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Datasheet for the decision of 17 February 2025

Case Number: T 0919/23 - 3.2.05

Application Number: 19161443.7

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Language of the proceedings: EN

Title of invention:
Method to produce hermetic wrappings and corresponding machine

Patent Proprietor:
I.M.A. Industria Macchine Automatiche S.p.A.

Opponent:
Focke & Co. (GmbH & Co. KG)

Relevant legal provisions:
EPC Art. 56, 100(a)
RPBA 2020 Art. 12(6)

Keyword:
Late-filed document - admitted (yes)
Grounds for opposition - lack of patentability (no)
Inventive step (yes)

Decisions cited:
T 1601/15, T 1249/22, T 1603/22

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Case Number: T 0919/23 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 17 February 2025

Appellant: (Opponent)	Focke & Co. (GmbH & Co. KG) Siemensstrasse 10 27283 Verden (DE)
Representative:	Aulich, Martin Meissner Bolte Patentanwälte Rechtsanwälte Partnerschaft mbB Hollerallee 73 28209 Bremen (DE)
Respondent: (Patent Proprietor)	I.M.A. Industria Macchine Automatiche S.p.A. Via Emilia 428-442 40064 Ozzano Dell Emilia (Bologna) (IT)
Representative:	Petraz, Gilberto Luigi GLP S.r.l. Viale Europa Unita, 171 33100 Udine (IT)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 14 March 2023 rejecting the opposition filed against European patent No. 3536487 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	P. Lanz
Members:	T. Vermeulen
	F. Blumer

Summary of Facts and Submissions

I. The opponent filed an appeal against the decision of the opposition division rejecting its opposition against European patent No. 3 536 487.

II. The opposition had been filed against the patent as a whole on the basis of the ground for opposition under Article 100(a) together with Article 56 EPC (lack of inventive step).

III. In the decision under appeal, the opposition division decided to disregard documents D34 to D38 pursuant to Article 114(2) EPC and came to the conclusion that the subject-matter of claims 1 and 15 of the patent as granted involved an inventive step when starting from document D3 in combination with common general knowledge as evidenced by either of documents D4 to D10 or D26 to D29 or in combination with the teaching of either of documents D2, D4 to D10 or D26 to D32, or when starting from document D1 in combination with the teaching of either of documents D2 or D4 or in combination with common general knowledge.

IV. Of the documents referred to in the decision under appeal the following are cited in the present decision.

D1: WO 2016/166141 A1	D6: EP 1 514 670 A2
D2: DE 10 2015 110 387 A1	D7: WO 2015/011597 A1
D3: WO 2015/128812 A1	D8: DE 10 2010 040 133 A1
D4: WO 2016/157132 A1	D9: DE 10 2009 026 952 A1
D5: WO 2014/111300 A1	D10: DE 602 24 088 T2

D26: WO 2007/025744 A1
D27: EP 2 110 227 A1
D28: FR 2 874 188 A1
D29: DE 39 29 770 A1

D33: "Ultrasonic welding", Wikipedia entry, last edited on 6 June 2021

D34: "Sonotrode", Wikipedia entry, last edited on 1 March 2021

D35: Beitz, W and Grote, K-H, "Dubbel - Taschenbuch für den Maschinenbau", 19th edition, 1997, pages S85 and S86

D36: Troughton, M J, "Handbook of Plastics Joining - A Practical Guide", 2nd edition, 2008, pages 15 to 35 and 121 to 126

D37: Jones, I and Stylios, G K, "Joining textiles - Principles and applications", 2013, pages 374 to 397

D38: Bach, S et al, "Ultrasonic Sealing of Flexible Packaging Films - Principle and Characteristics of an Alternative Sealing Method", Packaging Technology and Science, 25, 2012, pages 233 to 248

V. With its statement of grounds of appeal, the appellant (opponent) filed the following document.

D39: Bleisch, G et al, "Lexikon Verpackungstechnik", 2nd edition, 2014, pages 184 and 522

VI. The oral proceedings before the board took place on 17 February 2025.

VII. The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked. The appellant also requested that at least auxiliary requests 3 to 6 not be admitted into the

proceedings. Should one of auxiliary requests 1 to 6 be admitted and not be rejected as unallowable, the appellant requested to remit the case to the opposition division for further prosecution.

The respondent (patent proprietor) requested that the appeal be dismissed (main request) or, alternatively, that the decision under appeal be set aside and the patent be maintained as amended on the basis of the claims of one of auxiliary requests 1 to 6 filed with the reply to the statement of grounds of appeal. The respondent also requested that none of documents D34 to D39 be admitted in the appeal proceedings and that the appellant's arguments based on any of documents D36 to D38 not be admitted in the appeal proceedings.

VIII. Independent claims 1 and 15 of the patent as granted, corresponding to the respondent's main request, have the following wording (the feature numbering used in the decision under appeal appears in square brackets):

"1. Method [**a**] to weld folded lateral fins (110) of the gusset type of a pre-wrapping (105) that is the precursor of a hermetic wrapping (100) formed around an organized group of smoking articles (101), [**b**] each of said lateral fins (110) comprising at least two portions (110a, 110b, 110c) each having a respective thickness (Sa, Sb, Sc) and formed by overlapping a different number of said flaps (107, 108, 111, 112, 113) so that the thickness of one portion (110a, 110b, 110c) is different from the thickness (Sa, Sb, Sc) of the other portion (110a, 110b, 110c), [**c**] said pre-wrapping (105) advancing in a longitudinal direction of feed (P), [**d**] keeping said lateral fins (110) of said pre-wrapping (105) folded, so that said pre-wrapping (105) has in succession, in said direction of feed (P),

portions (110a, 110b, 110c) to be welded having a different thickness (Sa, Sb, Sc), characterized in that [**e**] the welding of the lateral fins (110) is an ultrasound welding, [**f**] obtained by means of pairs of welding rollers (30, 31) that rotate in coordination with the feed of said pre-wrapping (105) and that are disposed on one side and the other of said pre-wrapping (105), [**g**] wherein said ultrasound welding is performed continuously while said pre-wrapping (105) continues to move in said direction of feed (P), [**h**] wherein at least one of said welding rollers (30a, 31a, 30b, 31b) is selectively made to vibrate radially [**i**] so as to exert, on said lateral fins (110), a variable pressure as a function at least of the different thickness (Sa, Sb, Sc) of the portions (110a, 110b, 110c) that are progressively fed in said direction of feed (P)."

"15. Packaging machine to make a hermetic wrapping (100) of the gusset type, wrapped hermetically around an organized group of smoking articles (101), comprising:
- [**A**] folding means (20, 21, 22, 23) configured to perform all the operations of folding flaps (107, 108, 111, 112, 113) comprised in a pre-wrapping (105) that is the precursor of said hermetic wrapping (100) so as to make two lateral fins (110) folded in a gusset, [**B**] each of said lateral fins (110) comprising at least two portions (110a, 110b, 110c) each having a respective thickness (Sa, Sb, Sc) and formed by overlapping a different number of said flaps (107, 108, 111, 112, 113) so that the thickness of one portion (110a, 110b, 110c) is different from the thickness (Sa, Sb, Sc) of the other portion (110a, 110b, 110c),
- [**C**] linear transport means (26) configured to move said pre-wrapping (105) toward a welding station (25) in a direction of feed (P),

- [**D**] welding means (30, 31) configured to weld said lateral fins (110) in said welding station (25) while said pre-wrapping (105) is moving in said direction of feed (P),
said machine being characterized in that [**E**] said welding means comprise a first pair of welding rollers (30) and a second pair of welding rollers (31) disposed on one side and the other with respect to said pre-wrapping (105) in order to weld a respective lateral fin (110), [**F**] each of said pairs of welding rollers (30, 31) comprising an upper roller (30a, 31a) and a lower roller (30b, 31b) cooperating with each other in order to weld a respective lateral fin (110), [**G**] and in that it also comprises vibration generating means (35) associated with at least one of either said upper roller (30a, 31a) or said lower roller (30b, 31b) [**H**] in order to make said roller (30a, 31a, 30b, 31b) vibrate radially, [**I**] so that said pairs of welding rollers (30, 31) are able to exert, on said lateral fins (110), a variable pressure as a function of the different thickness (Sa, Sb, Sc) of said portions (110a, 110b, 110c)."

IX. The appellant essentially argued as follows.

Understanding claims 1 and 15 of the patent as granted

Feature i of claim 1 and feature I of claim 15 should be understood in their broadest sense, as was done in the decision under appeal. No active control was required to exert the variable pressure. It sufficed that the pressure varied as portions of the fin with different thickness passed between the welding rollers. It was not necessary to determine which portion actually was between rollers. As a consequence, if a fin moved in a fixed gap between welding rollers and

its thickness varied, then the pressure would automatically vary.

Admittance of documents D34 to D39

Document D34 was filed on 11 April 2022 in direct response to the respondent's reply to the notice of opposition, in which it was questioned whether features h and i were part of common general knowledge relating to ultrasonic welding. It was thus a timely response to a contestation of what was common general knowledge. Reasons for admitting documents D35 to D38 were presented in the submission of 13 December 2022. Documents D34 to D38 provided information on the effects which the skilled person associated with ultrasonic welding by means of sonotrode rollers. Particularly document D38 was therefore relevant, potentially more relevant than the prior art submitted within the nine-month opposition period. Decision T 1249/22 (Reasons 14.3) explained that a statement in the background section of a scientific paper explaining that something was a common measure might be considered common general knowledge. This case law applied to page 236 of document D38. Regarding document D37, it was noted that the skilled person was not confined to the technical field of packaging; they should be skilled in general ways of implementing closures of fins. This also followed from section 2.8.2 of document D36. Moreover, section 12.1 of document D37 discussed general ultrasonic welding techniques. Therefore, also document D37 qualified as evidence of common general knowledge. Documents D34 to D38 should thus be admitted in the appeal proceedings.

As to document D39, it served to demonstrate how the skilled person would have understood document D1,

particularly the passage on page 8, lines 25 to 29 of document D1. The opposition division had only discussed this at a point in time when document D39 could no longer be filed. Also document D39 should therefore be admitted pursuant to Article 12(6) RPBA.

Inventive step starting from document D3

Document D3 related to a packaging method and machine for folding a heat-sealable sheet of packaging material around a group of cigarettes. In one embodiment, the superimposed longitudinal flaps 17 were welded together in a continuous manner by means of pairs of heat-sealing welding rollers which rotated in coordination with the feed of the pre-packaging. The rollers were arranged on both sides of the pre-packaging. Not disclosed by document D3 were features e, h and i of claim 1 and features G, H and I of claim 15.

The technical effects of the distinguishing features were, inter alia, that the claimed method and machine did not require high temperatures without slowing down and formed a high-quality weld despite the variable thickness of the fin. The safety of the operator was merely a bonus effect. The objective technical problem was therefore to obtain a process and a machine, respectively, which used an alternative welding process that was fast, did not require high tool temperatures and achieved weld seals of good quality also for side fins of variable thickness.

The claimed solution was already suggested by common general knowledge. Document D36 disclosed that ultrasonic welding was the fastest welding process, it used compact equipment and was energy efficient. Also document D37 demonstrated the common general knowledge

in the field. It taught that ultrasonic welding was a suitable sealing method with short welding times, high continuous welding speeds and low energy consumption. In rotary or continuous welding, the fabric was guided between two rotating wheels, one of which was ultrasonically vibrated. Page 385 of document D37 disclosed that the gap was adjusted during continuous welding. Consequently, the pressure had to vary depending on the different thicknesses. Furthermore, document D38 disclosed on page 236 that, in case of continuous ultrasonic welding, the gap was set to a minimum and fluctuations in thickness were compensated by elastic elements such as springs.

Also documents D6 (paragraph [0003]), D7 (page 1, last paragraph to page 2, last-but-one paragraph), D9 (paragraphs [0001] to [0008]), D10 (paragraphs [0002] and [0003]), D26 (page 1, last paragraph to page 2, first paragraph) and D28 (page 1, line 6 to page 2, line 23) were evidence that continuous ultrasonic welding by means of a pair of welding rollers was common general knowledge. Hence, the skilled person would have had reason to switch from heat sealing to continuous ultrasonic welding, including the application of a variable contact pressure depending on the thickness of the side fin.

Alternatively, the skilled person would have considered document D2 which was in a relevant technical field and which, except for its application to food products instead of smoking articles, disclosed all features of claims 1 and 15. In particular, document D2 also disclosed the characterising features of claims 1 and 15, since the fin 15 of the packaging sleeve 10 had different thicknesses that were welded by means of a sonotrode 20 and an anvil 21 in a continuous ultrasonic

welding process, the anvil being supported by springs that were compressed when the gap widened due to an increase in thickness. Moreover, document D2 disclosed that the spring characteristic could be linear or progressive. So, even if document D2 revealed that the effective area of the anvil should exert a possibly constant pressure on the fin seal, the spring-loaded mounting of the anvil resulted in a variable pressure on the fin seal as a function of the different thickness. The skilled person would have combined document D3 with document D2 and applied features e, h, i and features G, H, I to the starting point as they solved the objective technical problem.

Further alternatively, the skilled person would have considered the teaching of document D4. It was in a relevant technical field and disclosed a method for welding folded side fins of the gusset-type by passing them between a rotary anvil and a rotary ultrasonic horn. Ultrasonic welding was carried out continuously by selectively radially vibrating the horn. Features i and I inherently resulted from the rollers rotating about fixed axes as shown in Figure 9 of document D4. Reference was made to page 4, lines 13 to 22 and page 9, lines 21 to 25 of document D4. Even if document D4 only disclosed packages to be sealed with a constant thickness, the requirement of portions with a different thickness was in features b and B, respectively, which were already known from document D3.

As a further alternative, the skilled person would have considered document D5. It referred to a welding device for ultrasonic joining plastic materials with the features e to i. In particular, document D5 disclosed a pair of welding rollers 2, 8 suitable for exerting a variable pressure on side fins, the pressure depending

at least on the different thicknesses of the portions progressively fed in the feed direction, see page 5, lines 26 to 29. In fact, features i, I only required that the pressure was dependent on the thickness, which was the case if the device of document D5 had a pre-set gap width.

As a further alternative, the skilled person would have considered document D27. It mentioned the application of ultrasonic welding systems for forming a longitudinal sealing fin. By means of a flexible plate 26, an elastic journalling of the blocks 22, 24 was realised, allowing a change in the distance D between the axes of rotation X12, X14 of the counterrotating elements 12, 14. The bending of the plate and the corresponding elastic force were a function of the thickness of the material that was welded and passed between the counterrotating elements.

As a further alternative, the skilled person would have considered document D29. This document generally related to a device and a process for the manufacture of a bellows. However, it described the problem that inadmissible heating occurred when using heatable clamping jaws to form a weld seam, and was therefore relevant. Ultrasonic welding was achieved by means of pairs of welding rollers that exerted a variable pressure on the side ribs depending on at least different thicknesses of portions that were progressively fed in the feed direction, see column 5, lines 65 to 68 of document D29.

Therefore, the subject-matter of claims 1 and 15 of the patent as granted did not involve an inventive step when starting from document D3.

Inventive step starting from document D1

Document D1 related to a method and machine for the manufacture of a sealed wrapper of a cigarette package. In a final sealing step, the tubular package was sealed at the open sides. To that end, document D1 revealed two possibilities. In the main embodiment shown in the figures, an envelope-type closure was performed. An alternative embodiment was mentioned on page 8, lines 25 to 29. Accordingly, a closure with longitudinal fins of the gusset-type was achieved, which longitudinal fins were folded against the lateral walls. The latter embodiment formed the starting point for the inventive step assessment. The respondent's view that the relevant passage in document D1 revealed a folding step before welding was not correct. Rather, the wording already indicated the reverse order. Closing was achieved by welding. This created the longitudinal fins. These fins were folded in the final step ("*Finally*"). In this embodiment, it was not disclosed how the welding was performed. The opposition division had thus been incorrect in the decision under appeal to assume that the starting point was a process or a machine in which the longitudinal fins of the gusset-type were each sealed by a single welding tool. Hence, features a to e of claim 1 and features A to C and, partially, feature D of claim 15 were disclosed by document D1.

The technical effects of the distinguishing features were that, despite the variation in thickness, a consistently good welding seam quality was achieved, whereby a relatively low tool temperature and little heat input was sufficient and a relatively fast processing was possible in a compact welding station. The objective technical problem was therefore to

achieve a welding method that made it possible to achieve these effects.

The solution to the objective technical problem was at least suggested by common general knowledge, by document D2 and by document D4. The skilled person knew about continuous ultrasonic welding processes, as evidenced by documents D34 to D38. There was no incompatibility in document D1. The skilled person in the field of packaging technology was familiar with the two main seal types for flexible packaging, namely fin seals and lap seals, see document D39. These were different in that the latter required that the inside and outside surfaces were compatible, but not the former. Assuming that the respondent were correct that the gusset-type fins of document D1 were first folded and then welded, this would mean that both inside and outside surfaces had to be suitable for the joining process. This spoke against the argument that folding occurred prior to welding. Further proof of the common general knowledge regarding seal types was document D39. The skilled person would have had this technical knowledge in mind. They would have applied the common general knowledge or the teaching of documents D2 or D4 by first welding and then folding. Incidentally, chocolate bar wraps were also formed in this way. Furthermore, the skilled person would have been orientated for the formation of the longitudinal fin seal by another disclosure in document D1, namely the flaps 11a, 11b which were welded first to close the opening 22 and then folded. This avoided the need to push against the package, see page 7, lines 23 to 25 of document D1. Regarding feature i of claim 1, the skilled person would have known that the weld quality depended on the exerted pressure, the amplitude and the welding time. It stood to reason that thicker fins

required a larger pressure. There were gap-controlled and force-controlled solutions. Any process where the force was not controlled would have rendered the solution of claim 1 obvious. In the contested patent, there was no active control since the pneumatic cylinder could not be controlled quickly enough. Alternatively, document D1 would have been combined with the continuous ultrasonic welding process of document D2. Due to the spring-mounted anvil, the force exerted on a thicker portion of the fin passing in between the rollers would have to be larger so that feature i was achieved. This was all the more so since the spring characteristic was also described as being progressive. The same applied to feature I of claim 15 which merely defined the machine not the process. Regarding document D4, it was irrelevant whether this document disclosed a gusset-type fin, as such was already known from document D1.

X. The respondent essentially argued as follows.

Understanding claims 1 and 15 of the patent as granted

Feature i of claim 1 should be read together with feature h. The step of exerting a variable pressure was a direct result of selectively making at least one of the welding rollers to vibrate radially. This was expressed by the phrase "so as to". The contested patent contained an example how this worked with a pneumatic actuator. The claim wording left open whether features h and i required an active control of the pressure. The same applied in view of the wording of claim 15.

Admittance of documents D34 to D39

The opposition division correctly decided not to admit documents D34 to D38. During the oral proceedings before the opposition division, the appellant mainly focussed on document D38, without providing convincing arguments in favour of the admittance of documents D34 to D37. There were no reasons that could have hindered the appellant from filing these documents at an earlier stage. Already in the notice of opposition, the common general knowledge had been invoked. Furthermore, the paragraph on page 236 of document D38 cited by the appellant did not belong to the background description but was part of the disclosure of the scientific paper. Moreover, it had to be taken into account that that paragraph was followed by footnotes, which themselves referred to other scientific papers. For these reasons, documents D34 to D38 should be disregarded also in appeal proceedings.

Document D39 was filed for the first time on appeal and should not be admitted into the proceedings because it was late filed and no convincing arguments were brought forward why this document was not filed before. Document D1, which mentioned both types of closure, had already been considered during the proceedings before grant. If the appellant believed that it was useful to file an excerpt of a manual explaining the different types of closure, this could have been done before the end of the nine-month opposition period.

Inventive step starting from document D3

Document D3 disclosed to heat-seal the lateral fins of the package with high pressure and high temperature in

order to obtain an effective sealing in a fraction of second, so as achieve the high productivity required for the packaging machine. The heat-sealing device 34 could comprise heat-sealing grippers or heat-sealing rollers between which the longitudinal fins 25 were compressed. But document D3 did not disclose any ultrasonic welding. In agreement with the reasoning of the decision under appeal, the subject-matter of claim 1 differed from document D3 by the distinguishing features e, h and i.

The technical effects of the distinguishing features included that the sophisticated process and packaging machine did not require high tool temperatures, they avoided loss of productivity and formed a high-quality weld despite the variable thickness of the side fins. Another related effect was that the safety of the operator was increased since ultrasonic welding tools were at a temperature much lower than the welding rollers or welding bars of document D3.

Considering the embodiment of document D3 which described the welding rollers, document D3 lacked any incentive for the skilled person to adopt ultrasonic welding. Even if it were found that this technology were compatible with the object of document D3 of achieving high productivity without damaging the smoking articles, there would have been no reason for the skilled person to turn to ultrasonic welding technology. But if they had adopted ultrasonic welding rollers, these would not have exerted a variable pressure as a function of the different thickness of portions of the fin.

Regarding documents D36 and D37, they did not mention the low temperature of the welding tools or the

increased safety of the operators, similarly to all the other prior-art documents on file. Compared to documents D36 and D37, document D38 added that the tool remained cool, which was however a well-known feature of any ultrasonic welding system. This was known, for example, from documents D4 and D8, which both acknowledged that, in ultrasonic welding, the roller warmed at temperatures that were lower than the usual temperature reached in conventional welding. In relation to the possible adjustment of the gap for compensating thickness variations described by document D38, it was remarked that this document provided no additional technical information with respect to documents D6, D10 and D26 to D29. These documents already disclosed ultrasonic welding systems that could be adjusted in order to vary the welding pressure or force. Documents D36 to D38 did not add any new technical information to that already disclosed by the prior-art documents on file.

Document D2 described a sonotrode 20 and an anvil 21 rotating about respective axes of rotation 20B, 21B. They served to weld a fin 15 passing through a gap S between the sonotrode and the anvil. According to paragraph [0044] of document D2, in order to achieve a uniform pressing force despite the different thicknesses of the fin, the anvil was mounted on a base plate 24 in such a way that the size of the gap could be changed in the transverse direction. To this aim, the anvil was supported in the device 16 through a plurality of springs 25, 26A, 26B. Due to the spring-loaded mounting of the anvil, the anvil could, depending on the thickness of the fin seam, rebound (increase the gap) or compress (decrease the gap), so that a constant pressure was applied to the fin. The presence of the springs did not automatically result in

a variable pressure, since document D2 clearly disclosed that it was aimed to exert a uniform pressure, not a variable one.

Document D4 described packaging of solid food products, as for example chocolate bars. Document D4 did not disclose that a package was welded with a fin having a variable thickness. In fact, the packages of document D4 were joined in the same row and necessarily had a constant thickness. The passages of document D4 mentioned by the appellant were completely silent about the presence of layers of different thickness.

Document D5 described an ultrasonic welding device comprising a sonotrode vibrating at high frequency. Page 2, lines 22 to 30 of document D5 indicated that, in most tools, the force was applied longitudinally, even if, in some sonotrode having a cylindrical surface, the radial oscillation was transverse to the longitudinal direction of propagation of the ultrasonic waves. In absence of a more detailed description, this generic statement could not be considered anticipating feature h, since the radial or the longitudinal direction were not represented in the schematic drawings. Furthermore, page 5, lines 26 to 34 of document D5 described that the gap width between the sonotrode and the anvil could be regulated with the aid of the motor to a target value. But this was part of the set-up process. There was no mention that the gap width was adjusted as a function of the different thickness of the material to be welded. Nor was a variable pressure exerted as a function of the different thickness of the material.

Document D27 disclosed ultrasonic rollers separated one from another by an adjustable distance. The regulation

was obtained thanks to a flexible plate 26 that could be selectively bent. It was not described that the rollers vibrated radially nor that they exerted a variable pressure as a function of a different thickness of the material to be welded. The skilled person would not have inferred features h and i from the mere fact that document D27 disclosed a structure able to adjust the distance between sonotrode and anvil.

Document D29 referred to the manufacture of a bellows. Therefore, it related to a distant technical field and it was doubtful that the skilled person would have taken its teaching into consideration. In addition, document D29 did not give any detail about the vibration of the wheel-shaped pressure bodies. It merely indicated that the device could be adjusted in a set-up stage to process material having different thickness.

Therefore, the subject-matter of claims 1 and 15 of the patent as granted involved an inventive step when starting from document D3.

Inventive step starting from document D1

Regarding the sequence of the folding and welding steps in document D1, the appellant apparently mixed references to the closing of the bottom wall obtained by overlapping and welding together the flaps 11a, 11b with references to the closing of the lateral longitudinal walls. In fact, the transversal fin 9 obtained by soldering the flaps 11a, 11b in document D1 corresponded to the bottom fin of the contested patent. Page 8, lines 8 to 24 of document D1 described the last steps for obtaining an envelope-type closure, namely

the longitudinal soldering along the minor lateral walls of the bundle of cigarettes. The possibility mentioned on page 8, lines 25 to 29 to also obtain a gusset-type closure was not described in detail. The generic word "*closure*" used in that passage encompassed all the steps for obtaining the closure, namely both the soldering and the folding steps. Moreover, the interpretation of the word "*Finally*" in that passage was purely speculative in absence of any detailed description of the operating step. Due to the complexity of the folding operation, it was evident that this sentence only referred to the last folding step after soldering. Other necessary folding steps had been performed before the soldering, as the skilled person knew very well. It was clear from the "*gusset out*" embodiment shown in Figures 6 and 7 of document D3 that a gusset-type closure did not necessarily entail that the thickness of the differed along its length. In any case, the formation of the transversal fin 9 in document D1 could not be operated by a roller and should not be confused with the operating steps to be performed on the minor lateral walls.

Document D1 disclosed the process of stepwise soldering. Maybe the skilled person would have opted to replace this process by continuous welding. But there was no hint to replace the heat soldering by ultrasonic welding or to replace the bars by rollers. Furthermore, feature h and i were not obvious.

Regarding document D37, it did not say anything about the change of thickness of the fin.

The reasons why documents D2 and D4 did not suggest to the skilled person to implement the distinguishing features e to i of claim 1 when starting from document

D1 were the same as set out in the context of the inventive step objection starting from document D3. In particular, document D2 was situated in the technical field of food processing, it disclosed a different way to fold the product compared to document D1, and it was concerned with a longitudinal fin of a uniform thickness. It was therefore not apparent why the skilled person would have had any incentive to consult document D2. As to document D4, it was not related to a problem involving a change of thickness during one welding cycle. Even when the rollers were spring-mounted or if the gap width remained constant, the pressure on portions of different thicknesses was not necessarily caused by the way in which the sonotrode was vibrated, for example by adapting its amplitude, as was required by features h and i.

Therefore, the subject-matter of claim 1 of the patent as granted involved an inventive step when starting from document D1. The same was true for the subject-matter of claim 15 of the patent as granted.

Reasons for the Decision

Understanding claims 1 and 15 of the patent as granted

1. In point 9.3 of the reasons for the decision under appeal, the opposition division held that feature i of claim 1 and feature I of claim 15, both of the patent as granted, must be interpreted in their broadest sense while still making technical sense. These features did not require that the pressure was continuously and dynamically adjusted as a function of the thickness. A pressure variation in response to a different thickness, so concluded the opposition division, was

inherently achieved if the gap between the sonotrode roller and the anvil roller remained unchanged.

2. In the board's view, the opposition division's interpretation of claims 1 and 15 ignores the syntax of the respective claim wording. Feature i can only be read within the specific context established by feature h. The phrase "so as to" expresses a purpose or intention of the action defined in feature h. Accordingly, the variable pressure as a function at least of the different thickness of the portions of the lateral fins is *caused* by the selective radial vibration of the at least one welding roller. The same applies to features G, H and I. The conjunction "so that" is understood as expressing a causal relationship between the radial vibration of at least one of the upper and lower welding rollers, on the one hand, and the ability of the pairs of welding rollers to exert a variable pressure on the lateral fins as a function of the different thickness of the portions of the fins, on the other hand.

Admittance of documents D34 to D39

3. Documents D34 to D38 were filed before the opposition division but were disregarded pursuant to Article 114(2) EPC for the reason that they did not prima facie provide a disclosure going beyond what was already acknowledged as well-known and/or considered as inherent (see points 10.1 and 10.2.2 of the reasons for the decision under appeal).

4. The same documents were referred to again on appeal as proof of common general knowledge. The board is unable to see why they should have to be excluded from the proceedings, for the following reasons.

Document D34 is a Wikipedia entry on "Sonotrode", a well-known component of a ultrasonic welding system (see, for example, page 2 of document D33). Document D35 is an excerpt of the 19th edition of what arguably is *the* standard textbook in the German language on general mechanical engineering (see also T 1603/22, Reasons 3.3). It is dated 1997. Document D36, in turn, is an excerpt from the 2008 edition of a reference work on joining of plastic materials. Thus, documents D34 to D36 reflect what was common general knowledge before the priority date of the contested patent and, to a certain extent, form the technical background for any activities the skilled person would have performed (T 1601/15, Reasons 3.5).

Document D37 is an excerpt from a textbook published in 2013 and situated in a different technical field, namely textile joining. Nevertheless, a large part of the document, particularly sections 12.1 and 12.2, concerns general background aspects of ultrasonic welding that apply beyond the specific context of joining textile materials.

Unlike documents D34 to D37, document D38 is a scientific article. Though it dates from 2011, such a document would not normally be considered as part of common general knowledge. However, the appellant convincingly argued by referring to decision T 1249/22 (Reasons 14.3) that a statement in the background section of a scientific paper explaining that something was a common measure may, depending on circumstances, be considered to establish that this measure was common general knowledge. The introductory portion of document D38 starts below the abstract on page 233 and continues until halfway through page 237. It discusses different

sealing methods used in packaging processes at the time of the article and, in particular, gives an overview of the principles of conduction sealing and ultrasonic sealing (page 234, first paragraph: "*Ultrasonic welding is an established and well-known method for joining polymers*"). This is followed on page 235 by an explanation of the heating mechanism responsible for the ultrasonic welding of thermoplastic polymers. Finally, on pages 236 and 237, an account is given of the main process parameters of conduction sealing and ultrasonic sealing in a way which implies that these parameters had been well-known in the art for many years preceding the publication date of the scientific paper ("*Typical sealing times range from* [...]", "*The sealing force is normally applied by springs or fluidic actuators*"). The board cannot find any reason why the introductory portion of document D38 would not constitute proof of common general knowledge before the priority date of the contested patent.

5. Having regard to the above considerations, the board exercised its discretion under Article 12(6), first sentence, RPBA and admitted documents D34 through D37 as well as the introductory portion of document D38 into the proceedings. The respondent's request not to take the arguments based on documents D36 to D38 into consideration was rejected.

6. Regarding document D39, which was filed for the first time with the statement of grounds of appeal, it is an excerpt of a lexicon dated 2014 explaining different terms used in the field of packaging technology. Also here, the board fails to see why such a document should be excluded from the proceedings, all the more so since it reflects knowledge that the skilled person was expected to have or at least to be aware of at the

relevant date. Pursuant to Article 12(6), second sentence, RPBA, document D39 was admitted in the appeal proceedings.

Inventive step starting from document D3

7. The embodiment of Figure 9 of document D3 shows three stations of a cigarette packaging machine. In the first station 13, a wrapping sheet 9 is folded around a group of cigarettes 2 moving along a direction P1. The resulting bundle is then transferred to the second station 14 where longitudinal fins 25 are formed at the opposite sides of the bundle. In a first step, shown in Figures 10 and 11 of document D3, longitudinal flaps 17 of the wrapping sheet 9 are folded towards each other while the package is conveyed in a direction P2. At the same time, transversal portions 18 of the wrapping sheet 9 are folded inwards between the flaps 17. In a second step, the superimposed flaps 17 are joined together by means of a heat-sealing device 34, an example of which is schematically shown in Figure 13. It is explained on page 15, lines 26 to 28 of document D3 that the heat-sealing device 34 may comprise heat-sealing rollers between which the longitudinal fins are compressed. By virtue of the transversal portions being caught between the two superimposed flaps 17, the resulting longitudinal fins must have portions of different thickness. In a final step of the second station 14 illustrated in Figure 10 of document D3, the welded longitudinal fins 25 are folded against the side wall of the package.

8. It follows from the above that the package disclosed by the embodiment of Figures 9 to 12 of document D3 is manufactured by a method having features a to d, f (without the *ultrasound welding* rollers implied by the

reference to feature e) and g (without the *ultrasound* welding), and by a packaging machine having features A to F. This is not disputed by the parties.

9. There is also agreement that the distinguishing features e, h, i and G, H and I have the technical effects that the corresponding welding method or packaging machine does not require high tool temperatures, avoids loss of productivity and forms a high-quality weld despite the variable thickness of the lateral fin. The respondent adds that the lower temperature provides an increased safety. The board agrees with the appellant that this would, if at all, be a bonus effect that should not be taken into consideration for the formulation of the objective technical problem. In consequence, the objective technical problem when starting from document D3 is to provide an alternative welding process or machine which is fast, does not require high tool temperatures and achieves good quality welding seams despite the variable thickness of the longitudinal fins.

(a) Document D3 in combination with common general knowledge

10. In a first line of argument, the appellant submits that, starting from document D3, the skilled person would have arrived at the claimed subject-matter in view of common general knowledge evidenced by either of documents D36 to D38, D6, D7, D9, D10, D26 or D28.

11. Regarding documents D36 to D38, the board notes that it is not disputed that ultrasonic welding was a well-known technique at the priority date of the contested patent (see also point 9 of the reasons for the decision under appeal). This is also evident from the

Wikipedia entries D33 and D34, and from the excerpt D35 of one of the standard textbooks on general mechanical engineering. Nevertheless, the fact that ultrasonic welding was common general knowledge does not mean that the skilled person would have opted to weld the longitudinal flaps 17 of document D3 in accordance with the requirements of features h and i, or by means of a packaging machine operating conform with features H and I. The appellant did not demonstrate in a convincing manner that the aspects of ultrasonic welding set out in documents D36 and D37 would have led the skilled person to adopt welding rollers that selectively vibrate so as to exert a variable pressure as a function of the different thickness of the material progressively fed between the rollers. Page 385 of document D37 may very well suggest to increase the gap between sonotrode and anvil for thicker materials, this would be part of the set-up of the machine; it does not lead to the conclusion that the pressure varies in function of the thickness.

Regarding document D38, the appellant's argument is based on the disclosure on page 236 that continuous ultrasonic sealing processes use gap-controlled systems. Yet the corresponding passage in the third paragraph of that page indicates that the gap formed between the horn (or: sonotrode) and the anvil of the ultrasonic welding apparatus is mechanically adjusted. This implies that the gap remains constant at least during the welding cycle so that, even if this arrangement results in a variable pressure on portions with different thicknesses, there would be no causal relationship with the radial vibration of the horn (see point 2. above). Similarly, the elastic elements that realise the combined gap and force control mentioned in the last sentence of the third paragraph of page 236 do

not establish the radial vibration of the horn as the cause of any variable pressure that may be produced in the packaging material during the welding cycle.

12. Documents D6, D7, D9, D10, D26 and D28 are all patent publications. Such documents do not normally form part of common general knowledge. An exception may be made where a series of patent publications provides a consistent picture that a particular technical procedure was generally known and belonged to the common general knowledge in the art at the relevant date (see "Case Law of the Boards of Appeal of the European Patent Office", 10th edition, July 2022, I.C.2.8.2). This is not the case here. The appellant cites paragraph [0003] of document D6. It describes how rotating sonotrodes are restricted to perform weld seams with a narrow width. Regarding document D7, the description of the background art starting from the last paragraph on page 1 sets out how rotating ultrasonic sealing devices overcome the problem of friction occurring with heat-sinking ultrasonic devices, but suffer from the problem that only the energy supplied to the sonotrode for radial vibrations can be used for sealing. In respect of document D9, paragraphs [0001] to [0008] are cited by the appellant. The subject of these paragraphs is the use of ultrasonic welding devices for producing longitudinal and transversal welding seams of tubular bags, whereby the former are performed continuously and the latter mostly intermittently. Paragraphs [0002] and [0003] of document D10, cited by the appellant, disclose that conventional ultrasonic welding systems are known to use adjustment systems in order to control, albeit in an inefficient manner, the contact point and the gap pressure between a rotary horn and an anvil. Both documents D26 and D28 concern textile materials rather

than plastic materials. Even if the passage on page 1, lines 8 to 31 of document D28 mentions the control of the pressure between sonotrode and anvil, it is but a remark made in the context of the discussion of another patent publication. A consistent picture that features h and i or H and I are part of common general knowledge does not emerge from the above passages of the cited patent documents.

(b) Document D3 in combination with either of documents D2, D4, D5, D27 or D29

13. In a further line of argument, the appellant argues that the skilled person would have combined document D3 with either of documents D2, D4, D5, D27 or D29 in order to arrive at the claimed subject-matter.

14. Document D2 discloses an ultrasonic welding apparatus with two welding rollers: a horn or sonotrode 20 and an anvil 21. These rollers form a gap, depicted by the reference sign 'S' in Figure 2, that receives a fin 15 of non-constant thickness shown in Figure 1F. According to paragraph [0044] of document D2, the arrangement of the anvil 21 on the supporting plate 24 causes a change in size of the gap S in the transverse direction so that a uniform pressing force and, consequently, a reliable welding is achieved in spite of the different thicknesses of the fin ("*Um trotz der unterschiedlichen Dicken D_1, D_2 der Flossennaht 15 eine gleichmäßige Anpresskraft und somit eine zuverlässige Verschweißung zu erreichen, ist der Amboss 21 derart an einer Grundplatte 24 gelagert, dass die Größe des Spaltes S in Querrichtung Z_S veränderbar ist*."). In fact, the anvil 21 is resiliently supported by means of springs 25, 26A and 26B illustrated in Figures 2 to 4 of document D2. The last sentence of paragraph [0044]

explains that, depending on the thickness of the fin 15, the anvil 21 can either extend (increase of the gap S) or become compressed (reduction of the gap S) so that the operating region 21A of the anvil acts on the fin with a pressing force which is as constant as possible ("*Durch die gefederte Lagerung des Amboss 21 kann der Amboss 21 je nach Dicke der Flossennaht 15 ausfedern (Vergrößerung des Spaltes S) oder einfedern (Verkleinerung des Spaltes S), so dass der Wirkbereich 21A des Amboss 21 mit einer möglichst konstanten Anpresskraft auf die Flossennaht 15 einwirkt*."). It follows from these passages that no *variable* pressure is exerted on the fin 15 of document D2. The goal of document D2 clearly is to keep the pressure as constant as possible. Even when following the appellant's argument that the characteristic of the springs must result in a different force with changing spring deflection, there is no disclosure in document D2 that the welding roller 20 is selectively made to vibrate radially so as to exert such a variable force or pressure as a function of the different thicknesses of the fin. Hence, features h and i are not disclosed. Nor are features H and I.

15. The appellant referred to the second paragraph on page 4 of document D4 in support of its argument that features i and I were disclosed by that document. The board disagrees. This passage is concerned with selecting an appropriate weld pattern density for a packaging material having a certain thickness. Furthermore, it describes the different melting behaviour of materials exposed to ultrasonic welding compared to heat sealing. There is no mention of a fin having portions of different thickness. Also the passage of document D4 on page 9, lines 21 to 25 does not disclose a method or machine for welding a fin with

different thicknesses. Moreover, nowhere in document D4 is there any hint that the welding roller is selectively made to vibrate radially so as to exert a variable pressure as a function of a different thickness. It follows that neither features h and i nor features H and I are disclosed by document D4.

16. Document D5 describes on page 5, lines 16 to 34 that the width of the gap between the sonotrode 2, which is movably fixed to support 6, and the counterpart 8 of the ultrasonic welding device shown in Figure 1 can be adjusted by means of a motor 7. The gap width can thus be controlled to a predetermined target value ("*auf einen vorbestimmten Sollwert geregelt*"). Alternatively, the force exerted by the sonotrode can be controlled to a predetermined value ("*auf einen vorbestimmten Wert geregelt*"). A variation of the pressure as a function of a different thickness of portions of a fin is, however, not disclosed by document D5, let alone as a consequence of the selective radial vibration of the sonotrode.

17. Document D27 provides a mechanism for regulating the relative position of blocks 22, 24 supporting the respective counter-rotating elements 12, 14 of an ultrasonic welding system (paragraphs [0029]). Though the actuator 32 described in paragraphs [0032] to [0036] can be operated to exert a variable pressure on a material arranged between the elements 12, 14, nothing in document D27 indicates that such variable pressure would be linked to the different thickness of portions of the material that is progressively fed in between the ultrasonic welding rollers. Moreover, the elastic force caused by bending the flexible plate 26 is in no way causally linked to the radial vibration of the welding horn 14.

18. The appellant further argues that column 5, lines 65 to 68 of document D29 teaches that a variable pressure is exerted on lateral fins. Firstly, the board observes that document D29 concerns the manufacture of bellows ("*Faltenbalge*"). Lateral fins, in particular of packages or hermetic wrappings, are not mentioned in document D29, let alone in the context of smoking articles. Secondly, the cited passage does not imply any variable pressure or force. Rather, it describes how the (rotating) clamping device 4 shown in Figures 1 and 2 can be used to adjust to different tolerances of the bellows material.

(c) Conclusion

19. For the above reasons, the appellant has not shown in a convincing manner that, when starting from document D3, the skilled person would have arrived at the subject-matter of claim 1 or claim 15 of the patent as granted.

Inventive step starting from document D1

20. Figures 1 and 2 of document D1 show six stations of a cigarette packaging machine. In the third station 103, a wrapping sheet 11 is folded around a bundle of cigarettes 10 held together with a stiffening element 30 in the pocket 20 of a first rotatable drum. The bundle is then transferred to a second rotatable drum forming the fifth station 105, where a transversal fin 9 is formed by welding flaps 11a and 11b of the wrapping sheet 11 to each other (Figures 9, 10, 10A). After the fin 9 is folded onto the front wall 5 of the package (Figures 15(c) and (d)), the package advances in a longitudinal feeding direction through the sixth station 106 (Figures 11 and 12) where the flaps 15, 16

protruding from the side walls are welded. Figures 11 and 15(e) to (h) illustrate how the smaller transversal flaps 15 and the larger longitudinal flaps 16 are consecutively folded against the side walls of the package. In a final step, these overlapping flaps are welded to hermetically seal the internal wrapping (Figure 12).

21. On page 8, lines 17 to 24 of document D1, the wrapping process shown in the figures is described as a closure of the "envelope"-type. An alternative embodiment is mentioned in the paragraph immediately following this passage. Accordingly, "*the closure of the open ends of the minor lateral walls of the wrapping 1 to be formed can be performed by a closure with longitudinal fins with side of the "gusset" type. Finally, these longitudinal fins are folded against the respective minor lateral wall in order to form the whole wrapping 1*". The board understands this to mean that, in a first step, the longitudinal flaps 16 are folded and joined to one another in order to close the open ends of the wrapping and, in a second step, the resulting fins are folded against the lateral walls of the package. This process occurs much in the same way as the transversal fin 9 illustrated in Figures 9, 10 and 15(c), (d) of document D1 is formed. The board does not share the view of the respondent and the opposition division (see the sentences bridging pages 12 and 13 of the reasons for the decision under appeal) that the above passage implies that the folding step occurs prior to the welding step. Such a sequence would contradict the teaching of the passage that the longitudinal fins are folded in a final step ("*Finally*"). Moreover, it would be at variance with how fin seal closures are normally produced in the art (see page 184 of document D39).

22. It stands to reason that, also in the "gusset"-type embodiment of document D1, the smaller transversal flaps 15 are folded against the side walls of the package before the longitudinal fins are formed. The respondent's argument that the "*gusset out*" option shown in Figures 6 and 7 of document D3 was possible also in document D1 is rejected in view of the unambiguous disclosure on page 8, lines 17 to 23 and Figure 15 of document D1. Hence, due to the overlapping arrangement of the flaps 15 and the longitudinal flaps 16, the resulting longitudinal fins have portions with a different thickness.

23. Document D1 does not explain how the longitudinal fins of the "gusset"-type embodiment are joined. In fact, there is no mention at all of welding, let alone of ultrasonic welding, in the passage on page 8, lines 25 to 29 of document D1. The board notes that document D1 consistently uses the expressions "*heat sealing*" and "*soldering*" when describing how the flaps are joined to one another in the "envelope"-type embodiment shown in the drawings. In addition, the detailed description on page 15, lines 4 to 5 is unambiguous in that the heat sealing occurs by means of soldering *blocks* 72.

24. In sum, the subject-matter of claim 1 differs from the method of document D1 by the characterising features e to i and the subject-matter of claim 15 differs from the packaging machine known from document D1 by features D to I.

25. For identifying the technical effects of the distinguishing features, the opposition division referred, inter alia, to paragraphs [0030] to [0032] of the contested patent according to which traditional welding solutions involved members heated to a high

temperature, requiring frequent maintenance and posing a danger to operators. The objective technical problem was defined in the decision under appeal as providing an alternative welding system which allows for a constant welding quality regardless of the thickness of the material to be welded without the use of high tool temperatures and with an increased process speed. In the statement of grounds of appeal, the appellant maintained this formulation which was not disputed by the respondent.

(d) Document D1 in combination with common general knowledge

26. It was common ground between the parties that ultrasonic welding was a well-known technique for joining plastic materials at the priority date of the contested patent (see point 9 of the reasons for the impugned decision). The board adds that this is evident from the Wikipedia entries D33 and D34, from the excerpts D35, D36, D37 of standard textbooks, and even from the introductory portion of document D38. Nevertheless, the fact that ultrasonic welding was common general knowledge does not mean that the skilled person would have opted to weld the longitudinal flaps 16 in the "gusset"-type embodiment of document D1 by means of a continuous ultrasonic welding system using a pair of cooperating welding rollers. There is no hint whatsoever in document D1 that flaps can be welded other than by soldering or heat sealing. Only soldering *blocks* 51, 52, 72 are proposed for that purpose (see Figures 9, 10, 12).

27. The board is also not convinced by the appellant's argument that the skilled person, being aware that the weld quality depends on the exerted pressure, the

amplitude and the welding time, would have exerted a larger pressure on thicker portions of the longitudinal fins 16 of document D1 in accordance with the requirements of claims 1 and 15. The gap-controlled and force-controlled system mentioned on page 236 of document D38 may result in a variable pressure on portions with different thicknesses. However, this circumstance is not governed by a causal link with the radial vibration of the welding horn or sonotrode. In the unlikely case that the skilled person had thus opted for joining the longitudinal flaps 16 of the "gusset"-type embodiment of document D1 by means of a continuous ultrasonic welding process, the welding horn would not be selectively made to vibrate radially so as to exert a variable pressure as a function of the different thickness of portions of the resulting fins.

(e) Document D1 in combination with either of documents D2 or D4

28. The appellant further argued that, starting from the "gusset"-type embodiment of document D1, the skilled person would have arrived at the subject-matter of claims 1 and 15 in view of the teaching of either document D2 or document D4.

29. These objections are not tenable for the same reasons as set out in points 14. and 15. above. Document D2 is firm in stating that a uniform pressing force is envisaged, or, at least, a pressing force which is as constant as possible (see paragraph [0044]). Should the force vary due to the spring characteristic associated with the anvil support, then such a variation would not be causally linked to the selective radial vibration of the sonotrode. Similarly, document D4 does not contain

any hint that would have encouraged the skilled person to adopt such an approach.

(f) Conclusion

30. For the above reasons, the appellant has not shown in a convincing manner that, when starting from document D1, the skilled person would have arrived at the subject-matter of claim 1 or claim 15 of the patent as granted.

Conclusion on inventive step

31. In sum, the board concludes that the subject-matter of both claims 1 and 15 of the patent as granted involves an inventive step. The ground for opposition under Article 100(a) together with Article 56 EPC does not prejudice the patent as granted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Schneider P. Lanz

Decision electronically authenticated