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**Datasheet for the decision
of 24 April 2013**

Case Number: T 1696/09 - 3.2.07

Application Number: 03707655.1

Publication Number: 1483183

IPC: B65G 15/42

Language of the proceedings: EN

Title of invention:

Conveyor belt

Patent Proprietor:

ThermoDrive LLC

Opponent:

Ammeraal Beltech Holding N.V.

Headword:

-

Relevant legal provisions:

EPC Art. 56, 123(2)

RPBA Art. 13(1)

Keyword:

"Added subject-matter (main request - yes)"

"Admissibility (auxiliary request 1 - no)"

"Inventive step (auxiliary requests 2 and 3 - no)"

Decisions cited:

-

Catchword:

-



Case Number: T 1696/09 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 24 April 2013

Appellant: ThermoDrive LLC
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
2 June 2009 concerning maintenance of the
European patent No. 1483183 in amended form.

Composition of the Board:

Chairman: H. Meinders
Members: G. Patton
I. Beckedorf

Summary of Facts and Submissions

I. Appellant I (patent proprietor) lodged an appeal against the interlocutory decision of the Opposition Division maintaining European patent N° 1 483 183 in amended form.

Appellant II (opponent) likewise lodged an appeal against the interlocutory decision of the Opposition Division.

II. In the opposition proceedings, appellant I filed a main request and two auxiliary requests during the oral proceedings held on 5 May 2009. The Opposition Division held that the main request did not fulfil the requirements of Article 123(2) EPC and the first auxiliary request did not comply with Article 54(1) EPC. The second auxiliary request was found to meet the requirements of the EPC.

III. With its statement of grounds of appeal appellant I requested the maintenance of a patent on the basis of the main request, first or second auxiliary requests considered in the impugned decision.

In the course of the appeal proceedings, the Board provided its preliminary non-binding opinion annexed to the summons for oral proceedings: none of the requests of appellant I fulfilled the requirements of the EPC in view of Articles 54(1), 123(2) and/or 123(3) EPC.

In reaction, appellant I filed with the letter of 19 March 2013 a main request and auxiliary requests 1 and 2 to replace the requests on file.

Due to force majeure the representative of appellant II could not attend the oral proceedings to be held on 23 April 2013. They were postponed by one day and held on 24 April 2013, as requested on 22 April 2013 by appellant II and accepted by appellant I.

During the oral proceedings appellant I filed a new auxiliary request 1, the earlier auxiliary requests 1 and 2 being renumbered as auxiliary requests 2 and 3.

The following issues, *inter alia*, were discussed during the oral proceedings:

- admissibility of the amendments in claim 1 of the main request (Article 123(2) EPC),
- admission into the proceedings of the (new) auxiliary request 1,
- inventive step of the subject-matter of claim 1 of the (renumbered) auxiliary request 2 in view of document D32 and the common general knowledge,
- inventive step of the subject-matter of claim 1 of the (renumbered) auxiliary request 3 in view of documents D3 and the common general knowledge (D27/D27a).

The present decision was announced at the end of the oral proceedings.

IV. Appellant I requests that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the set of claims filed as main request with letter of 19 March 2013 or, alternatively, of claim 1 filed as (new) auxiliary request 1 during

the oral proceedings or of one of the sets of claims filed as (renumbered) auxiliary requests 2 and 3 with letter of 19 March 2013.

Appellant I furthermore requests that the appeal of the opponent (appellant II) be dismissed.

V. Appellant II requests that the decision under appeal be set aside and that the contested patent be revoked.

Appellant II furthermore requests that the appeal of the patent proprietor (appellant I) be dismissed.

VI. Claim 1 of the main request reads as follows:

"A method of making a thermoplastic conveyor belt with integrally formed teeth for a conveyor where the belt is driven by engagement of the teeth with sheaves on a sprocket, comprising the steps of:

extruding a homogeneous flat ribbon (172) of a thermoplastic material having an inner surface (124) and an outside surface (110),

providing a profile drum (176) with a plurality of grooves (178) on its outer surface, corresponding in shape to the teeth;

passing the flat ribbon (172) over the outer surface of the profile drum;

compressing the inner surface of the flat ribbon (172) against the outer surface of the profile drum (176) surface while the flat ribbon is still soft and malleable with a preselected pressure so as to displace spaced apart portions of the inner surface of the flat ribbon by the thermoplastic material flowing into the grooves of the profile drum to thereby form a spaced

apart series of teeth between formed flat ribbon portions of generally constant thickness in a formed ribbon;

causing the formed ribbon to exit the profile drum and the compression; and

passing the formed ribbon through a cooling station for a predetermined time to shrink the formed ribbon to preselected dimensions and to harden the formed ribbon so as to maintain the preselected dimensions;

wherein the outside surface (110) of the belt (100) is substantially free of discontinuities, the teeth (106) extend from the inner surface (124) at a given belt pitch (112) and the belt (100) is stretchable through its length."

Claim 1 of auxiliary request 1 reads as follows (in bold the amendments with respect to claim 1 of the main request; emphasis added by the Board):

"A method of making a thermoplastic conveyor belt with integrally formed teeth for a conveyor where the belt is driven by engagement of the teeth with sheaves on a sprocket, comprising the steps of:

extruding a **homogeneous** flat ribbon (172) of a thermoplastic material having an inner surface (124) and an outside surface (110),

providing a profile drum (176) with a plurality of grooves (178) on its outer surface, corresponding in shape to the teeth;

passing the flat ribbon (172) over the outer surface of the profile drum;

compressing the inner surface of the flat ribbon (172) against the outer surface of the profile drum

(176) surface while the flat ribbon is still soft and malleable with a preselected pressure so as to displace spaced apart portions of the inner surface of the flat ribbon by the thermoplastic material flowing into the grooves of the profile drum to thereby form a spaced apart series of teeth between formed flat ribbon portions ~~of generally constant thickness~~ in a formed ribbon;

causing the formed ribbon to exit the profile drum and the compression; and

passing the formed ribbon through a cooling station ~~for a predetermined time to shrink the formed ribbon to preselected dimensions and to harden the formed ribbon so as to maintain the preselected dimensions~~ where it hardens, and establishing and determining the temperature of the flat ribbon, the pressure on the ribbon between the compression drum and the profile drum and the cooling time to anticipate the final thickness of the belt, the dimensions of each tooth and the belt pitch;

wherein the outside surface (110) of the belt (100) is substantially free of discontinuities, the teeth (106) extend from the inner surface (124) at a given belt pitch (112) and the belt (100) is stretchable through its length."

Claim 1 of auxiliary request 2 reads as follows:

"A method of making a thermoplastic conveyor belt with integrally formed teeth for a conveyor where the belt is driven by engagement of the teeth with sheaves on a sprocket, comprising the steps of

providing a homogenous flat ribbon of thermoplastic material having an inner surface and an outside surface,

molding teeth onto the inner surface of the flat ribbon by injection molding and curing the flat ribbon with the teeth,

wherein the outside surface of the belt is substantially free of discontinuities,

the teeth extend from the inner surface at a given belt pitch and the belt is stretchable through its length."

Claim 1 of auxiliary request 3 reads as follows (corresponds to claim 2 of auxiliary request 2):

"A method of making a thermoplastic conveyor belt with integrally formed teeth for a conveyor where the belt is driven by engagement of the teeth with sheaves on a sprocket, comprising the steps of

providing a homogenous flat ribbon of thermoplastic material having an inner surface and an outside surface,

molding teeth onto the inner surface of the flat ribbon by friction molding and curing the flat ribbon with the teeth,

wherein the outside surface of the belt is substantially free of discontinuities,

the teeth extend from the inner surface at a given belt pitch and the belt is stretchable through its length."

VII. The following document of the opposition proceedings is of relevance for the present decision:

D3 US-A-5 911 307

The following documents cited in the appeal proceedings are of relevance for the present decision:

D27a Wise, R.J., "Thermal Welding of Polymers",
Abington publishing, Cambridge, UK, 1999,
pages 5-14

D32 DE-A-2 323 601.

VIII. Appellant I argued in substance essentially as follows:

Main request

The features that the inner surface of the flat ribbon is compressed to "form a spaced apart series of teeth between formed flat ribbon portions of generally constant thickness in a formed ribbon" are implicit from the application as originally filed. They can be derived from the figures as well as the description. There is no need for a detailed description of the tools used in the extrusion method since the skilled person would understand that the said features are inherent to the belts produced according to the extrusion method.

Auxiliary request 1

The reasons given for the main request also apply to auxiliary request 1 with respect to the amendments. Since the latter does not raise any new issues, the request should be admitted in the appeal proceedings.

Auxiliary request 2

D32 does not disclose a conveyor belt in the sense of the contested patent, i.e. for transporting food, since it relates to a slat conveyor. The belt ("Band" 5, 10, 20) itself, which is part of the disclosed slat conveyor, is not suitable for conveying goods either. In addition, the teeth of the belts of D32 are not integrally formed with the belts, contrarily to what claim 1 requires.

Finally, in view of the construction of the belt in D32, the skilled person would not arrive at the solution of having a smooth and continuous surface on the outer surface of the belt, which is defined by the feature: "substantially free of discontinuities".

Auxiliary request 3

Taking account of D27a:

Friction molding the timing belt (22) to the flat belt (12) in D3 is not technically feasible since the whole timing belt (22) would have to move. Therefore, the skilled person, even aware of this technique from D27a, would not think of friction molding as a plausible alternative welding technique when starting from D3.

IX. Appellant II argued in substance essentially as follows:

Main request

The features introduced in claim 1 after grant that the inner surface of the flat ribbon is compressed to "form a spaced apart series of teeth between formed flat ribbon portions of generally constant thickness in a

formed ribbon" have no support in the original application as filed, neither explicitly nor implicitly.

Auxiliary request 1

Since the feature that the inner surface of the flat ribbon is compressed to "form a spaced apart series of teeth between formed flat ribbon portions in a formed ribbon" has remained in claim 1, previously raised objections with respect to Article 123(2) EPC remain valid for new auxiliary request 1. In addition, the further amendments raise new issues of lack of clarity. Therefore, this late filed request should not be admitted in the appeal proceedings.

Auxiliary request 2

If at all, the only distinguishing feature of claim 1 over the method of producing the conveyor belt of D32 is that "the outside surface of the belt is substantially free of discontinuities", leading to the problem to be solved as providing a method for producing a belt with an outside surface which is easy to clean. The skilled person faced with the said problem would immediately think of the known and usual belts with smooth and continuous outside surfaces made for this very same purpose. The proposed injection molding easily allows to achieve this, so that he would arrive at the claimed subject-matter in an obvious manner.

Auxiliary request 3

The only distinguishing feature of claim 1 over the method of producing the conveyor belt of D3 is the step of molding teeth (24) onto the inner surface of the flat ribbon by friction molding, leading to the problem to be solved of providing an alternative method of welding the timing belt with thermoplastic teeth of D3 to the flat belt. The skilled person faced with the said problem would immediately have recourse to his common general knowledge, as illustrated by D27a, for the known welding techniques for thermoplastics. He would then select and try the known techniques which are compatible with the belt of D3. By doing so, he would arrive at the claimed subject-matter in an obvious manner.

Reasons for the Decision

1. *Main request*

1.1 Since the Board considers that the following amendments to claim 1 contravene Article 123(2) EPC, there is no need to deal in this decision with the other objections raised by appellant II against this auxiliary request.

1.2 The Board shares the appellant II's view that the following features (a) and b)) introduced into claim 1 that the inner surface of the flat ribbon is compressed to

"form a spaced apart series of teeth between

- a) formed flat ribbon portions
- b) of generally constant thickness

in a formed ribbon"

have no support in the application as originally filed.

Indeed, "flat ribbon portions" are not **explicitly** disclosed in the application as originally filed. The same applies to the formed ribbon having these portions with a "generally constant thickness".

Further, contrary to appellant I's opinion, these features can neither be regarded as **implicit** from the application as originally filed.

They are not derivable from the original figures since said figures are schematic, nor from the original description since the tools used for the claimed extrusion method are not described (see in particular page 6, lines 7-21 where the extrusion method is exemplified in combination with original figure 7).

Indeed, for the flat ribbon portions of constant thickness, the tools used in the extrusion method should have been described with features enabling to obtain such particular features, like for instance:

- the forming drum (176) having the outer surface of its teeth forming a smooth cylinder, i.e. not flat, corrugated or otherwise shaped; and
- the forming drum (176) having all teeth of the same height.

In fact, the application as originally filed is completely silent on the tools used for forming the

teeth in the extrusion method. As a consequence, each of the said features represents a new teaching.

In view of the above, neither feature a) nor feature b) can be regarded as being explicitly or implicitly disclosed in the application as originally filed and, hence, the main request does not fulfil the requirements of Article 123(2) EPC.

2. *Auxiliary request 1*

Since claim 1 of auxiliary request 1 still comprises the above discussed feature a) the auxiliary request 1 does not solve this previously raised objection according to Article 123(2) EPC, contrary to appellant I's opinion.

Furthermore, as pointed out by appellant II, the other amendments introduced in claim 1 raise new issues with respect to original disclosure and clarity due to the wording "establishing and determining...".

Indeed, the wording may imply that the parameters, like for instance the pressure on the ribbon between the compression drum and the profile drum, are measured *in situ* and then used in the control of the process, for which there is no original basis.

Although contested by appellant I, this is also in contradiction with having a preselected pressure as earlier defined in the claim, leading to a lack of clarity.

Consequently, the Board decided not to admit auxiliary request 1 filed during oral proceedings, i.e. at a late stage in the appeal proceedings, since it does not fulfil the requirement of procedural economy in accordance with Article 13(1) RPBA as it does not solve all previously raised objections and also raises new issues.

3. *Auxiliary request 2*

3.1 Since the Board considers that the subject-matter of independent claim 1 of auxiliary request 2 lacks inventive step in view of D32 and the application of his common general knowledge by the skilled person (see below), there is no need to discuss in this decision the other objections raised by appellant II against this auxiliary request.

3.2 Document D32 discloses a method of making a thermoplastic (page 13, lines 6-13; polyamide) conveyor belt ("Band" 5, 10, 20) with integrally formed teeth ("Rippen" 7, 12) for a conveyor where the belt ("Band" 5, 10, 20) is driven by engagement of the teeth ("Rippen" 7, 12) with sheaves on a sprocket (figure 1), comprising the steps of providing a homogenous flat ribbon ("Band", 5, 10, 20) of thermoplastic material (polyamide) having an inner surface and an outside surface, molding teeth ("Rippen" 7, 12) onto the inner surface of the flat ribbon by injection molding ("Kunststoff-Spritzverfahren") and curing the flat ribbon with the teeth, wherein the teeth extend from the inner surface at a given belt pitch (figure 1), the belt being stretchable through its length (as it is

made of polyamide), see page 8, line 19 to page 9, line 5; page 12, line 25 to page 13, line 13.

Contrary to appellant I's opinion, D32 explicitly discloses a conveyor belt, i.e. a slat conveyor ("Lattenförderband"), falling within the meaning of claim 1. The invention of D32 is in any case not limited to slat conveyors (page 10, lines 1-9), but relates in general to conveyor belts and the belts (=ribbons) used therein.

The belt ("Band" 5, 10, 20), which is part of the slat conveyor of D32, is unambiguously suitable for conveying goods, including food (figures 1, 3 and 4).

In the method of D32, two holes ("Löcher") are punched through ("gestanzt") the ribbon before injection molding the teeth thereon so that the feature of claim 1 "the outside surface of the belt is substantially free of discontinuities" is not known from D32.

- 3.3 Appellant II argues that the two holes made in the ribbon by the method of D32 do not create a distinguishing feature for claim 1 due to the use of "substantially". It considers that said two holes in the ribbon of D32 do not form a substantial part of the outer surface so that the outside surface remains "substantially free" of discontinuities. It also refers to figure 6 of the contested patent where slots (160) are shown in a belt according to the invention, which are also discontinuities.

Since the Board considers that there is lack of inventive step, even taking the feature in question as a distinguishing feature, this objection need not be dealt with (see points 3.5-3.8 below)

- 3.4 Appellant I considers there to be another distinguishing feature, namely that the teeth are integrally formed with the belt.

This interpretation of the term "integrally" or "integral" cannot be shared by the Board since in the application as originally filed (page 3, lines 10-13; claims 1, 6, 12 and 13) it only means that the teeth and the belt are formed as a unitary whole. This is also the result if the teeth and the nipples 13 are of the same material (polyamide) and are injection molded onto the belt according to D32 (page 8, last paragraph; page 13, second paragraph). Indeed, also original claim 13 (molding method) specifies that the teeth are molded onto one surface of the flat ribbon leaving open the possibility of having additional part(s).

- 3.5 In view of the above, the only distinguishing feature of claim 1 over D32 is that "the outside surface of the belt is substantially free of discontinuities" with the technical effect of enabling an easy cleaning of the belt (see contested patent, [0002], [0003] and [0014]).

- 3.6 The objective technical problem solved by the single distinguishing feature is therefore to improve the ease of cleaning of the belt as produced by the method of D32.

3.7 Starting from the belt (5, 10, 20) of D32, the skilled person faced with the said problem would immediately realise that the though-holes and the nipples with which the teeth are connected to the ribbon create the discontinuities in the outside surface. He further knows the usual belts with smooth and continuous surface, as discussed for instance in the contested patent itself, [0004]. To achieve the same result, the skilled person will therefore either arrange the holes (in which the connecting nipples are formed when injection molded) as blind holes, i.e. not going through the ribbon, or perform the injection molding such that in the end there are no discontinuities at the outside surface. Both lead to the subject-matter of claim 1 of the auxiliary request 2.

3.8 Appellant I considered that, in view of the construction of D32, more particularly the nipples (13) and the slats (11, 21), the skilled person would not arrive at the solution of having a smooth and continuous outer surface of the "band" ("Band" 5, 10, 20). The construction constraints would force him to keep discontinuities on the outside surface of the belt.

The Board cannot share this view since, as mentioned on page 10, lines 1-9, the disclosure of D32 is not limited to slat conveyors, it also concerns belts simply provided with teeth. The person skilled in the technical field of conveyor belts faced with the above mentioned problem in this belt will, without any difficulties, adapt the belt of D32 to solve this problem in the manner indicated.

3.9 As a consequence, the subject-matter of claim 1 of auxiliary request 2 lacks inventive step (Article 56 EPC).

4. *Auxiliary request 3*

4.1 Since the Board considers that the subject-matter of independent claim 1 of auxiliary request 3 lacks an inventive step in view of the method of D3 combined with the application of common general knowledge of the skilled person as illustrated by D27a (see below), there is no need to discuss in this decision the other objections raised by appellant II against this auxiliary request.

4.2 D3 discloses a method of making a thermoplastic conveyor belt ((10); "solid plastic" and "polyurethane") with integrally formed teeth (24) for a conveyor where the belt (10) is driven by engagement of the teeth (24) with sheaves (50) on a sprocket (46) (figures 1 and 6), comprising the steps of

providing a homogenous flat ribbon ("flat belt" (12)) of thermoplastic material ("solid plastic") having an inner surface (16) and an outside surface (14),

laminating a timing belt (22) with teeth (24) onto the inner surface (16) of the flat ribbon (12) by heat gun heating and curing the flat ribbon with the teeth,

wherein the outside surface (14) of the belt (12) is substantially free of discontinuities (column 2, lines 50-52; figure 1), and

the teeth (24) extend from the inner surface (16) at a given belt pitch, the belt being stretchable

through its length as it is made up of thermoplastic (column 2, lines 45-58; column 3, lines 16-24; figures).

- 4.3 As a result, the only distinguishing feature of claim 1 of auxiliary request 3 over the method of D3 is molding the teeth (24) onto the inner surface of the flat ribbon by friction molding, as agreed by both appellants I and II. Both appellants also agree that with "friction molding" is meant "friction welding".
- 4.4 The technical effect of the distinguishing feature is that the teeth are welded to the flat ribbon, which is equally achieved by the technique of heat gun heating as applied in D3.
- 4.5 The objective technical problem to be solved is therefore to provide an alternative manner of welding the thermoplastic teeth to the flat belt.
- 4.6 The skilled person faced with the said problem would immediately have recourse to the known thermal welding techniques for thermoplastics, which form part of his common general knowledge, as illustrated by D27a (see list in "Contents", chapter 2). He would then select and try out the known techniques which are compatible with welding a timing belt (22) to the flat belt (12) of D3, among which is friction welding (called "vibration welding" in D27a, paragraph 2.1.2, pages 7-8). By doing so, he would arrive at the subject-matter of claim 1 of the auxiliary request 3 in an obvious manner.
- 4.7 Appellant I considers that friction welding is not technically feasible for the timing belt (22) and the

flat belt (12) of D3 since the whole timing belt (22) would have to move. Therefore, the skilled person, even aware of this technique, would never think of friction welding as a plausible alternative welding technique, when starting from D3.

This view cannot be shared by the Board since, as put forward by appellant II, the amplitude of the movements made in friction welding is in the order of a tenth of a millimetre and needs only be localized at the point of welding. In other words, it is not the complete timing belt (22) that has to move but rather only a selected part of it, by vibrating that part under pressure at the said small amplitude perpendicularly to the length of the timing belt (12), during a translating movement of flat belt and timing belt past the location at which vibration is applied.

- 4.8 As a consequence, the subject-matter of claim 1 of auxiliary request 3 also lacks inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

1. The appeal of the patent proprietor is dismissed.
2. The decision under appeal is set aside.
3. The patent is revoked.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders