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Datasheet for the decision of 30 May 2022

Case Number: T 2258/19 - 3.2.01

Application Number: 11808641.2

Publication Number: 2654469

IPC: A24F47/00, A61M15/06, A61M11/04, A61M15/00, A61M16/00

Language of the proceedings: EN

Title of invention:
AN AEROSOL GENERATING SYSTEM HAVING MEANS FOR DETERMINING DEPLETION OF A LIQUID SUBSTRATE

Patent Proprietor:
Philip Morris Products S.A.

Opponents:
British-American Tobacco (Investments) Limited
JT International S.A.

Headword:

Relevant legal provisions:
EPC Art. 100(a), 100(b), 54, 56, 89

Keyword:
Grounds for opposition - insufficiency of disclosure (no)
Novelty - (yes)
Inventive step - (yes) - neighbouring field
Priority - effect of priority right

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 2258/19 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 30 May 2022

Appellant: (Opponent 1)	British-American Tobacco (Investments) Limited Globe House, 1 Water Street London WC2R 3LA (GB)
Representative:	D Young & Co LLP 120 Holborn London EC1N 2DY (GB)
Appellant: (Opponent 2)	JT International S.A. 8 rue Kazem Radjavi 1202 Geneva (CH)
Representative:	Bandpay & Greuter 30, rue Notre-Dame des Victoires 75002 Paris (FR)
Respondent: (Patent Proprietor)	Philip Morris Products S.A. Quai Jeanrenaud 3 2000 Neuchâtel (CH)
Representative:	HGF HGF Limited 1 City Walk Leeds LS11 9DX (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 11 June 2019 rejecting the opposition filed against European patent No. 2654469 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairwoman	A. Jimenez
Members:	M. Geisenhofer
	V. Vinci

Summary of Facts and Submissions

I. Appeals were filed by opponents 1 and 2 (appellants 1 and 2) against the decision of the opposition division to reject the oppositions filed against the patent in suit.

II. The opposition division decided that the subject-matter of the claims as granted was novel and involved an inventive step. Furthermore, the opposition division held that the patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

III. Oral proceedings were held before the board.

(a) The appellants (opponents) requested that the decision under appeal be set aside and that the European patent be revoked.

(b) The respondent (patent proprietor) requested that both appeals be dismissed and the patent be maintained as granted, or, in the alternative, that the patent be maintained in amended form based on one of the auxiliary requests 1 - 15 filed with the reply to the statements of grounds of appeal.

IV. Claim 1 of the patent as granted reads as follows:

"An electrically operated aerosol generating system (100) for receiving an aerosol-forming substrate (115), the system comprising:
a liquid storage portion (113) for storing liquid aerosol-forming substrate; and

an electric heater (119) comprising at least one heating element for heating the liquid aerosol-forming substrate; characterised by
electric circuitry (109) configured to determine depletion of liquid aerosol-forming substrate based on a relationship between a power applied to the heating element and a resulting temperature change of the heating element."

Claim 12 of the patent as granted reads as follows:

"A method comprising:
providing an electrically operated aerosol generating system comprising a liquid storage portion (113) for storing liquid aerosol-forming substrate and an electric heater (119) comprising at least one heating element for heating the liquid aerosol-forming substrate; characterised by
determining depletion of liquid aerosol-forming substrate heated by the heater based on a relationship between a power applied to the heating element and a resulting temperature change of the heating element."

V. In the present decision, reference is made to the following documents:

E1 US 2009/0126518 A1
E2 EP 2 468 116 A1
E3 EP 2 468 118 A1
E4 US 4 947 874
E5 US 2009/0283103 A1
E6 US 6 155 268
E8 US 2002/0079309 A1
E9 US 2004/0081624 A1
E11 US 2003/0033055 A1
E16 US 5 666 977
E19 JP-H 5 220974 with translation E19a

VI. The appellants' arguments can be summarised as follows:

(a) The invention is not disclosed in a manner sufficiently clear and complete for a skilled person to carry it out, the reasons being as follows:
- Depletion at the storage portion cannot be detected by measuring the temperature only at the heating element arranged spaced apart from the storage portion.
- The relationship between temperature and power used as criteria is not sufficiently explained.
- Claim 1 is extremely broad and therefore one single embodiment is not sufficient to cover the entire breadth of the claim.
- The circuitry cannot distinguish between a depletion of the substrate and a blockage when the substrate is being conveyed to the heating element.

(b) The subject-matter of claim 1 is not novel over any of documents E1, E4, E8, E9, E11 or E19.

(c) Claim 12 is not entitled to the claimed priority such that documents E2 and E3 form part of the state of the art and anticipate the subject-matter of claim 12.

(d) The subject-matter of claim 1 is not inventive over:
- E1 with any of E4, E8 or E9;
- E4 with any of E5, E6 or E19;
- E8 alone or in combination with any of the general knowledge, E19 or E1;
- E9 with E19;

- E16 with E19.

VII. The respondent's arguments can be summarised as follows:

(a) The patent in suit discloses in figure 3 and the related passages of the description sufficient information to enable a skilled person to carry out the invention. The aforementioned passages also clearly explain which criteria should be used to determine depletion. Claim 1 is not extremely broad, but in fact is restricted to the essential features necessary for a complete definition of the invention.

(b) The arguments presented by appellant 2 with regard to sufficiency were not sufficiently substantiated in its statement of grounds of appeal. Hence, they should not be admitted as late-filed since substantiation was not provided until the oral proceedings on appeal.

(c) The subject-matter of claim 1 is novel for the following reasons:
- E1 does not disclose an aerosol-generating system. Instead, the substrate is vaporised in its entirety. Furthermore, depletion of the evaporated substrate is not detected.
- E4 uses a heating element impregnated with solid substrate and hence lacks a liquid storage portion. Furthermore, depletion of the substrate is not detected by the circuitry.
- The device of E8 determines the mass flow of substrate during use but does not process this information to determine depletion of the substrate.

- The devices of E9 and E11 fail to detect when the substrate is depleted.
- E19 should not be admitted into the appeal proceedings. If it were admitted, it does not disclose an aerosol-generating system but an inkjet printer.

(d) Claim 12 is entitled to the claimed priority such that neither E2 nor E3 forms part of the relevant prior art.

(e) None of the various lines of argument raised by the opponents can jeopardise inventive step of claim 1. Either a skilled person would not combine the documents, or combining the documents would not result in a system that falls within the scope of protection.

(f) The combination of E4 or E9 with E19 should have been raised in opposition proceedings rather than waiting until appeal proceedings. The associated lines of argument therefore should not be admitted into the proceedings.

Reasons for the Decision

Sufficiency of disclosure

1. The patent application as granted discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. Therefore, the ground of opposition under Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

1.1 The patent in suit explains with reference to figure 3 in paragraphs [0066] – [0068] that in the "emptying" region between X1 and X2 the rate of temperature increase is linear. The increase in the rate of temperature rise is a result of depletion of substrate "*in the vicinity of the heater as a result of emptying of the liquid storage portion*" (lines 14 – 17 of column 13). Depletion is hence considered to occur when the storage portion is empty or nearly empty.

1.2 Contrary to the appellants' allegation, it is possible to determine depletion of substrate in the liquid storage portion by using the described measurements of the temperature of the heating element and of the power applied to it even if the heating element is arranged spaced apart from the liquid storage portion. As soon as the "emptying" region is passed, depletion is completed.

1.3 Furthermore, a skilled person understands from the passage mentioned above in point 1.1 how depletion is defined (i.e. as the emptying of the liquid storage portion) and how it can be detected by measuring the temperature of the heating element and the power applied to it.

1.4 The appellants further argue that, when using the temperature of the heating element and the power applied thereto, it is not possible to distinguish between depletion of substrate in the liquid storage portion and a blockage between the liquid storage portion and the heating element.

However, this is not crucial since the claimed invention does not require a depletion of the substrate and a blockage to be distinguished. The invention is

directed to a system which according to claim 1 must comprise circuitry that configured to only determine a depletion of the substrate.

1.5 Still further, the appellants argue that claim 1 is extremely broad such that several embodiments are thus needed to cover the entire breadth of the claim. In particular, they allege that the claim does not define how substrate is conveyed from the storage portion to the heating element.

However, it is not the key issue of the invention how the substrate is conveyed from the storage portion to the heating element. Instead, the invention is directed to how depletion of the substrate can be detected. Claim 1 identifies the relevant parts of the system (heater with heating element, electric circuit) and which variables are used (power applied to the heating element, temperature of the heating element). Therefore, all essential features of the invention are identified.

It is not necessary to provide a skilled person with different possibilities concerning how the substrate can be conveyed from the storage portion to the heating element. Indeed, the inventive concept works with any kind of conveyor and a skilled person is aware of the various possibilities including e.g. wicks.

1.6 The appellants further allege that the relationship between power and temperature facilitating depletion determination is not explicitly defined in the patent as granted and that a skilled person is not therefore able to find a suitable criterion.

As explained above, figure 3 and the corresponding parts of the description illustrate how depletion can be detected. It is not necessary to indicate particular numerical values or a formula, but a skilled person understands how depletion influences the measured variables and thus can derive therefrom when depletion occurred.

2. Since none of the objections raised by the appellants can affect the validity of the patent as granted, it is not necessary to determine which of the objections had already been raised during opposition proceedings and which of them were not raised until appeal proceedings. Therefore, admittance into the proceedings does not need to be discussed (Article 12(6) RPBA 2007).

Novelty – claim 1

3. The subject-matter of claim 1 is novel within the meaning of Article 54 EPC.

3.1 The appellants allege that the subject-matter of claim 1 is not novel over **document E1**.

3.1.1 E1 discloses a system for vaporising hydrogen peroxide for the purpose of sterilising bottles (cf. paragraph [0012]) and does not therefore disclose an aerosol generating system as required by claim 1. An aerosol is a suspension of liquid droplets in air whereas a vapour produced from a substrate does not comprise liquid droplets suspended in air but the substrate is entirely gasiform.

3.1.2 The appellants allege that vapour can easily transfer into an aerosol when it cools down. The system of E1, however, does not mention that it is intended to cool

down the generated vapour but the vapour is directly applied to the bottles (cf. paragraph [0014]).

The system of E1 hence does not produce an aerosol.

3.1.3 Furthermore, E1 uses the measurements of the temperature of the heating element with the intention of ensuring that the amount of hydrogen peroxide produced is sufficient for a reliable sterilisation of the bottle (cf. paragraph [0016]). The device of E1 does not serve the purpose of determining depletion of hydrogen peroxide in the storage portion (reference sign 10) as required by claim 1.

3.1.4 The subject-matter of claim 1 is hence novel over E1.

3.2 The appellants allege that the subject-matter of claim 1 is not novel over **document E4**.

3.2.1 E4 discloses an electric cigarette having a heater with a heating element (reference sign 18). The heating element itself carries the aerosol-forming substance (cf. column 7, line 18, and column 8, lines 4 - 22), in particular the heating element being impregnated with the substance. E4 hence uses neither a liquid substrate nor a storage portion for that liquid substrate as required by claim 1.

3.2.2 The appellants argue that the surface of the heating element can be considered as a storage portion. However, the board does not understand a surface to be a storage portion for a liquid, which implicitly requires a void for receiving the liquid.

3.2.3 Further, the board does not share the appellants' understanding that impregnating the heating element

implicitly results in a liquid substrate. It might be true that during production of the heating element the substrate is applied to the heating element in liquid state. However, it then immediately dries and is in solid state when the heating element is mounted to the replaceable portion (12) and, later still, is used within the aerosol generating system.

3.2.4 Still further, the control circuitry (controller 14) of E4 controls the temperature of the heating element to avoid overheating. This control circuitry, however, is not configured to detect depletion of the substrate, in particular not being configured to detect depletion based on a relationship between a power applied to the heating element and a resulting temperature change of the heating element.

Contrary to the appellants' view, not every controller receiving information concerning the temperature and on the power applied to the heating element is configured to determine depletion of the substrate. The term "configured to" requires not only the abstract possibility of providing the existing controller with a program enabling the controller, after reprogramming, to carry out the required task, but the existing controller indeed must already be suitable to determine depletion, i.e. it must be programmed such that the task can be carried out without further modification of the existing controller.

3.2.5 The subject-matter of claim 1 is hence also novel over E4.

3.3 The appellants allege that the subject-matter of claim 1 is not novel over **document E8**.

3.3.1 E8 discloses an aerosol generator that determines the mass flow rate through the device by measuring the temperature in the heating element. As set out in paragraph [0032], the control of the mass flow serves to avoid overheating of the liquid, resulting in thermal degradation and hence clogging. Depletion of the substrate is not mentioned in E8.

3.3.2 The appellants argue that in E8 the total mass flow delivered through the second zone Z2 is calculated (as explained in paragraph [0025]) and the amounts are added up over time to obtain a total mass. This total mass is then compared to a desired mass as shown in figure 6 in steps 714 and 716. This also allows for comparing the total mass delivered with the amount of substrate stored in the storage portion such that depletion of substrate can be detected.

However, the total mass calculated in step 716 is not the accumulated mass provided by the device since its first use when starting with fully filled storage portion. Instead, it represents the total mass provided by the device during its actual use (cf. paragraph [0083]: "... during the cycle"). The device of E8 is used in particular in reoccurring medical treatments or similar applications where it is important to provide an exact dose of substrate (cf. paragraph [0004]). The routine described in figure 6 serves to ensure that during such a cycle of application the correct amount of substrate is used. The mass mentioned in step 716 is therefore - contrary to the appellants' understanding - not the total mass delivered since the first use of the device, and comparing it with the capacity of the storage portion is pointless.

The circuitry of E8 hence is not configured to detect depletion, in particular not configured to detect depletion based on a relationship between a power applied to the heating element and a resulting temperature change of the heating element.

3.3.3 The appellants further argue that the aerosol generator of E8 is able to detect a blockage of the device as set out in paragraph [0085]. They allege that the circuit thus automatically detects depletion of the substrate since in both cases the substrate delivered to the heating element runs dry.

Paragraph [0085] explains, however, that a blockage is detected by the controller of E8 if the blockage "would lower the mass flow rate" (page 6, right column, line 6). A blockage in E8 is hence not regarded as a total cut of flow rate but only as a reduced flow rate. Even if the controller emitted an alarm to alert the user in the event of a total cut of the flow rate, the purpose of the control system described in paragraph [0085] is not to detect depletion but to detect a blockage. This is hence merely a disclosure of a circuitry that is able, but not configured, to detect depletion.

3.3.4 The subject-matter of claim 1 is hence also novel over E8.

3.4 The appellants allege that the subject-matter of claim 1 is neither novel over **document E9** nor novel over **document E11**.

3.4.1 Documents E9 and E11 both disclose devices to deliver an aerosol whereby a substrate is heated by a heating element whose temperature is controlled such that it remains within a desired range. The circuits used for

this purpose, however, are not configured to detect depletion, in particular not configured to detect depletion based on a relationship between a power applied to the heating element and a resulting temperature change of the heating element.

3.4.2 The appellants argue that, if substrate runs dry, the control system of the devices known from E9 and E11 will automatically detect depletion of the substrate due to a rise in temperature of the heating element.

However, this is not the intended function of the control but only a description of the physical behaviour of the device. Even if the control cuts power due to an increase in temperature, this does not constitute a detection of depletion but merely a control of the heating element's temperature.

3.4.3 The subject-matter of claim 1 is hence also novel over E9 and E11.

3.5 Finally, the appellants allege that the subject-matter of claim 1 is not novel over **document E19.**

3.5.1 E19 was filed after expiry of the opposition period during opposition proceedings but admitted into the proceedings by the opposition division, since the latter deemed E19 *prima facie* relevant.

E19 hence forms part of the appeal proceedings (Article 12(1) RPBA 2020). The respondent requested that E19 not be admitted but fails to identify reasons in support of its opinion that the opposition division's decision was incorrect.

The opposition division used the correct criteria (relevance) and gave reasons why it considered E19 to be *prima facie* relevant (reasons, section 10.2, on page 5 of the decision). The board therefore sees no reason to deviate from the opposition division's decision to admit E19.

3.5.2 E19 discloses an inkjet printer that comprises a "heater waver" 3 that vaporises a part of the ink that ejects, due to the fulminating steam bubble produced, an ink drop through a nozzle (cf. paragraph [0009] of the translation E19a).

3.5.3 The appellants argue that an inkjet printer produces a plurality of droplets in air and hence can be considered as an aerosol generating system.

As set out above with respect to E1, an aerosol requires that the droplets be dissolved in air. An inkjet printer, however, produces droplets that are jetted with a high velocity through air onto a piece of paper, whereby these droplets are to interact as little as possible with the air in order to allow for a precise control of the location where the droplets are applied to the paper. These droplets are hence not dissolved in air and the jet of droplets does not therefore form an aerosol.

3.5.4 The subject-matter of claim 1 is thus also novel over E19.

3.6 No further lines of argument were raised by the appellants with regard to novelty of the subject-matter of claim 1.

Novelty – claim 12

4. The subject-matter of claim 12 is novel within the meaning of Article 54 EPC.

4.1 Appellant 1 alleges that **documents E2 and E3** form prior art under Article 54(3) EPC, and that the subject-matter of claim 12 is not novel over E2 or E3.

4.1.1 The issue of whether documents E2 and E3 form prior art under Article 54(3) EPC depends on whether these documents were filed before the relevant date of the patent in suit.

(a) The application with application number 11808641.2, on which the European patent in suit is based, was filed on 22 December 2011. It claims priority from the PCT application with application number PCT/EP2011/073791, which was filed on 24 December 2010 at the UK Intellectual Property Office.

(b) The appellant alleges that this claim to priority is not valid since claim 12 of the application in suit claims subject-matter that was not disclosed in the priority application. Indeed, whereas the priority application requires that the method of claim 12 be carried out in an electrically operated aerosol generating system, method claim 12 of the application in suit is not necessarily restricted to an aerosol generating system but also claims methods used with other, different systems.

(c) It is agreed that claim 12 of the application in suit does not use the literally identical designation of "*a method in an electrically operated aerosol generating system*". However, claim

12 defines as a first step of the method "*providing an electrically operated aerosol generating system comprising a liquid storage portion ... and an electric heater*", the electric heater "*comprising at least one heating element*". In the characterising portion, it is further specified that depletion of the substrate is determined based on a relationship between a power applied "*to the heating element*".

It is hence implicitly disclosed that the claimed method is used within this system.

(d) Claim 12 of the application in suit therefore does not differ in content from claim 12 of the priority document, the priority thus being validly claimed.

(e) The relevant date of the patent in suit is thus the filing date of the priority document, i.e. 24 December 2010.

4.1.2 Documents E2 and E3 were both filed on 24 December 2010 and hence not before the relevant date of the patent in suit, as required by Article 54(3) EPC. These documents are therefore not comprised in the state of the art.

4.1.3 It is not therefore necessary to determine whether E2 and/or E3 disclose(s) the subject-matter of claim 12 of the patent as granted.

4.2 No further lines of argument were raised with regard to novelty of the subject-matter of claim 12 or any other independent claim as granted.

Inventive step

5. The subject-matter of claim 1 is inventive within the meaning of Article 56 EPC.

5.1 The appellants argue in a first line of argument starting from **document E8 as the closest prior art**.

5.1.1 As set out above with regard to novelty, the subject-matter of claim 1 differs from the system known from E8 in that

- the electric circuitry is configured to determine depletion of substrate; and
- the detection of depletion is based on a relationship between a power applied to the heating element and a resulting temperature change of the heating element.

5.1.2 Determining depletion solves the technical problem of avoiding a dry hit when using the electric heating element.

5.1.3 Having expert knowledge , a skilled person is aware of a plurality of different possibilities for determining whether the liquid storage portion of E8 (reference sign 550) is empty, i.e. depletion of the substrate has occurred. Indeed, a skilled person knows that it is possible to install a sensor in the storage portion that measures the amount of remaining liquid, or to use a window in the wall of the liquid storage portion to allow inspection of the interior thereof. Using the relationship between the power applied to the heating element and a resulting temperature change is hence not the only possible solution when depletion of the substrate is to be be indicated. In particular, it is

not obvious since there is no teaching available that explains why this relationship should be used.

5.1.4 Although the appellants argue that the control of E8 already calculates the total mass of the substrate, which hence only needs to be compared with the amount of substrate contained in the storage portion at the beginning, this understanding cannot be accepted. As set out above with regard to novelty, the total mass calculated in E8 represents the amount of substrate used in the treatment in progress at the given time. Consequently, the controller would still need to add up the total mass of each treatment that has taken place since the first use of the device. This hence requires a further operation carried out by the controller which first needs to be implemented. The circuitry used in E8 hence must be modified in significant functions.

5.1.5 Furthermore, the board is convinced that depletion is not of interest in E8 since the aerosol generating system is a single-use device. Such single-use devices are usual in the field of administering medicines to the patient. It is hence likely that the system will be thrown away when depleted. Therefore, a user would accept the heating element being destroyed due to a dry hit. The same applies to clogging of capillaries or other parts of the device in response to a dry hit at the end of the lifetime of the system.

5.1.6 Even if considering modifying the system, a skilled person would not apply the teaching of E19 to the system of E8. Indeed, the inkjet printer of E19 is from a distant technical field and a skilled person would not therefore even consider a teaching restricted to producing ink droplets for an inkjet printer when

modifying a system for a medical treatment based on an aerosol.

5.1.7 Document E1 in turn does not provide any teaching concerning how the amount of substrate stored in the storage portion (reservoir 10) can be measured and, in particular, does not provide any teaching concerning how to determine depletion of substrate in that storage portion (cf. discussion of E1 with regard to novelty above). A combination of E8 with E1 hence does not guide the skilled person to the subject-matter of claim 1 either, contrary to the allegation of the appellants.

5.1.8 Starting from document E8, the subject-matter of claim 1 is hence not rendered obvious.

5.2 The appellants argue in a second line of argument starting from **document E16 as closest prior art.**

5.2.1 Document E16 discloses in figure 2 an electrically operated aerosol generating system for receiving an aerosol-forming substrate, the system comprising:

- a liquid storage portion (28) for storing liquid aerosol-forming substrate;
- an electric heater comprising at least one heating element (23) for heating the liquid aerosol-forming substrate; and
- an electric circuitry (24).

5.2.2 The appellants argue that the circuitry of E16 is already configured to detect depletion.

However, E16 only discloses that the circuitry controls a visual indicator that indicates the status of the amount of liquid substrate remaining in the storage portion (cf. column 4, line 66 – column 5, line 6).

Determining the remaining amount of substrate, however, does not include a step of determining depletion but merely provides an estimation of how many puffs remain on the basis of the calculated amount.

5.2.3 The subject-matter of claim 1 of the patent as granted therefore differs from D16 in that

- the electric circuitry is configured to determine depletion of the liquid aerosol-forming substrate; and
- the determination of depletion is based on a relationship between the power applied to the heating element and the resulting temperature change of the heating element.

5.2.4 The appellants argue that such a modification is suggested by E19. E16 already contains, in column 5, lines 48 – 53, a reference to the inkjet printer technology.

(a) E16 explains indeed in column 5 (starting in line 48) that substrate is conveyed to the heater using a liquid jet delivery system 32 that operates similarly to a bubble jet system used in inkjet printing. A resistor (57) is used to heat a thin layer of substrate such that the liquid boils and forms a bubble of vapour. The vapor bubble expands and forces a droplet of substrate through a nozzle (33). The droplet is jetted towards the heating element (23), where it is vaporised (cf. figures 4A – 4F).

A plurality of nozzles is provided to meter the total amount of liquid delivered to the heater, each nozzle having a resistor.

(b) The appellants argue that the resistor should be considered to form the heating element of the heater such that it is obvious from D19 to use the relationship between the power applied to the heating element and a resulting temperature change of the heating element.

(c) However, the resistor does not heat the substrate to form the aerosol. Instead, it merely forms a bubble below the substrate that provides a pressure sufficient for the droplet of substrate to be jetted towards the heating element, where it is vaporised to form the aerosol.

If a skilled person hence applies the teaching of E19 to E16, it may be obvious to replace the liquid jet delivery system 32 by an inkjet printer according to E19. This would not result in a concept of determining depletion of substrate based on the power applied to the heating element and the temperature of the heating element, but, rather, based on the power applied to and the temperature of the resistor of the liquid jet delivery system.

A skilled person would therefore still not arrive at the subject-matter of claim 1.

(d) It is not therefore necessary to determine whether it is possible to incorporate the inkjet device of E19 within the system of E16 in view of its size, as argued by the patent proprietor.

5.3 The appellants argue in a third line of argument starting from **document E1 as closest prior art**.

5.3.1 As set out above with regard to novelty, the subject-matter of claim 1 differs from the system known from E1 in that

- the system generates an aerosol;
- the electric circuitry is configured to determine depletion of substrate; and
- the determination of depletion is based on a relationship between a power applied to the heating element and a resulting temperature change of the heating element.

5.3.2 The appellants argue that the steam generated by the heating element cools down and will automatically transfer into an aerosol although this is not explicitly described.

5.3.3 There is, however, no indication in E1 that it is indeed intended that the steam should cool down prior to being applied to the bottles. On the contrary, the steam of air being mixed with the steam of hydrogen peroxide is preheated to more than 100°C (cf. paragraph [0014]) to provide hot dry air. It is thus obvious that the steam is not intended to condense to form an aerosol.

This would be counterproductive since sterilising the bottles with a hot dry steam is far more efficient than sterilising them with a steam of cool air. The hot air allows the hydrogen peroxide to spread over all surfaces whereas an aerosol of hydrogen peroxide would only treat those regions being wetted by the substrate.

5.3.4 A skilled person hence has neither an incentive nor a teaching at hand to transform the system of E1, which generates hot steam, into an aerosol generating system.

5.3.5 Even if the skilled person used hydrogen peroxide in the form of an aerosol, there is still no teaching available concerning the use of the relationship between a power applied to the heating element and a resulting temperature change of the heating element for determining depletion of substrate in the reservoir (10). On the contrary, as set out with regard to inventive step starting from E8 as the closest prior art, the skilled person has a plurality of other possibilities for determining depletion such that choosing the relationship between power and temperature of the heating element is not obvious.

5.4 The appellants argue in a fourth line of argument starting from **document E4 as closest prior art**.

5.4.1 As set out above with regard to novelty, the subject-matter of claim 1 differs from the system known from E4 in that

- the substrate is a liquid substrate;
- the system comprises a liquid storage portion;
- the electric circuitry is configured to determine depletion; and
- determining depletion is based on a relationship between the power applied to the heating element and the resulting temperature change of the heating element.

5.4.2 Moving away from the concept of impregnating the heating element with substrate and using instead a liquid substrate stored in a liquid storage portion and guiding it to the heating element does not constitute a modification that the skilled person would consider. Indeed, this would require an entire redesign of the

system. There is nothing available to motivate a skilled person to such a fundamental change.

5.4.3 Furthermore, the system of E4 uses a removable portion (12) which is exchanged after every application (cf. column 11, lines 1 - 5). There is hence no motivation for the skilled person to determine depletion of the substrate.

5.4.4 Even if the skilled person considered determining depletion, there are again a plurality of other possibilities for determining depletion apart from using the relationship between the power applied to the heating element and the temperature of the heating element. Use of this particular relationship is not disclosed in E5 or in E6 either.

5.5 The appellants further argue with regard to a combination of document E4 or E9 with document E19.

5.5.1 Document E19 concerns an inkjet printer which neither produces an aerosol nor has a similar function to the function of an electric cigarette such as those disclosed in E4 or E9. Consequently, the skilled person would not consider E19 when seeking to improve the electric cigarettes of E4 and E9.

5.5.2 It is not therefore necessary to determine whether the aforementioned lines of argument were sufficiently substantiated and hence cannot be admitted into the proceedings as requested by the respondent.

5.6 No further objections with regard to inventive step were raised by the appellants.

6. Since none of the arguments raised by the parties under Article 100 EPC prejudices maintenance of the patent as granted, the board sees no reason to deviate from the opposition division's decision.

Order

For these reasons it is decided that:

The appeals are dismissed.

The Registrar: The Chairwoman:

A. Voyé A. Jimenez

Decision electronically authenticated