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**Datasheet for the decision
of 21 June 2021**

Case Number: T 2244/19 - 3.2.01

Application Number: 10816778.4

Publication Number: 2477514

IPC: A24F47/00, G01F1/28, G01P13/00

Language of the proceedings: EN

Title of invention:
ELECTRONIC CIGARETTE

Patent Proprietor:
Altria Client Services LLC

Opponent:
Valsecchi, Chiara

Headword:

Relevant legal provisions:
EPC Art. 54, 56, 123(2), 84, 100(b)

Keyword:

Novelty - main request (no)

Added subject-matter - auxiliary request 2 (no)

Insufficiency of disclosure - auxiliary request 2 (no)

Clarity - auxiliary request 2 - no power to examine

Inventive step - auxiliary request 2 (yes)

Decisions cited:

G 0003/14

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 2244/19 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 21 June 2021

Appellant: Altria Client Services LLC
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted on
4 June 2019 concerning maintenance of the
European Patent No. 2477514 in amended form.

Composition of the Board:
Chairman G. Pricolo
Members: S. Mangin
O. Loizou

Summary of Facts and Submissions

I. The appeals were filed by appellant 1 (proprietor) and appellant 2 (opponent) against the interlocutory decision of the opposition division finding that, on the basis of the auxiliary request 1, the patent in suit (hereinafter "the patent") met the requirements of the EPC.

II. The opposition division held that the subject-matter of claim 1 of the main request (maintenance of the patent as granted) was not novel in view of documents:
D1: US 2007/0006889 A1; and
E2: EP0358114 A2.

As regards the auxiliary request 1, the opposition division held that

(1) the invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC),

(2) the subject-matter of claims 1 and 10 did not extend beyond the content of the application as filed (Article 123(2) EPC),

(3) claim 1 was clear in accordance with Article 84 EPC, and

(4) the subject-matter of auxiliary request 1 involved an inventive step (Article 56 EPC), in particular when starting from the closest prior art as disclosed by E2 and in view of the teaching of document
E5: US 2005/0081639 A1.

III. Oral proceedings were held before the Board on 21 June 2021.

IV. The appellant 1 (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained as granted (main request) or in the alternative that the appeal of the opponent be dismissed or the patent be maintained in amended form on the basis of the third or the fourth auxiliary request filed with the statement of grounds of appeal dated 11 October 2019. The first auxiliary request filed with the reply dated 3 March 2020 was withdrawn.

The appellant 2 (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

V. Independent claims 1 and 12 of the main request (patent as granted) with the feature numbering used by the opposition division read as follows:

Claim 1:

M1 An electronic smoke apparatus (10) comprising

M1.1 an inhale detector (100) and

M1.2 a smoke effect generating circuitry,

characterized in that

M1.1.1 the inhale detector (100) comprises an air-flow sensor (120) which is arranged to detect direction and rate of airflow through the smoke apparatus (10), and

M1.2.1 the smoke effect generating circuitry is arranged to generate smoking effect when the air flow through the air-flow sensor (120) has a flow direction corresponding to inhaling through the apparatus (10) and a flow rate reaching a predetermined threshold.

Claim 12:

M12 An inhale detector module of an electronic smoke apparatus, characterized in that, the module comprises M12.1 an air-flow rate and direction sensor (120) and

M12.2 smoke effect generating circuitry

M12.3 which are mounted on a printed circuit board (140);

M12.1.1 wherein the air flow rate and direction sensor is housed within a metallic can (126)

M12.1.2 and comprises a conductive baffle surface which is separated from a base conductive surface (122) by an insulating spacer (123);

M12.1.3 wherein an inlet aperture and an outlet aperture are defined at axial ends of the metallic can (126);

M12.1.4 wherein the conductive baffle surface is axially and resiliently deformable and is to deform in response to air flow through the metallic can (126);
and

M12.2.1 wherein the smoke effect generating circuitry comprises a microcontroller (160) which is adapted to determine the air-flow rate and the air-flow direction with reference to the extent of deformation of the conductive baffle surface.

VI. Claim 1 of the set of claims allowed by the opposition division is based on claim 1 of the main request with the addition of the following part of claim 2 as granted reading:

"wherein the air-flow sensor (126) comprises an air-baffle surface; wherein the air-baffle surface is adapted to deform in response to movement of air through the inhale detector of the apparatus (10), the extent of deformation of the air-baffle surface being measured to determine both the direction and rate of air flow through the apparatus (10)", and with the term "through the smoke apparatus" in feature M1.1.1. replaced by "through the air-flow sensor".

Claim 10 of the set of claims allowed by the opposition division is based on claim 12 of the main request, but with feature M12.2.1 reading (added terms are underlined): "wherein the smoke effect generating circuitry comprises a microcontroller (160) which is adapted to determine the air-flow rate and the air-flow direction through the air flow rate and direction sensor with reference to the extent of deformation of the conductive baffle surface"

and with the addition of the following features:

- "wherein the conductive baffle surface and the base conductive surface (122) are mounted spaced apart and in a substantially parallel manner to form a capacitive component; and wherein the microcontroller (160) comprises an oscillation circuit, and the air-flow rate and direction sensor forms a capacitive component part of the oscillator circuit; wherein the oscillation frequency of the oscillation circuit changes when the capacitance of the air-flow rate and direction sensor as measured between the base conductive surface (122) and the conductive baffle surface changes; and the microcontroller (160) is adapted to determine the air-flow rate and the air-flow direction with reference to the oscillator frequency or variation in oscillator frequency of the oscillator".

Reasons for the Decision

1. Main request - Claims as granted

1.1 Claim 1 - Novelty - Articles 100(a) and 54 EPC

The Board confirms the findings of the opposition division that the subject-matter of claim 1 is not

novel over D1. Indeed D1 discloses all the features of claim 1.

1.2 Appellant 1 (proprietor) was of the opinion that D1 failed to disclose:

(i) An electronic smoke apparatus generating a smoking effect.

(ii) An air-flow sensor "arranged to detect direction and rate of airflow through the air-flow sensor".

(iii) The generation of a "smoking effect when the air flow through the air-flow sensor (120) (...) has a flow rate reaching a predetermined threshold"

1.3 The Board does not agree.

(i) The expressions "electronic smoke apparatus" and "smoking effect" used in claim 1 are broad. Therefore, the "virtual or augmented reality smoking system which provides smoking sensations(...)"(Paragraph [0003]), generating "a virtual image of a red burning tip 610" (paragraph [0055]) of D1 anticipates the electronic smoke apparatus generating a smoking effect of claim 1.

(ii) In D1, both the direction and the rate of the air-flow are detected. Indeed paragraphs [0032] and [0033] disclose measuring the direction and the force of the air.

Paragraph [0032] discloses: "The exemplary cigarette model 300 preferably includes a sensor 340, which can be used to sense the position and motion of the model 300, as well as air flow direction and force within a model."

Paragraph [0033] discloses: "Additionally, the sensor 340 can be adapted to detect air flow and force passing through the lumen of the cigarette model 300 to

determine whether a smoker has drawn on the cigarette model 300 and which how much force (how deeply)".

In this context it is noted that the force of the air is proportional to rate of air flow, and that document D1 in paragraph [0048] specifically refers to the air flow volume passing over the sensor, see also point 1.6.4 of the decision of the Opposition Division (also further referring to D1ref).

(iii) While D1 does not explicitly disclose the term "threshold", D1 implicitly discloses a threshold at which a smoking effect is generated. It is to be noted that the threshold has not been further defined in claim 1, in particular no value has been defined. D1 discloses in paragraph [0055] that "if a sensor 340 in a cigarette model 300 determined that a smoker was inhaling on the cigarette model 300, an image generator could generate a virtual image of a red tip 610 to simulate an inhalation on a conventional cigarette (...). Alternatively, the red burning tip 610 can be provided by light emitting devices, such as light emitting diodes (LEDs), which can be activated during a smoking session, wherein the intensity of the glow can be controlled by a puffing profile to provide a realistic experience". Thus D1 implicitly discloses that when a negative pressure, a pressure below 0, is reached a smoking effect is generated.

2. The appellant 1's (proprietor's) request to dismiss the appeal of the appellant 2 (opponent), i.e. to maintain the patent in the form upheld by the opposition division.

2.1 Clarity of claim 1 - Article 84 EPC

- 2.1.1 Appellant 2 (opponent) was of the opinion that claim 1 was unclear for the two following reasons:
- (i) Replacing "air flow through the smoke apparatus" with "air flow through the air flow sensor" introduced a lack of clarity , because the claim could now be read as implying an air flow through the sensor, rather than around the sensor as disclosed in the description.
 - (ii) The following essential feature was missing from claim 1: "the airflow causing a deflection and the extent of that deflection being measured by a capacitance variation".
- 2.1.2 According to decision G 3/14, amended claims of a patent may be examined for compliance with the requirements of Article 84 EPC ("clarity") only when, and then only to the extent that the amendment introduces lack of clarity.

In the present case the clarity issues raised by appellant 2 do not originate from the amendments:

(i) While feature M1.1.1 of claim 1 has been amended by replacing the terms "smoke apparatus (10)" by "air-flow sensor (120)", such that claim 1 reads: "the inhale detector (100) comprises an air-flow sensor (120) which is arranged to detect direction and rate of airflow through the air-flow sensor (120)", feature M1.1.2 which is present in claim 1 as granted reads "the smoke effect generating circuitry is arranged to generate smoking effect when the air flow (120) through the air-flow sensor (120) has a flow direction corresponding to inhaling through the apparatus (10) and a flow rate reaching a predetermined threshold". Thus the amendment to feature M1.1.1 does not introduce a clarity issue because claim 1 as granted already defines that there is an "air flow through the air-flow sensor", whereby

the alleged clarity issue, if any, was already present in the granted patent.

(ii) As regards the features "the airflow causing a deflection and the extent of that deflection being measured by a capacitance variation", these features were not present in claims 1 and 2 as granted, which are now combined into claim 1. Hence, also here, the alleged lack of clarity, if any, was already present in the patent as granted and does not originate from the amendments.

2.2 Added subject-matter in claim 10

The Board confirms the findings of the opposition division which held that claim 10 did not extend beyond the content of the application as originally filed.

2.2.1 Appellant 2 was of the opinion that claim 10 defining that only the sensor should be housed within a metallic can and that neither the circuitry nor the Printed Circuit Board (PCB) needed to be housed in the metallic can led to added subject-matter contrary to Article 123(2) EPC.

2.2.2 The Board disagrees with appellant 2. While the application as filed discloses on figure 4 and page 6, line 16 - page 7, line 11 that the "sub-assembly of the air-flow sensor and PCB is housed within a metallic can (126) which defines an air inlet and an air outlet at its axial ends", claim 1 does not present the skilled person with new technical information. The relevant aspect is that the airflow-sensor is placed in a metallic can and that an air inlet and an air outlet are defined. This is confirmed by the schematic figures 6A, 6B and 6C that only depict the air flow sensor and

the metallic can around it. Whether the circuitry and the PCB are housed in the metallic can or outside the metallic can is not essential and can be omitted without leading to an unallowable intermediate generalisation.

2.3 Sufficiency of disclosure

The Board confirms the findings of the opposition division that the invention is sufficiently disclosed.

- 2.3.1 Appellant 2 was of the opinion that the invention was not sufficiently disclosed for the following reasons:
- (i) In conventional fluid mechanics, a flowing airstream created an area of reduced pressure, regardless of the direction of the airflow. Hence the scenario depicted in figure 6C of the patent would not occur. The declaration from Mr Stickland, a University professor, filed by the appellant 1 (proprietor) was worthless as it provided no evidence that the skilled person as opposed to a University professor could reproduce the invention at the priority date and as the sensor modeled by Stickland had dimensions significantly different from those of the example disclosed in paragraph [0022] of the patent.
 - (ii) Even if the air-baffle surface of the sensors deformed in both directions depending on the air-flow direction, in the Stickland's model the change of capacitance would be too small to be measured. Furthermore, the weight of the membrane would outweigh the air flow deflection forces such that the latter could not be measured as they would be hidden by weight deflection effects.
 - (iii) In any case, Mr Stickland's declaration could only support an arrangement having the airflows arising from the very particular baffling and can arrangement

depicted on figures 6B and 6C and did not render the broad claim to any arrangement of baffles sufficient.

- 2.3.2 The Board notes that it is established case law that an objection of lack of sufficiency based on Article 100(b) EPC presupposes that there are serious doubts, substantiated by verifiable facts, that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. In order to establish insufficiency, the burden of proof is upon the opponent to establish that a skilled person, using its common general knowledge, would be unable to carry out the invention (Case Law of the Boards of Appeal of the European Patent Office, 9th edition, 2019, II.C.9).

The Board takes the view that the patent, in particular in paragraphs [0022]-[0027] and figures 4-8, gives sufficient guidance to the skilled person for reproducing the invention as claimed.

Appellant 2 alleged that contrary to figure 6B and paragraph [0023], suction due to the air flow would not cause the resilient metallic membrane to bulge away from the back plate, but failed to give any evidence. Appellant 2 did not try to reproduce the sensor of the patent placed in a metallic can as shown in the figures 4 and 6 to prove his allegations but simply relied on theoretical arguments for confuting the declaration of Mr Stickland, which was considered by the Opposition Division.

It is noted in this respect that the declaration of Mr Stickland cannot be dismissed merely on the basis that the sensors do not have the dimension of the example given in paragraph [0022] of the patent and that Mr

Stickland is a university professor reproducing the invention after the priority date of the patent. According to point 2 of his declaration, Mr Stickland reproduced the sensors according to figures 4 and 6 of the patent and has shown that the resilient metallic membrane would bulge away. Appellant 2 failed to convincingly show that with different dimensions the Stickland's model would no longer provide the mechanical functionality as described.

As regards the argument that the change of capacitance in the Stickland's model would be too small to be measured, this argument is moot as it is the capacitance of the sensor described in the patent that has to be considered (see paragraph [0022]).

Finally, appellant 2 failed to show what embodiments, if any, that would fall under the allegedly broad scope of the claim, could not be reproduced by a skilled person.

2.4 Inventive Step

The subject-matter of claim 1 involves an inventive step in view of E2 in combination with E5.

- 2.4.1 According to appellant 2, the subject-matter of claim 1 differed from E2 in that "the air-flow sensor (126) comprises an air-baffle surface; wherein the air-baffle surface is adapted to deform in response to movement of air through the inhale detector of the apparatus (10), the extent of deformation of the air-baffle surface being measured to determine both the direction and rate of air flow through the apparatus (10)"
- Appellant 2 was of the opinion that the skilled person would combine the teaching of E2 with the teaching of

E5 to arrive at the subject-matter of claim 1. E5 disclosed a sensor with an air baffle (diaphragm 17) deflecting in both directions, thereby changing the capacitance of the sensor, which enabled the determination of both the direction and rate of flow through the apparatus. Appellant 2's view was that E5 was more sophisticated than the present invention as it comprised a negative feedback to limit the diaphragm motion resulting from pressure change to a negligibly small value (paragraph [0084] of E5). Appellant 2 considered that the diaphragm nevertheless deformed with air-flow.

- 2.4.2 The Board agrees with the difference identified by appellant 2 between the subject-matter of claim 1 and the disclosure of E2, but does not agree that a combination of E2 with E5 would result in the subject-matter of claim 1. Indeed claim 1 requires that "the extent of deformation of the air-baffle surface be measured to determine both the direction and rate of air flow through the apparatus". In E5, it is not the extent of deformation of the air-baffle surface, which is measured, but the magnitude of the feedback voltage. Paragraph [0070] discloses that:
- "The electrostatic force is created by applying a DC voltage between the diaphragm metallization 16 and sensing electrodes 12A and 12B. The sensitivity of the sensor is primarily controlled by the electrostatic feedback. The sensor output is highly amplified and applied as an opposing electrostatic force to the diaphragm. The diaphragm is thereby maintained in a high capacitance force balanced state. Pressure tending to deflect the diaphragm is opposed by electrostatic attraction between the diaphragm metallization and the sensing electrodes. The gain of the feedback system is sufficient to keep the diaphragm virtually motionless

with applied pressure. With diaphragm deflection reduced to a negligible value, the mechanical properties of the diaphragm have only a minor effect on the sensitivity of the sensor. The effects of changes in diaphragm properties due to manufacturing variations, aging, temperature, and backflow deposits are substantially reduced. The magnitude of the feedback voltage is used as the measure of pressure".

Paragraph [0070] of E5 clearly teaches that the deformation of the diaphragm is negligible due to the DC voltage applied. This measure has been implemented in E5 to avoid degradation of the diaphragm (see paragraph [0031]).

Therefore the extent of deformation of the diaphragm is not measured in E5, but it is the magnitude of the feedback voltage which is measured to determine the pressure.

3. From the above it follows, as no other objections were raised in appeal proceedings by appellant 2 against the patent in the form as maintained by the opposition division, the appealed decision is to be confirmed.

Order

For these reasons it is decided that:

Both appeals are dismissed.

The Registrar:

The Chairman:



D. Magliano

G. Pricolo

Decision electronically authenticated