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Datasheet for the decision of 10 December 2014

Case Number: T 1937/11 - 3.2.04

Application Number: 03713219.8

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Title of invention:
CIGARETTE FILTER WITH BEADED CARBON

Patent Proprietor:
Philip Morris Products S.A.

Opponent:
BRITISH AMERICAN TOBACCO PLC

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

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Catchword:

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Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1937/11 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 10 December 2014

Appellant: (Opponent)	BRITISH AMERICAN TOBACCO PLC Globe House 4 Temple Place London WC2R 2PG (GB)
Representative:	Davies, Christopher Robert Dehns St Bride's House 10 Salisbury Square London EC4Y 8JD (GB)
Respondent: (Patent Proprietor)	Philip Morris Products S.A. Quai Jeanrenaud 3 2000 Neuchâtel (CH)
Representative:	Marlow, Nicholas Simon Reddie & Grose LLP 16 Theobalds Road London WC1X 8PL (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 5 July 2011 concerning maintenance of the European Patent No. 1474008 in amended form.**

Composition of the Board:

Chairman	T. Bokor
Members:	E. Frank
	S. Oechsner de Coninck

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division, dated 12 May 2011 and posted on 5 July 2011, to maintain the European patent No. 1 474 008 in amended form according to the main request received 12 April 2011.

II. The appellant (opponent) filed a notice of appeal on 7 September 2011, paying the appeal fee on the same day. The statement of grounds of appeal was submitted on 10 November 2011.

III. A communication pursuant to Article 15(1) RPBA was issued after a summons to attend oral proceedings, which were duly held on 10 December 2014. The following evidence has been considered for the purposes of the present decision:

as filed with notice of opposition:

D1 = US 3351071
D8 = GB 1383085

as filed with grounds of appeal:

D21 = data of activated carbon beads of both the Kureha group and Blücher GmbH; tables 1 to 4;

as filed with reply to the grounds of appeal:

D22 = overview of data of Blücher GmbH beads; table 1, and figures 1 to 6;

IV. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (proprietor) requested that the appeal be dismissed and the patent be maintained on the basis of amended claim 1 as upheld by the opposition division.

V. The wording of claim 1 as maintained by the opposition division reads as follows:

"A cigarette filter including a beaded, activated carbon of a spherical form and of a diameter within the range of 0.2mm to 0.7mm, wherein the beaded, activated carbon has a bulk density greater than 0.5 g/cm^3 and a specific surface area in the range of 1000 to 1600 m^2/g BET."

VI. The appellant argued as follows:

By way of illustration D21 data had been filed in relation to two currently commercially available activated carbon materials consisting of spherical beads.

Claim 1 differed from two of D1's examples (VII and XI) by its bulk density and BET surface area parameters. However, the patent was silent as to a link between pore size distribution, i.e. presence of macro/micropores, allegedly having an effect on taste, and bulk density. Moreover, no convincing link between the claimed bulk density parameter and particle strength had been provided, especially no synergic effect between the claimed parameters is apparent. This could also be seen from table 1 of the patent, data in D21, or examples D27 and D28 in the data overview D22. Thus, any differences in macropore range distribution depended on the production process. Since any problem regarding the effect of macropores was not at all substantiated, starting from D1, the problem to be solved was to look for an alternative material suitable for use in a cigarette (or at most, to improve robustness). Examples VII and XI of D1 related to

cigarette filters. However, since D1 also referred to "fluids and the like", D1 was addressed to a skilled person generally working with filters, who was also aware of carbon filtering in general.

Thus, starting from D1 the skilled person, an expert on carbon filtration, would select a level of activation consistent with the object of providing suitable adsorption properties for tobacco smoke whilst maintaining sufficiently high particle strength, thus routinely arriving at a level of activation to provide a specific surface area within the wide range claimed by claim 1, as well as at particles having a bulk density greater than the arbitrary value of 0.5 g/m^3. Moreover, faced with the problem of looking for a more robust material suitable for use in a cigarette, the skilled person would also turn to D8, which concerned activated carbon particles for filtering gases of cigarette smoke, i.e. a filter material suitable for cigarettes. Instead of pan granulating, which was used in D1, D8 suggested particles formed by disperging fused pitch in a fluid medium to achieve higher structural strength. Two of the examples of D8 (examples 8 and 9) were activated to provide surface areas within claim 1. The claimed bulk density inherently resulted from the given specific surface area and diameter of the activated beaded carbon in examples 8 and 9 of D8. Thus, claim 1 was also obvious in the light of D1 and D8.

VII. The respondent argued as follows:

In response to the D21 data filed by the appellant, D22 data in relation to eight spherical activated carbon materials obtained from Blücher GmbH had been filed.

The patent clearly presented various effects due to manufacturing (dusting, costs, weakening material when

activated, etc.) and consumer problems (removing smoke from constituents being potentially harmful whilst maintaining taste and dynamic puffs). These objects were simultaneously solved by all the parameters of claim 1. It was not a question of whether or not some of the D21 or D22 data also achieved, e.g., a particular hardness or pore size distribution outside the claimed ranges of claim 1. Rather, the "sweet spot" in terms of all advantages of a cigarette filter which fell within the combined ranges as claimed had to be sought, i.e. the combination of diameter range, bulk density and relatively low or moderate BET range of claim 1. Thus, the relevant skilled person was a designer of cigarette filters, who had to be concerned with smoke constituents but also with production problems of cigarettes. Starting from D1, the skilled person looking at improving a cigarette filter, thus would not arrive at claim 1 in an obvious manner: e.g., no specific surface area in combination with examples VII and IX was taught in D1, much less a relatively low BET range. Moreover, the skilled person indeed would understand that there is a relationship between the high bulk density of claim 1 and pore size distribution of the beaded carbon (less macropores), which also led to an improved taste. Nothing of this was hinted at in D1. Finally, since D8 related to the remote technical field of industrial carbon filters and did nowhere addressed cigarette filters, starting from D1, D8 would not be known to and would not be considered by the skilled person. Therefore claim 1 was inventive in the light of D1 and D8.

Reasons for the Decision

1. The appeal is admissible.

2. *Late filed evidence*

The appellant's data sheet D21 had been filed with its grounds of appeal, but directly addressed the impugned decision's finding regarding effects. The respondent's data sheet D22 was filed immediately in response. Neither set of data changes the framework of the discussion of inventive step in the light of D1 and D8. Indeed the admissibility of D21 and D22, respectively, has not been contested by the parties, and the Board is satisfied that even if late filed the evidence as a whole relates to the case under appeal pursuant to Articles 12(2) and(4) RPBA.

3. *Amendments*

As to the further amendments with respect to claim 1 as granted and the newly adapted patent specification, the appellant did not bring forward any objections, and the Board is also satisfied that the requirements of Rule 80 EPC and Articles 123(2) and (3) EPC are fulfilled.

4. *Novelty and Inventive step*

4.1 The appellant did not dispute the novelty of claim 1, and since also the Board has no reason to doubt that its subject-matter is novel, claim 1 is considered to comply with Article 54 EPC.

4.2 The invention according to claim 1 relates to a cigarette filter, more particularly to a cigarette filter including activated carbon of a spherical form and of a diameter within a given range.

With respect to commercially available granular active carbon (e.g. PICA carbon, cf. patent paragraph 0057), which is irregularly shaped and prone to fracture, beaded carbon is of much more consistent spherical form and size and physically more robust (cf. patent, paragraphs 0012, 0014, 0016, and 0020). It is therefore easier to handle by cigarette manufacturing machinery with less dust formation, and gives a more uniform product for a more complete and consistent filling of cavities during automated filter rod making (plug-space-plug filter), cf. patent, paragraph 0018.

4.3 However, also beaded carbon is subject to three central concerns with respect to machinability and the selection of the carbon material for cigarette filter applications, viz.: the dust and handling problems during cigarette manufacturing, the costs of executing the heat treatment for activating carbon, and the limitations on how short a cavity can be established and filled in plug-space-plug filter rod making operations (cf. patent, paragraph 0061).

4.4 Moreover, gas phase removal efficiency is impacted by bead diameter, the smaller beads being more efficient. Additionally, the more a given carbon is activated, the more efficient it is at gas phase removal, however, machinability (dusting factor, weakening of material) and cost of the activation treatment are countervailing considerations as to how much activation is desirable (cf. patent, paragraphs 0062 and 0021). Furthermore, the Board also notes the statement in the patent that the smaller the carbon bead, the more closely packed become the beads, which elevates pressure drop. Hence, the tendency toward ever smaller bead diameters for improving gas phase removal efficiency is countered by the need to stay within expectations of smokers with respect to resistance to draw upon smoking cigarettes. As also argued by the respondent,

the removal of constituents from mainstream smoke has to be fully effective throughout all (dynamic) puffs, cf. patent, paragraphs 0063 and 0065.

4.5 To this end, claim 1 at issue specifies a particular diameter range of 0.2 to 0.7 mm at an activation level equivalent to a specific surface area in the range of 1000 to 1600 m^2/g BET.

According to the patent, balance is therefore struck between required activation level and machinability (cf. patent, paragraph 0062). At such bead sizes, sufficient gas phase removal is achieved at moderate to lower activation levels. Moreover, the robustness and hardness of the carbon beads is preserved so as to enhance their resistance to fracture and formation of undesirable dust during automated manufacture of filter rods (cf. patent, paragraphs 0021 and 0069).

4.6 Without prejudice to additional effects based on the specified bulk density greater than 0.5 g/cm^3, which is also required by claim 1 at issue, the Board finally notes the stated effect that the activated beaded carbon filter of claim 1 moreover contributes to an improved taste vis-à-vis a cigarette that includes granulated active carbon filter materials (cf. patent, paragraphs 0013, 0058, and 0059).

4.7 Following from the above, as also argued by the respondent, thus in any event the selected diameter and specific surface area ranges of claim 1 provide, in combination, an advantageous balance between manufacturing and consumer aspects of a cigarette filter including beaded activated carbon. Thus the Board considers that the claimed parameters contribute to solving a plausible technical problem and are as such not arbitrary.

4.8 It is common ground that document D1 forms the closest prior art. Regardless of its abstract (cf. D1, col. 1, lines 10 to 13) where a filter material for cigarettes and, in very general terms, "fluids and the like" are mentioned, the Board holds that D1 focuses on active carbon filter material of a cigarette filter. Indeed, D1 is concerned with problems in the commercial production of carbon-bearing cigarette filter rods of cigarettes, that is, the dusting of active carbon granules which had hitherto been used as filter aids in cigarettes, and the difficulties of handling due to their irregular sizes and shapes. Moreover, active carbon produced in the form of cylindrical plugs had poor draw and offered high resistance to smoke flow. The combination of active carbon granular and fibrous filter elements also removed most of the tobacco smoke flavour and resulted in a tasteless smoke. Finally, active carbon particles could be bound together with various binding agents but, in the process, often lost much of their ability to filter (cf. D1, column 1, lines 16 to 26).

To overcome these drawbacks of active carbon granules previously used in cigarette filters, D1 (cf. column 1, lines 28 to 33) suggests low-dusting, particulate forms of active carbon of spherical shape and uniform size giving them better filter properties. To produce spherical shaped particles having both high strength and high carbon content (cf. D1, col. 1, lines 46 to 54), e.g., a tilted rotating pan, in which a wetted homogeneous mass of cellulose crystallite aggregates and carbon particles is made to form spherical particles by the so-called "snowballing" method, can be used (cf. D1, paragraph bridging columns 2 and 3, and column 3, lines 8 to 30). The resulting spherical particles of cellulose-carbon aggregates for use as free-flowing cigarette filter material may vary in diameter from about 0.1 to 8 mm (cf.

D1, claim 3). The carbon-containing particles are preferably activated (cf. D1, column 2, line 70, and column 3, lines 43 to 48).

4.9 More particularly, examples VII and XI of D1 produce particles of 20 x 48 mesh (Tyler), that pass a filter with openings 0.841 mm (20 mesh) but not a filter with openings 0.297 mm (48 mesh). As also acknowledged by the appellant, these examples of beaded activated carbon in any case, thus, are meant for cigarette filters as required by claim 1 of the patent. The exemplified values imply, not disputed, a considerable overlap with the claimed range of diameters of the cigarette filter material of claim 1 at issue. Hence, the examples VII and XI of D1 represent the most suitable starting point for the assessment of inventive step.

4.10 However, although the active carbon being used in D1's filter material preferably is highly activated, (cf. D1, column 2, line 71), D1, let alone examples VII and XI, do not give any values for activity, i.e. for the specific surface area, and do not mention bulk density at all.

Therefore, it is common ground that the subject-matter of claim 1 differs from D1's exemplified cigarette filter in that the beaded activated carbon has a bulk density greater than 0.5 g/cm^3 and a specific surface area in the range of 1000 to 1600 m^2/g BET.

4.11 As argued by the appellant, the patent (see. table 1 on page 8, and paragraph 0074) does not provide any information about a link between bulk density (alone or in combination with the other parameter ranges) and pore size, much less that improved taste is correlated to bulk density (cf. patent, paragraph 0059). Moreover, the Board is not convinced that the data of the respondent's D22

(cf. table 1 and figure 1) can give any clear indication that pore size distribution, let alone a relatively small distribution in the macropore range, might be inextricably linked to the bulk density range as specified by claim 1. Rather, the data of the appellant's report D21 shows that macropore volume (cf. D21, table 3) is not closely related to bulk density (cf. D21, table 1). Nor appears from D21 (cf. table 4) that the particle strength increases, when the bulk density has been increased (cf. D21, table 1). Therefore, in the view of the Board, the respondent did not convincingly demonstrate that an improved taste (due to less macropores) or an improved strength of the activated carbon material was particularly achieved merely through selecting the range of a bulk density greater than 0.5 g/cm^3 at the filing date of the patent.

4.12 However, the Board shares the respondent's view that the data shown in either D21 or D22 concerns filters, which are not necessarily bound to any of the other complex restraints (and thus effects) during manufacturing and consumer use of a cigarette filter of claim 1, which are indeed derivable from the patent: see points 4.3 to 4.5 of this decision.

Therefore, the problem to be deduced in the light of the technical effects of the distinguishing specific surface area in the range of 1000 to 1600 m^2/g BET over D1, in combination with a diameter between 0.2 and 0.7 mm, has to be formulated as follows: How to provide a cigarette filter including beaded activated carbon with an improved balance between manufacturing and consumer aspects. See point 4.7 of this decision.

4.13 Consequently, both the starting point of the "problem-solution-approach", viz. the disclosure of examples VII and XI of D1, and the problem to be solved with respect to

the latter belong to the technical field of cigarettes and the production thereof. The appropriate skilled person, therefore, must be clearly considered to be somebody who is concerned with production and consumer requirements for cigarettes, such as machinability or allowed smoke constituents and human smoking patterns.

4.14 Starting from the examples VII and XI of D1, the paragraph bridging columns 2 and 3 does only generally suggest that a highly activated carbon material may be used and that any desired adsorption properties can be achieved by suitable choice of the constituent carbon properties (particle size, density, porosity, pore volume, etc.). However, if a balance between manufacturing and consumer aspects had to be sought by the skilled person, D1 does not give any clue as to how the plurality of physical properties described by this paragraph may have to be varied, much less for examples VII or XI. And even if the skilled person considered highly activated carbon material in context with examples VII and XI, he would have been led away from claim 1 at issue. According to the patent, a sufficient gas phase removal of the cigarette filter is already achieved at moderate to lower activation levels (in view of dusting factor, weakening of material, costs, and expectations of smokers) in combination with the diameter range specified by claim 1. Cf. point 4.4 of this decision.

Hence, starting from examples VII an XI of D1, and faced with problem of balancing manufacturing and consumer aspects for a filter including beaded activated carbon, the skilled person would not be prompted, merely based on his common general knowledge, to arrive at the given diameter and specific surface area ranges of claim 1. Whether the claimed bulk density parameter greater than 0.5 g/cm3 would be obvious for the skilled person in the

light of D1, or not, thus can be left undecided, cf. also points 4.6, 4.7 and 4.11 above.

4.15 Document D8 describes a process for producing beaded activated carbon. As opposed to pan granulating (cf. D8, page 2, lines 12 to 29), the spherical carbon particles are made by dispersion of fused pitch into microspherical particles (cf. D8, page 2, lines 30 to 47).

However, D8 does not refer to the technical field of cigarette filters, but only relates to filters generally for other purposes, e.g., to purification of drinking water and desulphurization of exhausts and fumes on an industrial scale (cf. D8, page 1, lines 55 to 60). Contrary to the appellant’s view, thus, D8 does not address any problems relating to cigarette filters. The Board therefore deems that the competent skilled person concerned with the design of cigarette filters cannot be assumed to be aware of D8's industrial filters.

4.16 Therefore, starting from D1, and applying the “problem-solution-approach” according to the established case law, the remote technical field of D8 would not be considered by the relevant skilled person for the assessment of the inventive step of a cigarette filter of claim 1, much less in view of the problem as stated under point 4.12 above.

4.17 Summing up, the Board concludes that the skilled person would not, without hindsight, arrive at the subject-matter of claim 1 in the light of documents D1 and D8 in an obvious manner. Finally, the Board is also convinced that the remaining documents referred to in the written procedure are not more relevant than those discussed before the Board. Therefore, the subject-matter of claim 1 involves an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Magouliotis T. Bokor

Decision electronically authenticated