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Datasheet for the decision of 4 November 2008

Case Number: T 1297/06 - 3.3.09

Application Number: 95914027.8

Publication Number: 0759703

IPC: A23G 3/30

Language of the proceedings: EN

Title of invention:
Continuous chewing gum base manufacturing process using polyvinyl acetate and the removal of volatiles

Patentee:
WM. WRIGLEY JR. COMPANY

Opponent:
Cadbury Schweppes Plc

Headword:
-

Relevant legal provisions:
EPC Art. 54(2), 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Main request: novelty (yes); inventive step (no)"
"Auxiliary request: novelty, inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1297/06 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 4 November 2008

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office orally announced 23 May 2006 and posted 7 July 2006 rejecting the opposition filed against European patent No. 0759703 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: P. Kitzmantel
Members: W. Ehrenreich
M-B. Tardo-Dino

Summary of Facts and Submissions

I. Mention of the grant of European patent No. 0 759 703 in respect of European patent application No. 95 914 027.8, filed on 13 March 1995 as International application No. PCT/US95/03163 (published as WO 96/28042) in the name of *Wm. Wrigley Jr. Company*, was announced on 3 September 2003 (Bulletin 2003/36).

The patent, entitled *"Continuous Chewing Gum Base Manufacturing Process using Polyvinyl Acetate and the Removal of Volatiles"*, was granted with twenty two claims. Claim 1 reads as follows:

"1. A process for continuously producing a chewing gum base comprising the steps of:

a) continuously adding chewing gum base ingredients, including a hard elastomer, filler and one or more lubricating agents comprising polyvinyl acetate, into a continuous mixer comprising one or more feed inlets and vents, the polyvinyl acetate being added at one or more PVAC feed inlets;

b) venting polyvinyl acetate volatiles from the mixer at one or more vents downstream of said one or more PVAC feed inlets, said one or more vents not serving as a feed inlet for any chewing gum base ingredients that appreciably absorb acetic acid;

c) subjecting the chewing gum base ingredients to continuous mixing operations within the mixer, thereby producing a chewing gum base; an[d]

d) continuously discharging the chewing gum base from the mixer while chewing gum base ingredients continue to be introduced and mixed within the mixer."

Claims 2 to 21 were, either directly or indirectly, dependent on Claim 1 and Claim 22 was directed to a process for making a chewing gum composition by using a gum base according to the preceding claims.

II. Notice of opposition was filed by

Cadbury Schweppes Plc

on 3 June 2004.

The Opponent based its opposition on Article 100(a) EPC, arguing that the claimed subject-matter lacked an inventive step, and cited the following documents:

D1 EP-A 0 483 054
D2 US-A 4 187 320
D3 US-A 4 352 822.

After the expiry of the opposition period the Opponent, with its letter dated 23 March 2006, introduced the new opposition ground of lack of novelty and supported its novelty objection by the following documents:

D4 EP-B 0 273 809
D4a English Translation of D4
D5 The Thermal Degradation of Polyvinyl Acetate in *"Transactions of the Faraday Society"*, vol. 48, 1952, coversheet and pages 379-382.

With its letter dated 19 May 2006 the further document:

D6 Twin screw extruder in confectionary in *"Confectionary Production"*, September 1994, page 641

was cited.

III. With its decision orally announced on 23 May 2006 and issued in writing on 7 July 2006 the Opposition Division rejected the opposition.

Because of their prima facie relevance to the issues of novelty and inventive step the Opposition Division decided to admit into the proceedings the document D4/D4a and the complementary documents D5 and D6 as well as the opposition ground of lack of novelty.

However, the Opposition Division held the claimed subject-matter to be novel and inventive over the continuous process comprising an arrangement of three processing units, i.e. the mixing apparatus A, the powder mixer B and the extruder C described in D4a and illustrated by the single figure therein.

As to novelty it was held that, in order to arrive at the claimed process, multiple selections had to be made, including (i) the choice of polyvinyl acetate from a list of possible ingredients, (ii) the use of the hopper C_7 as an alternative for the pump C_6 in the extruder unit C, and (iii) the use of the port k for venting off polyvinyl acetate volatiles, whose generation was moreover not to be expected at the

maximum temperature of 75°C at which the extruder C operates.

Furthermore, since D4/D4a, which represented the closest prior art for the assessment of inventive step, did not address the problem of the removal of unwanted polyvinyl acetate volatiles, the skilled person was not motivated to use the unit C_7 for this purpose.

IV. On 16 August 2006 the Opponent (hereinafter: the Appellant) lodged an appeal against the decision of the Opposition Division. The Statement of the Grounds of appeal was submitted on 17 November 2006.

The Appellant again alleged lack of novelty over D4a of the subject-matter of Claim 1 as granted - which constituted the Patent Proprietor's (hereinafter: the Respondent) main request - and alleged that the subject-matter claimed in the set of claims according to the auxiliary requests 1 and 2 - which were submitted by the Respondent with the letters dated 28 February 2007 and 10 September 2008 - was not based on an inventive step over a combination of D4a with D5 and/or D6.

V. In the oral proceedings held on 4 November 2008 the Respondent, after a discussion of the issues of novelty and inventive step of the subject-matter according to the main request and the then operative auxiliary requests 1 and 2, withdrew these auxiliary requests, and replaced them by a single new auxiliary request. Claim 1 of this request reads as follows:

"1. A process for continuously producing a chewing gum base comprising the steps of:

a) continuously adding chewing gum base ingredients, including a hard elastomer, filler and one or more lubricating agents comprising polyvinyl acetate, into a continuous mixer comprising one or more feed inlets and vents, the polyvinyl acetate being added at one or more PVAC feed inlets;
b) venting acetic acid volatiles from the mixer at one or more vents downstream of said one or more PVAC feed inlets, said one or more vents not serving as a feed inlet for any chewing gum base ingredients that appreciably absorb acetic acid;
c) subjecting the chewing gum base ingredients to continuous mixing operations within the mixer, thereby producing a chewing gum base; and
d) continuously discharging the chewing gum base from the mixer while chewing gum base ingredients continue to be introduced and mixed within the mixer;
wherein the polyvinyl acetate degrades to give off said acetic acid when heated to 121-149°C (250-300°F)."

VI. The arguments of the Appellant concerning the issues of novelty and inventive step were as follows:

Novelty

It was stated in paragraph [0044] of the patent specification that one mode for carrying out the

continuous process in the sense of the invention could be realised by coupling a plurality of mixers in series. Claim 1 did not define the amount of polyvinyl acetate volatiles removed during mixing, nor were there any temperature conditions indicated. Since, according to paragraph [0022], commercial grade polyvinyl acetate contains free acetic acid in an amount of less than 0.05%, the process according to Claim 1 included the process measure of venting off at low temperatures these volatile impurities automatically present in commercial polyvinyl acetates.

A continuous process for preparing a gum base by means of three coupled mixing devices, i.e. the mixing apparatus A, the powder mixer B and the extruder C comprising the sections C_1, C_2 and C_3 was described in D4a and was illustrated by the single figure of this document. According to Table II in conjunction with the last but one paragraph at page 15, a gum base containing polyvinyl acetate as one ingredient was processed and mixed in the powder mixer B with the elastomer/filler composition fed from the mixer A. Although no indication as to the presence of polyvinyl acetate volatiles was to be found in D4a, it was certain that D4a used commercial polyvinyl acetate either already comprising such volatiles as impurities (see statement in paragraph [0022] of the patent specification) or generating them by decomposition of the polyvinyl acetate under the action of the shear forces exerted in the mixer B, in accordance with the disclosure in D5 indicating that polyvinyl compounds degrade at mechanical agitation.

Consequently, irrespective of the absence of an explicit positive disclosure in D4a, volatiles existed and were automatically vented off, either through the feed port f when the gum base premix was fed from the powder mixer B to the extruder C, or through the open inlet k in the extruder unit C_3, which served for the addition of flavours/sweeteners fed by the hopper C_7 (the addition of flavours being also contemplated in the patent in suit: paragraph [0035]).
This situation corresponded fully to the two-mixer arrangement according to examples 1 to 5 of the patent in suit (paragraph [0109]) wherein *"... polyvinyl acetate is added to the first continuous mixer and volatiles are vented when the mass from the first mixer is added to the second continuous mixer"*.

The process according to Claim 1 of the main request was therefore not novel over D4a.

Inventive step

Main Request

Even if the claimed process was to be considered novel over D4a, no inventive step was seen in the light of a combination of D4a with D6.

No comparative data were given in the patent specification showing that acetic acid impurities present in commercial grade polyvinyl acetate resulted in an unwanted after-taste of the final chewing gum. Since conventional gum base fillers like calcium carbonate were capable of absorbing acetic acid, most probably there was not even anything to be vented off.

This all the more so as the claimed process allowed processing of the gum base ingredients considerably below the degradation temperature of polyvinyl acetate, which was stated in paragraph [0022] of the patent specification to be at least 121°C.

Therefore, the problem to be solved was merely seen in the provision of an alternative continuous process for preparing a gum base.

It was, however, known from D6 that off-flavours can be removed from confectionary products, e.g. chewing gums, via degassing zones in continuously working extruders.

Auxiliary Request

The request should be rejected as being late filed.

The new features introduced into Claim 1 merely defined a temperature range at which the polyvinyl acetate degrades to give off acetic acid. It was, however, not clear within the provisions of Article 84 EPC whether this temperature range was merely descriptive of the thermal properties of the polyvinyl acetate or constituted a process measure in the claimed process, in that the mixer was heated up to this temperature. In any case, for the reasons set out above, it was obvious to vent off from the mixer either volatile impurities, which were initially present in commercial polyvinyl acetate, or acetic acid volatiles, which were created by thermal degradation in the mixer.

VII. The counter-arguments of the Respondent were as follows

Novelty

There was no clear and unambiguous disclosure in D4a of the presence of volatiles in the polyvinyl acetate component which was compounded with the elastomer/filler composition in the powder mixer B. Furthermore, the general observation on page 380 of D5 that *" a number of polyvinyl compounds ... may be broken down by ... mechanical agitation"* could not serve as a proof that polyvinyl acetate degraded when mixed in the powder mixer B of D4a to give off acetic acid.

Furthermore, the Appellant's reference to paragraph [0022] of the patent specification was not apt to show that commercial grade polyvinyl acetate even contained free acetic acid. The indication that *"... the specification for commercial grade polyvinyl acetate is less than 0.05% free acetic acid ..."*, only gave an upper tolerance limit of free acetic acid but did not unambiguously express that commercial polyvinyl acetate contained these volatiles.

Therefore, there was no explicit or implicit disclosure in D4a that any polyvinyl acetate volatiles are vented off when the elastomer/filler/polyvinyl acetate composition is fed from the mixer B to the extruder C.

It was furthermore questionable whether the process described in D4a and illustrated by the figure - which was qualified as being "highly diagrammatic" on page 5, line 15 of D4a - was continuous as a whole in the sense

of the continuous process defined in Claim 1. Rather, it followed from the description on pages 6/7 that the compounding steps in the units A and B were carried out batch-wise and that the only continuous step was performed in the extruder C. Because, however, the maximum temperature in the extruder was only 60 to 75°C in section C_1 and therefore far below 121°C at which polyvinyl acetate begins to degrade, volatiles which could be vented off through the input k of the unit C_3, were not produced in the extruder C.

The claimed process was therefore novel over D4a.

Inventive step

Main Request

The presence of volatiles in polyvinyl acetate was not mentioned in D4a. The person skilled in the art starting from D4a was therefore not aware that such volatiles caused taste problems for the final chewing gum, and that, consequently, there was a need to remove such volatiles from the gum base composition.

In contrast thereto, Claim 1 of the main request explicitly required removal of volatiles by the feature *"venting polyvinyl acetate volatiles from the mixer"*. Consequently, the polyvinyl acetate used in the claimed process had to emit volatiles and polyvinyl acetate types which do not liberate volatiles would not fall under the scope of the claim.

Venting off volatiles as required by the claimed process was therefore not obvious from D4a.

For similar reasons, a combination of D4a with D6, the latter referring to degazing/degassing zones provided in the extruder, would also not lead to the invention. In this conjunction D1 should be considered. This indicated on page 4, lines 50 to 52 that in continuous chewing gum production processes those ports in the extruder which are not used for introducing the chewing gum ingredients are sealed to provide a closed system.

Therefore, a skilled person who was not induced by D4a to vent off volatiles would not provide degassing zones as proposed in D6, but would rather seal the extruder system in accordance with the teaching in D1.

Auxiliary Request

According to Claim 1, the polyvinyl acetate was heated up to its degradation temperature at 121 to 149°C to give off acetic acid volatiles. Thus, acetic acid formed by polyvinyl acetate degradation was vented off from the mixer and not only volatile impurities which might or might not initially be present in commercial products.

The teaching in D4a to apply moderate temperatures in the continuous process, thereby avoiding degradation products which result in an after-taste of the chewing gum (page 1, last paragraph to page 2, paragraph 3), however, led away from the claimed process.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

IX. The Respondent requested that the appeal be dismissed or alternatively that the patent be maintained on the basis of the set of Claims 1 to 20 filed during the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

2. *Opposition ground submitted late*

The opposition ground, that the claimed subject-matter lacked novelty vis-à-vis D4/D4a was introduced by the Opponent after the expiry of the opposition period. It was considered prima facie relevant in accordance with G 10/91 and was admitted into the opposition proceedings. Therefore, this opposition ground is part of the decision under appeal and thus must be considered in the appeal proceedings.

3. *Admission of the new auxiliary request into the proceedings*

The new auxiliary request was filed by the Respondent in reaction to the Appellant's objection that the amendments made in the "old" second auxiliary request, which was submitted with the letter of 10 September 2008, contravened Article 123(2) EPC.
Because this objection was raised for the first time in the oral proceedings, the Board considered it equitable to give the Respondent the opportunity to defend itself against this late objection and admitted the request

into the proceedings. The Appellant's objection as to this issue is rejected.

4. *Amendments in Claim 1 of the auxiliary request - Article 123(2) EPC*

Claim 1 of this request was modified vis à vis Claim 1 as granted in that:

- in feature (b) the general term "polyvinyl acetate volatiles" was replaced by "acetic acid volatiles";
- the statement was added at the end of the claim that "polyvinyl acetate degrades to give off said acetic acid when heated to 121-149°C (250-300°F)".

These amendments are derivable from the disclosure on page 9, lines 23 to 38 of the application as filed (represented by the WO publication), corresponding to paragraph [0022] of the patent specification.

The first amendment, namely that *acetic acid volatiles are vented from the mixture*, follows from the passage at lines 33 to 38: *"Thus when polyvinyl acetate is added to a continuous mixer, acetic acid volatiles can be generated. If these are not removed ... "*.
The temperature range at which polyvinyl acetate degrades is derivable from page 9, lines 23 to 25 of the WO-publication, which states that *"some polyvinyl acetates apparently degrade when heated to about 250-300°F as they give off an acetic acid odor"* (cf. lines 46/47 in paragraph [0022]).
It is also derivable from the above passages when read in context that the acetic acid which is vented off from the mixer according to feature (b) originates from

the degradation of polyvinyl acetate at 121 to 149°C (250 to 300°F).

5. *Clarity - Article 84 EPC*

In the oral proceedings the Appellant disputed the clarity of Claim 1 of the auxiliary request and pointed out that the claim did not unambiguously indicate whether the polyvinyl acetate was heated up to 121-149°C in the mixer to give off acetic acid which was then vented off or whether the acetic acid vented off from the mixer according to feature (b) was that already initially present in the polyvinyl acetate starting material as an impurity (point VI).

The Board does not share the Appellant's view. A link between the acetic acid which is vented off from the mixer according to feature (b) and the acetic acid which originates from the degradation of polyvinyl acetate at 121-149°C is clearly formed by the word "said" in the expression *"... to give off said acetic acid when heated to 121-149°C ..."* at the end of Claim 1.
Because acetic acid would not be formed by degradation below this temperature range, Claim 1 clearly implies that the temperature in the mixer is raised to at least 121°C.

6. *Novelty - Main Request, Auxiliary Request*

It is one essential feature in Claims 1 of the main and auxiliary request that polyvinyl acetate volatiles/acetic acid are vented off from the mixture. This means that volatiles originating from the polyvinyl acetate

component have to be present or formed when the gum base ingredients are subjected to continuous mixing.

Thus, when assessing novelty over D4a, it has to be considered whether there is an unambiguous disclosure in this document which gives rise to the conclusion that the polyvinyl acetate ingredient of the gum composition according to Table II either initially contains such volatiles or produces them by degradation under the process conditions applied in the process of D4a.

The Board does not agree with the Appellant's conclusion from paragraph [0022] of the patent specification that any commercial polyvinyl acetate - and therefore also the product used in D4a - initially contains acetic acid as an impurity.
Rather, the Board follows the Respondent's interpretation of the phrase: *"Although the specification for commercial grade polyvinyl acetate is less than 0.05% free acetic acid ..."* which is that in commercial products merely up to 0.05% acetic acid volatiles are tolerated, which, however, does not mean that they have to be present in any commercial product.

The Appellant's further argument, based on D5, that polyvinyl acetate volatiles would be formed by a breakdown through mechanical agitation in the powder mixer B of D4a and would then be automatically vented off through the port f is also not convincing. The general disclosure at page 380, paragraph 2 of D5 does not define any mechanical conditions or shear forces at which such breakdown might occur. It cannot therefore be concluded that the shear forces in the mixer B of

D4a, which must be assumed to be low due to the mixing of the ingredients in powder form, are capable of degrading polyvinyl acetate.

The Board furthermore refers to the passage on page 1, last paragraph to page 2, line 25 of D4a, from which it can be derived that processing conditions by which degradation products during the mixing operation of the gum ingredients would be produced, should be avoided by keeping the temperature in the mixing devices as low as possible.
Because the maximum temperature at which the extruder C operates is 75°C, i.e. considerably below the degradation temperature of polyvinyl acetate, the Appellant's argument that polyvinyl acetate volatiles are necessarily created in the extruder and are vented off through the port k in the unit C_3, fails.

The process claimed according to the main and auxiliary requests is therefore novel over D4a. For similar reasons, the other cited documents are not novelty destroying either.

7. *Inventive step*

7.1 The patent in suit

The patent is concerned with the preparation of chewing gum bases by continuously mixing gum base components containing polyvinyl acetate as one gum base ingredient. It is the aim of the invention to provide a continuous process by which the entrapment of polyvinyl acetate volatiles into the gum base, as it takes place in sealed continuous mixers, is avoided, and which

therefore allows the continuous preparation of gum bases having no unwanted acetic acid off-tastes (paragraphs [0015] and [0018] of the patent specification).

According to Claims 1 of the main and the auxiliary request, it is an essential element of the continuous process to vent polyvinyl acetate volatiles (i.e. acetic acid) from the continuous mixer at one or more vents downstream of the one or more polyvinyl acetate feed inlets.

7.2 The closest prior art

D4 and its English translation D4a is representative of the closest prior art.
D4a discloses the continuous preparation of chewing gum bases and chewing gums by which an after-taste in the final chewing gum, due to the degradation of the gum ingredients, is avoided.
For this purpose, the process is performed at moderate temperatures in an apparatus comprising an assembly of three essential units, i.e. a mixing apparatus A of the kneading machine type, a powder mixer B and an extruder C having three sections C_1, C_2 and C_3 (page 1, last paragraph to page 2, line 25; page 5, line 30 to page 6, line 7 and the single figure).
The extruder C at least is working continuously at a maximum temperature of 75°C in its section C_1 which is fed through the inlet f with a gum base composition containing elastomer, filler, and other constituents such as waxes/resins or emulsifiers, prefabricated in the kneader A and the subsequent powder mixer B.

Further gum-base ingredients, like liquid plasticizers and water, are added into the extruder section C_2 via pumps. At section C_3 of the extruder C sweeteners/flavours are added either in liquid form via the pump C_6 or via the hopper C_7 and the port k (page 6 second paragraph to page 9, line 17 in conjunction with the figure).
According to Table II in conjunction with the disclosure at page 15, last but one paragraph, a gum-base composition comprising 7.40% polyvinyl acetate is used, which is added through the inlet f into the extruder C.

7.2.1 Inventive step of the process according to the main request

As mentioned above with regard to the issue of novelty, the claimed process requires that polyvinyl acetate volatiles are vented off from mixer, but does not define a temperature at which the mixing process has to be carried out. Claim 1 therefore also embraces the low temperature conditions which are applied in the process of D4a.

Because, as said above, D4a lacks an explicit or implicit disclosure that polyvinyl acetate volatiles are vented off from any of the potential vents f of the mixing device B or k of the extruder section C_3, the process according to Claim 1 differs from that according to D4a essentially by the venting off of polyvinyl acetate volatiles.

Therefore, the problem to be solved with regard to D4a is seen in the provision of an alternative continuous

process which avoids an off-taste of the chewing gum caused by the presence of volatile impurities emitted when polyvinyl acetate is used as gum base ingredient.

It is, however, known from D6 that in continuously working extruders for the preparation of high quality confectionary, inter alia chewing gums, degassing zones are provided through which off flavours can be removed (see in particular the right column at page 641).

A skilled person starting from the process according to D4a and being aware of the fact that free acetic acid is a potential impurity in commercial grade polyvinyl acetates (see patent specification, paragraph [0022]), would therefore be induced by D6 to vent this volatile substance off, either via the port f at the point where the composition enters the extruder C and/or through the inlet k in the extruder section C_3 when the compounding is close to completion, in order to avoid reduction of the product quality by an acetic acid off taste.

Therefore, the skilled person would arrive at the process claimed in Claim 1 without an inventive effort by the combination of D4a with D6.

The main request is therefore not allowable.

7.2.2 Inventive step of the process according to the auxiliary request

As mentioned under point 4, the process according to Claim 1 is carried out under conditions embracing heating the polyvinyl acetate to 121-149°C, thereby

allowing partial degradation and liberation of acetic acid volatiles, which are then vented off from the mixer.

Hence, the claimed process differs from that disclosed in D4a in that acetic acid volatiles originating from the degradation of polyvinyl acetate at temperatures of at least 121°C are vented off.

The problem to be solved is therefore seen in providing an alternative continuous process for preparing a chewing gum base without an after-taste, which might be caused by the incorporation of polyvinyl acetate degradation products.

According to the teaching of D4a, however, initial degradation of chewing gum substances should be strictly avoided by processing the polyvinyl acetate containing premix f in the extruder C at moderate temperatures, which do not exceed 75°C.

Although in principle D6 recommends degazing/degassing zones in continuously working extruders in order to remove off flavours, a skilled person starting from D4a would not be induced to apply temperature conditions exceeding the degradation temperature, thereby running the risk to produce undesired acetic acid volatiles.

Because the teaching of D4a leads away from the more rigorous processing conditions of the invention a combination of D4a with D6 does not render the claimed process obvious.

The subject-matter claimed in the auxiliary request is therefore inventive over the prior art.

7.3 The argument put forward by the Appellant that it would be impossible to determine whether or not the claimed process is infringed is irrelevant for the assessment of inventive step in the sense of Article 56 EPC.

8. Since all the claims according to the auxiliary request meet the requirements of Articles 84, 54, 56 and 123(2) EPC, their subject-matter is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of Claims 1 to 20 of the auxiliary request as filed during the oral proceedings, after any necessary consequential adaptation of the description.

The Registrar The Chairman

L. Fernández Gómez P. Kitzmantel