course of proceedings in which validity is put in issue by virtue of section 75 of the Patents Act 1977. But such an amendment will not be permitted if (amongst other things) it fails to cure the invalidity (i.e., the claims as proposed to be amended are still obvious).
95. Philip Morris helpfully indicated in its written opening submissions that the issues on obviousness and on infringement “are all encapsulated by a consideration of claims 1, 3 and 5 of [the 486 Patent]”.⁶⁴

H. THE INVENTIVE CONCEPT(S) IN THIS CASE

96. The questions on obviousness that are said to arise in this dispute are distilled and set out in paragraphs 19 to 22 of Philip Morris’ written opening submissions. In identifying the battle-lines on the question of obviousness, Philip Morris articulates with helpful clarity the concepts that it says are inventive, and British American did not take issue with these (although, as will be seen, certain points of construction did arise). It is, therefore, helpful to set these paragraphs out verbatim, as they assist in focussing on exactly what the inventive concept or concepts are:

“19. The questions on obviousness can be distilled as follows:

Obviousness Question 1

Was it obvious at the priority date in light of (i) Deevi or (ii) Monsees (read individually but each with the CGK) to include

- (a) *a heater comprising one or more electrically conductive tracks on an electrically insulating substrate, the electrically conductive tracks comprising a plurality of portions each portion being separately connectable to the power supply; and*
- (b) *wherein one or more electrically conductive tracks are heated for different durations or to different temperatures or both?*

This is called the **Portions Concept**.

20. This feature is included in claim 1 of [the 486 Patent] and claim 1 of [the 484 Patent] (the specific requirement for heating for different durations or temperatures being in

⁶⁴ At paragraph 18.

claim 2 of [the 484 Patent]). The feature is in claim 3 of [the 483 Patent] and claims 6-7 of [the 485 Patent].

Obviousness Question 2

Was it obvious at the priority date in light of (i) Deevi or (ii) Monsees (read individually but each with the CGK) to include the features set out in Question 1 but also to:

- (i) *include an aerosol-forming substrate wherein the aerosol-forming substrate is solid and is in the form of a cylindrical plug comprising shreds containing reconstituted tobacco; and/or*
- (ii) *control the power supply to the heater in dependence upon a desired temperature.*

21. These are called the **Tobacco Plug** and **Temperature Control** features and are the subject of the proposed conditional amendments to the claims. The Tobacco Plug feature is (in part) already found in claim 1 of [the 485 Patent] and claim 9 of [the 483 Patent].

Obviousness Question 3

Was it obvious at the priority date in light of (i) Deevi or (ii) Monsees (read individually but each with the CGK) to include (either alone or in combination with the Portions Concept, Tobacco Plug or Temperature Control features) a thermally insulating material provided as a separate element for insulating the at least one heater, wherein the thermally insulating material comprises a metal?

22. This is the **Metal Insulator** feature. This is a feature of claim 5 of [the 486 Patent] and claim 1 of the other Patents.”

I adopt the terms used in these paragraphs.

I. COLLOCATION

97. The present case is, to my mind, clearly a case of collocation. There is no synergistic effect between Feature A and Feature B. The heating of the tobacco product is one thing, and the insulation (whether to keep the device efficient or to protect the user) very much another.
98. One can test the matter in the following way: suppose an altogether different form of heater were employed in a device, there is no reason why Feature B could not be deployed in insulating that – entirely different – heating device. In short, there is nothing in Feature A that connects it with Feature B save for the fact that Feature A involves the application of heat, with the consequent need of insulation both for efficiency and safety purposes.
99. The point was put to Mr Hopps:⁶⁵

Q (Mr Speck, QC)

You are not identifying anything about the feature of the heater that matters, or of the insulator – yes?

A (Mr Hopps)

I am not sure I understood that question, sorry.

⁶⁵ Transcript Day 2/p.258

- Q (Mr Speck, QC)** You are not specifically identifying anything about the feature of the heater, i.e., that it is formed of electrically conductive tracks and so forth? You are not identifying anything about that? It is just that the heat that the insulator is insulating has come from the heater – yes?
- A (Mr Hopps)** Yes, that it has come from the heaters.
- Q (Mr Speck, QC)** So, rather like a sausage skin-filling machine needs minced meat to fill the skins, and a minced meat machine provided the minced meat, you are saying there is that kind of dependency, but nothing specific about the features of the heater or the insulator are identified by you – yes?
- A (Mr Hopps)** You would select the insulator based on these temperature rings and duration, yes.

100. I appreciate that in at least one combination, the two Features can be made or can be implemented into a device at the same time. But that is no more than incidental advantage in the manufacturing process, rather than any kind of combinatorial invention.
101. In short, the combination of Feature A with Feature B involves – in terms of the combination – no kind of inventive step. Indeed, the fact that a component (the Feature A) is intended to heat a material to levels where (i) it could burn the user or (ii) it could be rendered less efficient through heat loss from the device renders Feature B so blindingly obvious that it is quite clear that we are talking about the non-inventive combination of what may be (or what may not be) two inventions, given that there is literally nothing apart from heat linking the two Features.

J. OBVIOUSNESS

(1) Approach

102. Given my conclusion on collocation, I am obliged to consider as separate inventions the heater and the insulator. The Portions Concept and the conditional amendments going to the Tobacco Plug and the Temperature Control all relate to the heater or to Feature A (to use British American's terminology). The Metal Insulator feature goes to the insulator or to Feature B (to use British American's terminology).
103. Of course, whether there is one invention or two, the prior art – in the form of Deevi and Monsees – cannot be considered as a mosaic, and would have to be read individually with the common general knowledge.⁶⁶ But it is quite clear from British American's pleading that Deevi is only relied upon in relation to the heater and Monsees only relied upon in relation to the insulator.⁶⁷ So this requirement to consider the prior art separately is required not only as a matter of law, but is also the pleaded case advanced by British American.

⁶⁶ See paragraph 60 above.

⁶⁷ See paragraph 62(2) above.

104. Accordingly, I propose to consider Deevi only in relation to Feature A, and Monsees only in relation to Feature B, as that is the case that is advanced by British American. I propose to consider Feature B first, and then Feature A.

(2) Feature B

(a) *The importance of Monsees*

105. Much of the cross-examination of Mr Wensley was based on the (given my conclusion on collocation, irrelevant) contention that Feature A was not obvious over Monsees.⁶⁸ Given that Monsees discloses a butane heater – albeit in a device that could be designed around an electrical heater – it is very difficult to see what a Skilled Team would derive from Monsees so as to render Feature A obvious over Monsees. It was put to Mr Wensley that in order to incorporate a different (electrically powered) heater, he would have to strip out most of the components described in Figure 8 above, without actually learning anything of value.⁶⁹ I consider that point to be well-made, and indeed Mr Wensley did not really seek to gainsay it.

106. The fact is – once the focus is, as it should be, properly on Feature B – the (potential) importance of Monsees becomes clear. Because the insulation feature is agnostic between heat sources, for the reasons I have described, the only thing in Monsees that matters is the insulation in relation to the heat source. This is the component numbered 24 in Figure 8 above. Everything else can be disregarded, because heat is heat: the fact that the heat is (in the case of Monsees) likely to be coming from a butane powered heat source is entirely by-the-by for the purposes of Feature B.

(b) *Common general knowledge in this regard*

107. Mr Wensley considered the question of thermal insulation in paragraphs 72ff of Wensley 1:

“72. Regardless of heater placement, there would need to be some level of insulation between the heater and the rest of the device. The objective is to keep the heat where it belongs: on the tobacco, and away from other components or the user's hands. There are generally three ways in which heat is transferred: conduction, convection and radiation. For an electric [heat, not burn device], conduction would be the principal method of energy transfer. Heat loss from convection or thermal radiation would be less of a problem for a [heat, not burn] device. Opaque or reflective materials could counter radiative heat loss, but a heater in a [heat, not burn] device would produce relatively little thermal radiation to begin with, given the operating temperature is not expected to be anywhere near the temperature for tobacco combustion. That being said, having an additional reflective layer might make sense, especially given that reflective layers are relatively inexpensive and do not take up additional space.

73. There are several types of insulators that were known and available at the Priority Date and which could be used in a [heat, not burn] device. These include at least an air-gap insulator, a vacuum insulator, or a material with low thermal conductivity. These may be used alone or in conjunction with one another. The Skilled [Team] would want to avoid

⁶⁸ See Transcript Day 3/pp.394ff.

⁶⁹ See Transcript Day 3/pp.394ff.

an insulator which may off-gas into the air stream the user is inhaling or in general break down at the temperatures expected, such as plastics and paints.”

108. On the question of insulation, and the common general knowledge of the Skilled Team, I found Mr Wensley to be a helpful and compelling witness. Indeed, he was not particularly cross-examined on the technical aspects of this area, and to the (very limited) extent that he was, his evidence stood up well. Nor did Mr Hopps gainsay Mr Wensley’s evidence, either in his reports or in his oral evidence. Based largely on Mr Wensley’s evidence, which I accept, but taking into account all of the evidence that I heard, the following – so far as Feature B is concerned – would have been common general knowledge of the Skilled Team in this case:

- (1) Heat is generally transferred by conduction, convection and/or radiation.
- (2) Even though a heat, not burn device can potentially heat to a lower temperature than a combustible cigarette, and may operate in a manner using bursts of energy to heat rapidly but over a short duration, insulation is a necessary part of any heat not, burn device for the following (related reasons):
 - (a) To focus the heat exactly where it needs to be applied – that is, on the tobacco product that is to be heated.
 - (b) To protect other components within the device from the effect of heat.
 - (c) To protect the user of the device from adverse, direct or indirect, heat effects. A direct effect would be being burned by the heating element of the device. An indirect effect would be inhaling off-gasses created by the application of heat to other (uninsulated) components of the device that might give off gasses, unless adequately protected from the heat.
- (3) Precisely what sort of insulation might be deployed would depend upon the nature of the device in question and the subjective preferences of the designer of the device. The Skilled Team would be aware of the following options as potential insulation solutions:
 - (a) *Air-gap insulators.*⁷⁰ An air-gap insulator places air between the heat source and the target being protected. It works because air has a relatively low level of thermal conductivity. The greater the width of the air-gap – or the more layers of air creating multiple air-gaps – the better the insulation. Air-gap insulators can be made from metal. That is not because metal is a good insulator (to the contrary, it is a good conductor, and not useful as an insulator) but because metal works very well to form a structure that traps air.
 - (b) *Vacuum insulators.*⁷¹ A vacuum insulator is a more extreme version of an air-gap insulator. Like an air-gap insulator, the vacuum insulator creates a gap between the heat source and the target being protected. Unlike an air-gap insulator, the air is evacuated from the gap to form a vacuum. A vacuum

⁷⁰ Wensley 1/§74.

⁷¹ Wensley 1/§75.

has a thermal conductivity of zero: it will not conduct heat, since there is nothing to conduct the heat. However, since no vacuum is perfect, a vacuum insulator is really no more than a better version of an air-gap insulator. Vacuum insulators are often made of ceramic or glass or metal.

- (c) *Low thermal conductivity layers.*⁷² Materials capable of being made as part of the device and with a low thermal conductivity can be used to insulate. Thus, fibreglass has a low thermal conductivity and acts as an insulator.
- (d) *Reflective layers.*⁷³ Generally speaking, a reflective layer will insulate against radiated heat. They are relatively inexpensive, typically made of metal (e.g., a foil) and so thin, and useful in combination with other forms of insulation.

(c) *Monsees*

109. For present purposes, as I have noted, the only interesting part of Monsees is the element numbered 24 in Figure 8.⁷⁴ The relevant parts of Monsees provide as follows:

“[0044] The heater of the device is fitted into the case with an insulator 24. The insulator could be made of PEI (brand name Ultem), ceramic, or other insulating material. The insulator serves to minimize thermal transfer from the heater to the case, while creating an airtight seal. The seal prevents exhaust gases produced by the heater from entering the vaporization chamber. Exhaust gases are instead vented out the case slots. Since the air inlet is distant from the slots, there is substantially no contamination of the inhaled vapor mixture by heater exhaust gases.

[0045] In an alternate embodiment, the insulator could be a partially hollow shell, containing a sealed vacuum. In another embodiment, the heater might be sealed directly to the case by braising in a vacuum furnace, so as to create a vacuum between the two and obviate need for an insulator component.”

Pausing there, braising is generally understood to be a metal joining process in which two or more metals are joined together. Continuing with Monsees:

“[0047] In the preferred embodiment, the case is made of a material that is either a good thermal conductor (such as aluminum), or a poor one (such as ceramics). In both cases, the effect is that the body remains cool enough to touch over a large portion of its surface.”

110. Monsees contains a clear and specific description of the use of insulating materials in heat, not burn devices. Monsees does not claim or purport to invent any new form of insulation, but merely articulates – albeit with great clarity – the range of options available in terms of insulation. Monsees is dated 2007 – relatively shortly before the Priority Date – and represents a helpful statement of how existing insulation technology could be used in a heat, not burn device. The heat in Monsees' primary design, of course, derived from a butane heater, and there is specific discussion of how to deal with the resultant gasses. That discussion would not be relevant to an electric heat, not burn device, such as that described in the Patents, but neither would it mislead. In reality,

⁷² Wensley 1/§76.

⁷³ Wensley 1/§§76 and 78.

⁷⁴ See paragraphs 105 to 106 above.

Monsees is a good example of the deployment of well understood insulation techniques of the sort described in paragraphs 107 to 108 above in a specific type of heat, not burn device. The fact that the device in Monsees is very different to the device described in the Patents is immaterial for the reasons that I have given.

(d) Obviousness

111. The Patents claim as the inventive concept the Metal Insulator feature, "a thermally insulating material provided as a separate element for insulating the at least one heater, wherein the thermally insulating material comprises a metal." Not claimed is the "thermally insulating honeycomb structure" that is mentioned in the Patents.⁷⁵
112. I find the meaning of the claims in the Patents in relation to Feature B to be opaque. It seems to me that the Patents claim either the use of a solid metal as an insulator or an air-gap or vacuum insulator, of the sort described in paragraph 107(3), in a metal structure.⁷⁶ This does, therefore, seem to me to be a case of classical insufficiency, in that the Skilled Team is unable to carry out the claimed invention given the description of it in the specification and his/her common general knowledge.
113. However, this point was not particularly pressed in argument, and I do not decide the issue on this basis. It seems to me that whichever construction is adopted – and, as I have said, I regard the claims as ambiguous – the claim is entirely unoriginal:
- (1) A solid insulator is clearly identified in Monsees, which refers to a solid insulator made of "PEI (brand name Ultem), ceramic, or other insulating material".⁷⁷ The only difference between Monsees and the Patents is that an inefficient – conductive – material is suggested. In short, in this construction, metal is being suggested as the "other insulating material" and what we have is an entirely obvious "invention" that obviously does not work, because the material suggested is conductive rather than insulating.
 - (2) An insulator based upon a vacuum or using air gaps is obviously described in Monsees and, in any event, formed part of the common general knowledge, of which (in this regard) Monsees is merely an articulation. Whilst such insulators do not have to be made out of metal, metal was an obvious and actually used material for such insulators before the Priority Date.
114. Feature B is obvious and/or contains no inventive concept.

(3) Feature A

(a) Approach regarding the "state of the art"

115. As I have described,⁷⁸ the prior art pleaded and relied upon by British American – Deevi – comes rather early in the day, and I must beware that I do not allow the relative simplicity of an articulation of common general knowledge in the abstract – without a

⁷⁵ Mr Wensley describes this in Wensley 1/§178. He goes so far as to consider it "an interesting design".

⁷⁶ The honeycomb structure would be an example of this.

⁷⁷ At [0044], quoted at paragraph 109 above.

⁷⁸ See paragraph 79 above.

starting point – to distract from the potentially confusing way in which technology develops and advances. In other words, what might be obvious if the common general knowledge were set out in a rational manner, disregarding the byeways and false trails that the process of invention and development over time inevitably involves, a different picture will obtain than if a purely chronological approach were to be adopted.

116. The approach that I will take is to set out the common general knowledge of the Skilled Team as I find it, and then (even though Deevi falls chronologically very early) I shall consider the teaching of Deevi. I will then proceed to the question of obviousness.

(b) *Common general knowledge*

117. Given that the obviousness questions – as set out in paragraph 96 above – all relate to the engineering aspects of the device, rather than question of smoker experience and flavour, inevitably my focus is on these engineering aspects. That, as I have described, is simply because of the nature of the questions before me, and particularly those going to the question of heating tobacco product.⁷⁹ It seems to me that if what was at issue was tobacco flavour and enhancing the user experience through different mixes of tobacco, then the team member whose expertise I would most draw on would be Mr Hopps. But these are not the questions before me. As I say, the questions before me are much more the engineering questions that arise in designing a device for smokers. Thus, it is no discourtesy to Mr Hopps to say that I draw considerably more assistance from the evidence of Mr Wensley than I do from that of Mr Hopps. That said, I repeat that I must beware of the undoubted fact that Mr Wensley was an active inventor with a clearly inquiring mind. Those are matters I must leave out of account as not being attributes of the Skilled Team.

118. I accept that this member of the team would not necessarily have derived his or her experiences from the tobacco industry.⁸⁰

119. The following matters would, I consider, have been part of the common general knowledge of the Skilled Team at the time of the Priority Date:

(1) The composition and operation of combustible cigarettes would have been known.⁸¹ It would have been known that the development of devices that heated, but did not burn, tobacco, was desirable and worth pursuing because of the perceived health benefits (i.e., not burning the tobacco product was less damaging to health than merely heating it). It was also known that – to date – none of the heat, not burn products that had been developed – including those which (at no doubt considerable expense) had come to market (i.e., Premier, Eclipse, Accord and Heatbar) – had been commercially successful.

(2) It was common ground between the parties that these four devices would have been carefully inspected by the Skilled Team, and known in detail to them.⁸² Thus, the

⁷⁹ See paragraphs 57 and 58 above.

⁸⁰ Wensley 1/§32.

⁸¹ Summarised in paragraph 17 above.

⁸² Transcript Day 2/p.306.

descriptions of the Premier, Eclipse, Accord and Heatbar devices set out in Section C above would have been part of the Skilled Team's common general knowledge.

- (3) The three ways in which heat is transferred – conduction, convection and radiation – as described in paragraph 107 above would have been known, as well as the manner in which heat can be created. The three classes of heater described in paragraph 22 above would have been part of the Skilled Team's common general knowledge. My focus, given the nature of the invention claimed in the Patents, will be on electrical resistive heaters, and the fact that I say no more about electrical inductive heaters and chemical heaters is simply because the Skilled Team's common general knowledge on these aspects is immaterial. I accept Mr Wensley's evidence that the best form of heater for a heat, not burn device would be a resistive heater – but I place no weight on that fact.⁸³
- (4) So far as resistance heaters are concerned:

- (a) As I have described,⁸⁴ resistive heaters rely upon electrical resistance to generate heat, and that would have been part of the Skilled Team's common general knowledge.
- (b) Resistive heaters are capable of being powered by battery, and battery technology (both in terms of capacity – batteries were getting more powerful; and in terms of size – batteries were getting smaller) improved in the years up to the Priority Date. As Mr Wensley noted:⁸⁵

“By the Priority Date, lithium batteries were well known. These would have been preferred by the Skilled [Team] as they were light and portable with good energy storage and discharge (power) capabilities. They were capable of rapidly releasing energy for the purposes of rapid heating and also allowed the user to recharge the device.”

- (c) As a type of resistive heater, thin-film heaters would have been known to the Skilled Team. Although I note that Mr Wensley had particular experience of thin-film heaters, I nevertheless consider that thin-film heaters formed part of the Skilled Team's common general knowledge, and I accept his evidence in Wensley 1/§§58 and 59:⁸⁶

“58. Thin-film heaters, and in particular Kapton heaters, were (and still are) a common form of resistive heater. Kapton is a DuPont trade name for polyimide developed in the 1960s and Kapton heaters became commonplace heaters for many years up to and including the Priority Date. Kapton was and still is particularly favored given its thin-film form, flexibility, strength and high-temperature stability.

⁸³ Wensley 1/§54.

⁸⁴ Paragraph 22(1).

⁸⁵ Wensley 1/§47.

⁸⁶ Mr Hopps, less well qualified than Mr Wensley in engineering matters, and having (in this regard) a degree of common general knowledge that I consider would have been less than that of the engineer in the Skilled Team, recognised that thin-film heaters would have been known to the Skilled Team: Transcript Day 1/pp.107-109.

59. In general, a thin-film heater is made up of a thin-film heater element and a thin-film substrate. The thin-film element is a conductive trace exhibiting some electrical resistance. The thin-film substrate serves as an electrical insulator and protection for the thin-film element. Current is passed through the thin-film element, wherein the thin-film element's resistance converts some of the electrical energy into thermal energy. Typically, the thin-film element would use a serpentine or spiral path to increase its length (thereby increasing the resistance of the electrical circuit). In addition, the pattern, width, and spacing of the thin-film element may be manipulated to control how much heat is produced in different parts of the thin-film heater. For example, the power density at the periphery can be increased so that the peripheral portions are as warm as the center (removing end effects). The thin-film heater element may be placed on the surface of the thin-film substrate or sandwiched within it in an encapsulated design. The thin-film heater has a functionality similar to that of a circuit board in that conductive traces and other electrical components can be added to additional layers of the structure.”

The ubiquity of Kapton heaters is apparent from the fact that they are referenced in *Deevi*, which of course is dated 1994.⁸⁷

- (d) Resistive heaters obviously have to be controlled. It would have been known at the Priority Date that the heat provided by the heater could be controlled in various ways, including the temperature and the duration of the application of the heat.⁸⁸ Heat could be applied according to some pre-programmed profile, and triggered automatically or through the operation of user-choice (by pressing a button).⁸⁹ Temperature itself could be monitored and controlled by way of a closed loop or feedback control.⁹⁰
- (5) The Skilled Team would have known that the arrangement of the various components comprising the heat, not burn device was highly flexible and that multiple different arrangements were possible. This is made clear by the devices – Premier/Eclipse and Accord/Heatbar that I have described in Section C(4) above. Multiple different configurations were possible and were known to be so. In particular:
- (a) The arrangement of the tobacco product in relation to the heater was known to be highly flexible (in that there was a massive range of options). Premier had a heat source at the tip, with a substrate behind in a capsule, wrapped with a tobacco roll. Eclipse had a similar placement of the heat source, but with two different processed tobacco forms behind. Accord and Heatbar surrounded the tobacco product with heaters.
- (b) Equally, the type of product heated was – and was known to be – highly flexible. Indeed, the product did not have to be tobacco: *Deevi*, as I have noted, referred to a "flavour-generating medium" (i.e., not necessarily even

⁸⁷ See paragraph 38 above.

⁸⁸ Wensley 1/§§82-83

⁸⁹ Wensley 1/§84.

⁹⁰ Where the output of a circuit is measured. The difference between input and output can be used to derive the heat created through resistance. See, e.g., Transcript Day 1/p.126.

tobacco),⁹¹ which was coated on to the (disposable) heating elements.⁹² Premier used a tobacco roll or mat, whereas Eclipse used a form of processed tobacco. Accord, judging from Figure 4 above, used a combination of tobacco filler and tobacco mat. These tobacco products can be made out of shredded tobacco or cut filler.⁹³

- (c) Portional heating was known and used in the Accord and Heatbar products. As I have described, these were battery powered devices, where the cigarette-like insert was heated sequentially (according to puffs from the user) and in short bursts through the array of eight heater blades.⁹⁴

(c) *Deevi*

120. In these circumstances, Deevi is significant because it shows:

- (1) The use of a thin-film (Kapton) heater.⁹⁵
- (2) The use of a forerunner of the portions concept, whereby each heater element is heated in turn.

It is important have in mind the things that Deevi does not teach or that amount to significant differences between the claims in the Patents and Deevi. Thus, in Deevi, the heater elements are covered in a flavour-generating medium which – when the elements are heated – gives off a gas. Thus, one has a form of portional heating, but in circumstances where the heating element is disposable after the aerosol has been created by burning off the flavour-generating medium. There is no insertable cigarette, and Deevi teaches nothing about the application of heat to an inserted tobacco product. That is simply not the system that is used. Equally, therefore, although Deevi teaches the use of a thin-film (e.g., Kapton) heater, that heater is deployed in a manner very different both to the application of heat in Premier/Eclipse and Accord/Heatbar and in the Patents themselves.

(d) *Obviousness*

Approach

121. Given the early date in which Deevi subsists and the subsequent developments to Deevi that are common general knowledge, using the EPO's problem/solution approach⁹⁶ does not commend itself. The fact is that Deevi contains some valuable teaching, but it is very different to the devices which followed, and which in fact were sold on the market.
122. Philip Morris rightly stressed the importance of clear starting points and the dangers of allowing an articulation of common general knowledge, without a clear starting point, to

⁹¹ See paragraph 39 above.

⁹² See paragraph 42 above.

⁹³ See, e.g., Transcript Day 1/p.135.

⁹⁴ See Section C(4)(b) above generally, and paragraph 36 in particular.

⁹⁵ See paragraph 44 above, which describes the heater generally. Kapton was a specific brand of thin-film heater identified in Deevi: paragraph 44(1) above.

⁹⁶ See paragraph 70 above.

prevail.⁹⁷ However, I am equally conscious that the question of obviousness cannot be approached in a literalist or mechanistic way, and an over-enthusiastic reliance on Deevi as the starting point runs the risk of overlooking and disregarding the subsequent common general knowledge that evolved after Deevi.

123. It would be possible to use Deevi as a starting point, and to ask what it would have been obvious for the Skilled Team to have done from that starting point. Thus, as Mr Wensley stressed, "[o]ne idea that stands out in Deevi is forming the heater by simply attaching the ends together to form a tube (as opposed to forming a tubular heater around a cylinder support)".⁹⁸ I agree that this is an important part of the Deevi design in the context of the invention claimed in the Patent.

124. However, Mr Wensley also noted:⁹⁹

"...the Skilled [Team] would be critical of Deevi's use of a disposable heater...the heater is incorporated into the disposable portion of the device. First, each unit of flavor-generating medium would need to be manufactured with its own heating element. Second, good heaters would be thrown away after every use. A Skilled [Team] would consider this both wasteful and costly. Indeed, the extra manufacturing required to build many disposable heaters instead of one permanent heater runs contrary to Deevi's goal of cheap mass-production..."

125. I accept this evidence. However, it seems to me that whilst it is obvious what a Skilled Team would do if faced with Deevi alone, the Skilled Team would actually already know – as part of his or her common general knowledge – various ways in which one could arrange the components so as to create a heat, not burn device with a retained (i.e., not disposed of) heater and an inserted cigarette-like disposable, for that is precisely what Accord and Heatbar show. Whilst I am prepared to hold that this move away from a disposable heater would indeed be obvious to the Skilled Team, the true position is that this obvious step was in fact already taken in the Accord/Heatbar devices. However, and this is equally important, the fact is that Accord/Heatbar did not incorporate thin-film heaters, even though they were developed in the late-1990s and mid-2000s¹⁰⁰ and Deevi dated from 1994.¹⁰¹ The question "why was it not done before?" raised in paragraph 71(3) above looms large.

126. For these reasons, the *Pozzoli* approach is not merely the common approach in these courts, but in this case clearly and distinctly the better one. I will therefore – bearing in mind the detailed findings I have already made and the *Pozzoli* approach articulated in paragraph 68 above – consider:

- (1) The precise inventive concept claimed as Feature A. As I will describe, this actually requires some unpacking.

⁹⁷ See Section E(3)(e) above.

⁹⁸ Wensley 1/§132.

⁹⁹ Wensley 1/§133.

¹⁰⁰ See paragraph 32 above.

¹⁰¹ See paragraph 38 above.

- (2) The state of the prior art as at the Priority Date – considering Deevi as well as the common general knowledge – and the differences between the inventive concept and this prior art.
- (3) Whether the differences so identified are obvious. Whilst obviousness involves a multifactorial assessment,¹⁰² I shall pay particular regard to the “why was it not done before?” question.

The inventive concept and unpacking it

127. I turn then to the inventive concept inherent in Obviousness Question 1. What is contended for are two related inventive concepts:
 - (1) A heater comprising one or more electrically conductive tracks on an electrically insulating substrate, the electrically conductive tracks comprising a plurality of portions each portion being separately connectable to the power supply;
 - (2) Wherein one or more electrically conductive tracks are heated for different durations or to different temperatures or both.
128. The inventive concept, so described and described by Philip Morris as the Portions Concept,¹⁰³ actually contains multiple features, namely:
 - (1) The description of the heater.
 - (2) The operation and control of the heater, so described.
 - (3) The notion of separate portions or tracks.

It seems to me that eliding these aspects under a single head as the Portions Concept is not a helpful way of describing the inventive concept in this case, and that a measure of disaggregation is required when considering the question of obviousness.

Obviousness

129. The description of the heater – “one or more electrically conductive tracks on an electrically insulating substrate” – is no more or less than a description of the thin-film resistive heaters that were available as at the Priority Date and, indeed, were described in Deevi.
130. In my judgment, deploying a thin-film resistive heater as a means of enveloping an insertable tobacco product was obvious to the Skilled Team:
 - (1) The Skilled Team would have known of the existence of such heaters, and in particular their flexibility. Causing the heater to be formed into a tubular shape was disclosed in Deevi.¹⁰⁴

¹⁰² See paragraph 71 above.

¹⁰³ See paragraph 96 above.

¹⁰⁴ See paragraph 44(5) above.

- (2) Using a heater – albeit not a thin-film heater – to envelope, and so heat, an insertable tobacco product was a configuration of heat, not burn devices like Accord and Heatbar.¹⁰⁵
- (3) Putting the two together – the heater shape and type disclosed by Deevi, and the device configuration revealed by Accord/Heatbar – is entirely obvious. Why, then, was it not done before? Deevi is, after all, dated 1994, Accord and Heatbar were launched in the late 1990s and mid-2000s, yet the Patents (and, to be clear, the Parent and Grandparent Applications) dated around 2010 or later in terms of their filing and have a Priority Date of 29 October 2009. There is, therefore, a significant gap between the date of the (known) state of the art and the Patents and the applications out of which they are divided in which this obvious step was not taken.

131. I shall return to this question, but it is important to keep it in mind.

132. Leaving on one side, for the moment, the “portions” element of the claims, and focussing simply on a single electrically conductive track, it is quite obvious (indeed, it was known and done prior to the Priority Date) that that single track could be “heated for different durations or to different temperatures or both”. There is nothing that is not old technology here. There was a great deal of debate as to whether Deevi not only articulated its disposable version of portional heating, but also articulated a disclosure that electronic controls could be used to control the duration of the heating. Deevi says this:¹⁰⁶

“A more preferred embodiment of an article according to the present invention includes controls that automatically select which charge will be heated, initiate heating in response to a certain stimulus (for example, the user's inhalation), and control the duration of the heating of each flavor charge.”

In my judgment, the words are clear. I do not see how duration can be controlled without it being capable of variation.

133. I turn to what Mr Hopps considered to be the inventive part of the concept – namely the notion of heating portions. The fact is that portional heating of a tobacco product was well-known in both Deevi and in the Accord/HeatBar devices, as I have described.¹⁰⁷ The question is whether achieving this end by means of a thin-film (Kapton) heater was obvious. It is one thing to deploy such a heater to heat an insertable tobacco product by surrounding or enveloping the tobacco product with the heater, but it is quite another to use the heater to heat the tobacco product in portions. It may be – again, I raise the question in order to address it later – that whereas the deployment of a thin-film resistive heater as a means of enveloping an insertable tobacco product was obvious to the Skilled Team, using that heater to heat in portions was not. That might serve to explain the gap in time referred to in paragraph 130(3) above.
134. Before I consider the obviousness of this particular step, there was an issue of construction between the parties as to exactly what was being claimed in the Patents. Were the Patents claiming:

¹⁰⁵ See paragraph 33 above.

¹⁰⁶ Column 3 of Deevi (emphasis added).

¹⁰⁷ See paragraphs 119(5)(c) and 120 above.

- (1) Multiple, separately connected, electrically conductive tracks; and/or
- (2) A single track with a plurality of portions, each portion being separately controllable/connectable to the power supply?

In short, the question is whether what is being claimed is the concept of wholly separate tracks, where current cannot flow from one track into another, or a single track that is electrically continuous (i.e., current can flow from one end to the other) but has separately controllable portions or parts within it.¹⁰⁸

135. British American contended that what was being claimed in the Patents was the latter (a single track with separately controllable portions) and not the former (separate tracks on a single substrate).¹⁰⁹ It may be that British American favoured this construction because it is an approach articulated in Deevi.¹¹⁰
136. British American contended that its construction was supported by the underlined words in [0023] of the 486 Patent. It is important, however, to read these words in context, and I set out below [0022] and [0023]. The words relied on by British American are, as I say, underlined:

“[0022] In accordance with the invention, **the one or more electrically conductive tracks** comprise a plurality of portions, each portion being separately connectable to the power supply. This provides a number of advantages. First, it allows the different portions to be heated for different durations, which may enhance the smoking experience, depending on the nature of the aerosol-forming substrate. Second, it allows the different portions to be heated at different temperatures, which may also enhance the smoking experience, depending on the nature of the aerosol-forming substrate. Third, it allows a particular portion of the heater to be activated at any one time. This allows only a portion of the aerosol-forming substrate to be heated at any one time. This may be advantageous as it means that each portion of the aerosol-forming substrate may be heated only once, and not reheated.

[0023] **In one embodiment, the electrically conductive track or tracks comprise a single track of electrically conductive material. A first end of the single track is connectable to the power supply and a second end of the single track is connectable to the power supply. In that case, the power supply may also be connectable to one or more central sections of the single track to provide a plurality of portions, each portion being separately connectable to the power supply. In another embodiment, the electrically conductive track or tracks comprise a plurality of tracks of electrically conductive material, each track being separately connectable to the power supply.**”

137. In my judgment, whilst the underlined words do indeed support British American’s contention, when read in context, and in particular when considering the words I have **bolded**, it is quite clear that both of the alternatives set out in paragraph 134 above are being claimed. All of the advantages articulated in [0022] regarding portional heating, also pertain where there are multiple tracks, each track (self-evidently) being separately controllable.

¹⁰⁸ See paragraphs 99 to 102 of British American’s written opening submissions; Wensley 2/§§7-11; Hopps 1/§§102-108.

¹⁰⁹ See paragraphs 99 to 102 of British American’s written opening submissions.

¹¹⁰ Described by Mr Wensley at Wensley 1/§§128-129, and by Mr Hopps at Hopps 1/§159.

138. It is, to my mind, entirely unsurprising that the Patents should articulate both alternatives. Whether portional heating is achieved through a single track with controllable portions (through an array of switches that can be opened and closed¹¹¹) or through multiple tracks (whether with switches or without) all on the same, flexible, substrate, seems to me a distinction without a material difference.
139. The question is whether using a thin-film heater in this portional way to heat portions of the tobacco product would be obvious to the Skilled Team as at the Priority Date. I am in no doubt that it would be:
- (1) Mr Wensley, when describing the common general knowledge of the Skilled Team, said this:¹¹²

“The thin-film heater could also easily be used to heat different segments of different regions or zones on the substrate. Segmented heaters are made by applying multiple thin-film elements to the substrate. Specifically, different pathways covering different regions allow multiple heating zones to be created on a substrate. To heat a particular portion, current is applied to the pathway covering that portion. The desired thin-film element pattern and zones would be a standard customization option for such heaters at the Priority Date. As such, a single thin-film heater could provide a number of segments (e.g., five or ten) which can be turned on individually at particular times and heated individually at particular temperatures.”
 - (2) Mr Hopps’ evidence was that the Patents were not obvious over Deevi:¹¹³

“...the [Patents] describe a heater with track portions in which the actual temperature and/or duration of heating of any particular portion is dependent upon the desired temperature of that portion and achieved through electronic circuitry. This is not taught in Deevi. In the [Patents], the circuitry allows the temperature of the portion to be monitored so that the energy supplied to the relevant portion may be controlled such that the temperature is at the desired value. This process provides a means of optimising delivery of tobacco volatiles, aerosol and nicotine to the user and represents a significant difference, and improvement, over the heater arrangement in Deevi in which fixed pulses of energy¹¹⁴ are supplied to 8-10 heater elements one by one in succession and irrespective of the actual temperature of the heater elements. As I note above, such a modification would not be obvious to the [Skilled Team] in light of Deevi. Further, I have explained how the [heat, not burn] products known at the Priority Date operated and there is nothing in the [common general knowledge] that would point towards this modification.”
 - (3) Mr Wensley’s evidence went the other way.¹¹⁵ Also using Deevi as a starting point, his evidence was that a device incorporating the invention claimed in the Patents would have been obvious to the Skilled Team. More particularly:
 - (a) Mr Wensley considered that the Skilled Team would take the notion of a thin-film heater rolled on itself to form a tube from Deevi.¹¹⁶

¹¹¹ As *per* Deevi: see, in particular, Wensley 1/§128.

¹¹² Wensley 1/§60.

¹¹³ Hopps 1/§185.

¹¹⁴ For the reasons given in paragraph 132 above, I do not consider that this description of Deevi is correct.

¹¹⁵ Wensley 1/§§191ff.

¹¹⁶ Wensley 1/§191.

“The Skilled [Team] would consider this to be a cheap and practical way to form a stable heater structure, but would be critical of using a disposable heater...”

I accept this evidence.

- (b) I consider that “the Skilled [Team] would want to move away from this wasteful aspect and instead incorporate the thin-film heater into [a non-disposable section] of the device, which [could] receive a disposable cigarette”.¹¹⁷
- (c) The question is what – in light of the obvious need to render the heater re-usable – would have been obvious to the Skilled Team. It seems to me, for the reasons I have given,¹¹⁸ that moving to a tubular heater structure designed to hold an insertable tobacco product (hereafter the **Heating Tube**) would have been obvious to the Skilled Team. This would have been all the more obvious because this step would bring the user of the device much closer to the experience of smoking a combustible cigarette.¹¹⁹ The insert is a very obvious way to emulate this experience – and one that was used in the Accord and Heatbar devices.
- (d) Clearly, the engineer, who would be part of the Skilled Team, would defer to the tobacco chemist (also a part of the Skilled Team) in order to understand how best to heat the insertable tobacco product in order to achieve the best experience for the intended user. That would involve articulating precisely the durations, temperature and manner in which the insertable tobacco product should be heated.¹²⁰ Having obtained these details, it would be obvious to the Skilled Team that the Heating Tube could be configured to achieve any desired heat, not burn heating profile in terms of temperature,¹²¹ duration and other parameters.¹²²

¹¹⁷ To quote, with amendment, from Wensley 1/§191.

¹¹⁸ See paragraph 130 above.

¹¹⁹ As to which, see paragraph 19 above.

¹²⁰ I did not hear very much evidence about the manner in which heat would be applied to the insertable tobacco product so as best to create an aerosol pleasing to the user. That is unsurprising, as the permutations are many, given the different shapes/sizes of the insertable tobacco product that could be fitted into the Heating Tube – and given the inherent design flexibility provided by thin-film heaters. It cannot, therefore, be said, what sort of heating profile in terms of temperature, duration, etc. would be best. That is a matter falling squarely within the province of the tobacco chemist's expertise, where it would be obvious to try multiple heating profiles and multiple inserts to see what worked best. I was not particularly addressed on this by either party, but to be clear, I regard such questions as ones falling to the common general knowledge of the tobacco chemist within the Skilled Team. It would – in framing the nature of insertable and the profile according to which it would be heated – be “obvious to try” multiple options. The end product would be a specification for a heating profile that the engineer within the Skilled Team would implement: see Transcript Day 2/p287. The point is that, having got such a heating profile, it would be entirely straightforward for the engineer in the Skilled Team to configure the Heating Tube to perform according to that profile. In short, the manner in which the desired profile could be achieved would be entirely obvious.

¹²¹ At times there were suggestions that the Heating Tube would not be able to reach the necessary temperatures for a successful heat, not burn product. That was because some of the maximum temperatures stated in the specifications for thin-film heaters appeared to be too low. These suggestions were not pursued, and rightly so, for they would inevitably involve a contention that the invention claimed in the Patents itself did not work.

¹²² See paragraph 132 above.

- (e) It would – if the tobacco chemist considered it desirable¹²³ – be equally obvious to the Skilled Team that portional heating was easily achievable. The notion of portional heating would be known to the Skilled Team from the Accord/Heatbar devices, and translating that functionality to the Heating Tube would be entirely straightforward and obvious through the use of portional heating techniques that I have described in paragraphs 134 to 138 above. I cannot say which approach would commend itself to the Skilled Team – a single track with controllable portions or multiple tracks (whether with portions or not) on the same substrate – but it would be obvious to try both.

Why was it not done before?

140. I return to the question that I posed in paragraphs 125 and 130(3) above: why, given the gap in time between Deevi/Accord/Heatbar and the Patents did someone not do what I have found to be obvious? As Philip Morris stressed, this is not a case where there was any lack of interest in developing heat, not burn devices. To the contrary – as the devices that came to market and this litigation itself demonstrate – a great deal of resource is being expended on developing (or preventing others from developing) heat, not burn devices.
141. The question I am posing is, self-evidently, an important one. But the reasons why a particular (obvious) development did not take place itself turns on secondary evidence. I heard no such evidence in this case, and the reasons why these developments – which I have found to be obvious – did not occur are, inevitably, speculative.
142. In short, whilst I do see the failure to develop a Heating Tube as described in the preceding paragraphs prior to the Priority Date as a material indicator against obviousness, it does not persuade me that that conclusion is wrong. It seems to me – and I recognise that this is speculation – that the answer to the question may turn on the fact that the Heating Tube that I have described is actually not that dissimilar to the Accord/Heatbar devices (although, of course, much would turn on the insertable and the heating profile applied). Those devices failed commercially not (or not solely) because of their large and cumbersome nature, but mainly because users did not like what they were inhaling. That is an issue that cannot be cured solely by a different type of heater and I anticipate that heat, not burn devices will be developed as and when better forms of heat, not burn tobacco product are developed or better ways of creating a pleasing aerosol identified.
143. Accordingly, whilst I cannot and do not dismiss this question, it is not sufficient – given the secondary evidence that I have not heard – for me to reverse the very clear view I have reached that Feature A was obvious.

¹²³ This is a question that was again not particularly explored in the evidence before me. Clearly, the desirability of portional heating is implicit in the design of the Accord/Heatbar devices, and I proceed on the basis that the Skilled Team (this time referring to the tobacco chemist) would – as in the case of Accord/Heatbar – take the view that the insertable tobacco product would be shaped like a combustible cigarette, and would consider (as part of the process of achieving the “best” aerosol) as part of the overall heating process whether the product was best heated in portions or segments.

The conditional amendments

144. In light of my conclusion, I must consider whether Feature A can be saved by the conditional amendments described in Section G above and summarised in paragraph 96 above as the Tobacco Plug and Temperature Control features.
145. I can deal with these conditional amendments very briefly. An amendment that seeks to narrow the nature of the tobacco product used in the invention (which is the subject of the Tobacco Plug amendment) cannot save the Patents. The fact is that my analysis of obviousness obtains whatever the nature of the tobacco product.
146. The same is true of the Temperature Control amendment. It is inherent in my analysis that it would have been obvious to the Skilled Team that the Heating Tube would have to have some kind of temperature control.

(4) Conclusion

147. For all these reasons, the claims in issue – set out in paragraph 93 above – all lack an inventive step because they are obvious having regard to the matter forming the state of the art taken together with the common general knowledge as at the Priority Date. It follows that British American's claim for invalidity succeeds.

K. OTHER MATTERS AND DISPOSITION

148. A number of other issues were live between the parties which, in light of my conclusions on obviousness, it is unnecessary and so would be inappropriate for me to consider or determine.¹²⁴ For the reasons I have given, British American's claim succeeds, and Philip Morris' counterclaim fails.

¹²⁴ See, e.g., *R (Heathrow Hub Limited) v. Secretary of State for Transport*, [2020] EWCA Civ 213 at [208]. This was, of course, a public law case, but of relevance here. My conclusions on obviousness are determinative, and – in this case at least – is does not assist to go further into the other, consequential and so redundant, questions.

ANNEX 1

TERMS AND ABBREVIATIONS USED IN THE JUDGMENT

(paragraph 1, footnote 1 of the Judgment)

TERM/ABBREVIATION	FIRST USE IN THE JUDGMENT
British American	§3
CPR	§2
Deevi	§38
Feature A	§62(1)
Feature B	§62(1)
glo device	§2
Grandparent Application	§5
Heating Tube	§139(3)(c)
Hopps 1	§12(1)
Hopps 2	§12(2)
Metal Insulator	§97
Monsees	§38
Obviousness Question 1	§96
Obviousness Question 2	§96
Obviousness Question 3	§96
Parent Application	§5
Patents	§1
Philip Morris	§4
Portions Concept	§96
PPD	§15
Priority Date	§5
Skilled Team	§59
Temperature Control	§96
Tobacco Plug	§96
Wensley 1	§14(1)
Wensley 2	§14(2)
483 Patent	§1(1)
484 Patent	§1(2)

Approved Judgment
Marcus Smith J

485 Patent	§1(3)
486 Patent	§1(4)



Claim No: HP-2020-000011

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

HP-2020-000011

THE HONOURABLE MR JUSTICE MARCUS SMITH

13 July 2021

BETWEEN:

NICOVENTURES TRADING LIMITED

Claimant and First Part 20 Defendant

-and-

PHILIP MORRIS PRODUCTS SA

(a company incorporated under the laws of Switzerland)

Defendant/Part 20 Claimant

-and-

BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED

Second Part 20 Defendant

ORDER

UPON the Trial in these proceedings regarding EP (UK) 3,248,483, EP (UK) 3,248,484, EP (UK) 3,248,485 and EP (UK) 3,248,486 (together, “the **Patents**”) being heard before the Honourable Mr Justice Marcus Smith on 18-20, 24-25 May 2021

AND UPON the Court handing down its judgment in relation to the Patents remotely on 14 July 2021 (“the **Judgment**”)

IT IS ORDERED THAT:

1. Determination of the appropriate form of order following the handing down of the Judgment be adjourned to a hearing to be listed on a date convenient to the parties and the Court (the “**Form of Order Hearing**”).

2. Such adjournment is an adjournment within paragraph 4.1(a) of Practice Direction 52A to Part 52 and accordingly the time for making any application for permission to appeal the decision(s) of the Judge shall be extended until the Form of Order Hearing and pending that hearing the time for service of any Appellant's Notice shall not run.
3. This Order shall be served by the Claimant/ First Part 20 Defendant and Second Part 20 Defendant on the Defendant/ Part 20 Claimant.

Service of the Order

The court has provided a sealed copy of this order to the serving party: Kirkland & Ellis International LLP at 30 St Mary Axe, London, EC3A 8AF, United Kingdom (ref: 46327-1)