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Datasheet for the decision of 16 January 2007

Case Number: T 0387/06 - 3.2.06

Application Number: 99947462.0

Publication Number: 1047520

IPC: B23K 3/06

Language of the proceedings: EN

Title of invention:
Apparatus and method for inerting a wave soldering installation

Patentee:
L'air Liquide, S.A.

Opponent:
LINDE AKTIENGESELLSCHAFT

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 114(2)
RPBA Art. 10b(1)

Keyword:
"Inventive step - (no)"
"Late filed amendments - not admitted"

Decisions cited:
-

Catchword:
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Case Number: T 0387/06 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 16 January 2007

Appellant: (Opponent)
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Respondent: (Patent Proprietor)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 17 January 2006 rejecting the opposition filed against European Patent No. 1047520 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: P. Alting Van Geusau
Members: G. De Crignis
K. Garnett

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division to reject the opposition against the European patent 1 047 520.

II. The opposition was filed on the grounds that the subject matter of the patent was not patentable for lack of novelty and inventive step (Article 100(a) EPC). In its decision the opposition division held that the subject-matter of claim 1 as granted was novel and inventive in view of the prior art

D1: DE-A-195 41 445,
D2: WO-A-95/23045,

relied upon by the appellant (opponent).

III. Claim 1 of the patent as granted reads:

"Apparatus for inerting a wave soldering installation having a solder bath (19) and a conveying system for producing one or more solder waves (14, 15), in particular for soldering electric printed circuit boards, having an immersion box (1) which is closed on all sides, shaped like a frame, which can be immersed in the solder bath (19) and which has porous pipes (2, 3, 4) to distribute nitrogen, said pipes being arranged inside the immersion box in cage-like housings (5, 6, 7) with outlet openings (8, 9, 10), the cage—like housings (5, 6, 7) being designed such that the porous pipes (2, 3, 4) are arranged therein in such a way that the porous pipes (2, 3, 4) essentially cannot be struck by

solder splashes produced during the operation of the wave soldering installation."

IV. In its appeal the appellant maintained its position that the subject-matter of claim 1 as granted lacked novelty and inventive step in view of D1, taking into account also the teaching of, amongst others,

D5: EP-B-0 561 794.

V. Following the request for oral proceedings made by the respondent (proprietor) in its reply to the appeal, the Board summoned the parties to oral proceedings on 16 January 2007. In the communication annexed to the summons, the Board addressed the interpretation of claim 1 and expressed the preliminary opinion that the subject-matter of claim 1 appeared to be novel over D1. With regard to the decision on inventive step based on the remaining differences when compared to the apparatus from D1, the underlying technical problem needed to be defined. Further consideration should be given as to whether the novel features had a functional interaction or not. The parties were informed that further submissions should be at the disposal of the Board at least 1 month before the envisaged date of oral proceedings.

VI. With facsimile of 28 December 2006 the respondent replied to the Board's communication and presented arguments with respect to novelty and inventive step. Two sets of amended claims corresponding to first and second auxiliary requests were submitted with a brief indication of the basis for the amendments. It was requested that the appeal be dismissed or,

alternatively, the patent be maintained in amended form on the basis of either of the auxiliary requests.

In claim 1 according to the first auxiliary request the feature

"there being in each case, between the outlet openings (8, 9, 10) and the porous pipes (2, 3, 4), an intermediate space (11, 12, 13) which is open at the bottom within the cage—like housings (5, 6, 7) and which permits solder splashes to run off downwards without striking the pipes",

has been added to claim 1 as granted.

In claim 1 according to the second auxiliary request the feature

"in which at least one guide plate (17) is fastened to a cage—like housing (6) in regions of turbulence in the solder bath and/or in regions in which solder splashes are to be expected to an increased extent"

has been added to claim 1 as granted.

VII. With a fax of 12 January 2007 the respondent announced that he would not attend the oral proceedings and confirmed its requests expressed in the submission of 28 December 2006.

VIII. Oral proceedings were held on the 16 January 2007 in the presence of only the appellant, at the end of which the decision was announced to set aside the appealed decision and to revoke the patent.

IX. The arguments of the appellant in support of its request for revocation of the patent may be summarised as follows:

– The apparatus of D1 depicted in the schematic drawing comprised an immersion box which was necessarily closed on all sides. This was implicitly disclosed by the terminology used in column 2, lines 52 to 55, in particular by the expressions "*Abdeckhaube*" and "einhaust", as well as by the statement found at the end of claim 1 (column 3, lines 25-27).

– The apparatus of D1 comprised sheet metal arrangements around the pipes 9 and 10, which were part of the immersion box, constituting thereby cage-like housings protecting the pipes from solder splashes. No distinction could be made between the apparatus shown in D1 and the apparatus shown in figure 1 of the opposed patent in terms of this function.

– Even if the features "porous pipes" and "cage-like housings being designed such that... cannot be struck by solder splashes..." would have to be considered as novel, the subject-matter of claim 1 according to the main request lacked an inventive step. Porous pipes constituted a well known alternative to the perforated gas diffusers disclosed in D1. The reference made in D1 to D5 would already point the skilled person in the direction of this feature. Furthermore, D1 disclosed, at least in the case of the pipe 12, a cage-like

housing which obviously protected it from solder splashes. It would amount to the normal practice of the skilled person also to protect the other pipes of the installation by cage-like housings if this was found necessary. No functional interaction of these two differing features was apparent.

– The auxiliary requests 1 and 2 had been submitted after the term set by the Board and, consequently, would have to be considered as late filed. With respect to claim 1 of the first auxiliary request it would appear that the amendment did not remedy the lack of inventive step applicable to the granted claim 1. Also it appeared questionable whether this amendment would not infringe Article 123(2) EPC, since the feature "without striking the pipe", taken apparently from claim 5 as granted, had been added to claim 1 as granted in combination with the features of claim 4, although claim 5 did not depend on claim 4. Also, a description adapted to the amended claims of the auxiliary requests had not been submitted. Finally, the dependencies in the dependent claims of both auxiliary requests appeared to be changed, so that this might possibly lead to subject-matter not originally disclosed in this form.

X. The arguments of the respondent presented in writing may be summarised as follows:

– D1 did not disclose the features "porous pipes", "immersion box which is closed on all sides, shaped like a frame", and "cage-like housings with outlet openings, the cage-like housings being designed such that... cannot be struck by solder splashes...", so

that the requirement of novelty was met. In particular, D1 disclosed in its figure only an immersion box having two vertical walls adjacent to the left and right walls of the recipient containing the solder bath. However, nothing in D1, even taking into account the problem with which it was concerned, namely to increase the performance of inerting, would permit the conclusion that the immersion box should necessarily be closed on all four sides. Also, the cage-like housings as mechanically integral parts of the closed, frame-like immersion box were not disclosed in D1.

– Claim 1 as granted also comprised an inventive step. The problem to be solved focussed on attaining a better efficiency of inerting, the operation of the installation for as long as possible without interruption and easy maintenance (patent in suit, column 2, line 57 to column 3, line 2). The combination of the features as claimed solved this problem. The problem was neither mentioned in the prior art nor did D1 suggest the claimed solution.

Reasons for the Decision

1. The appeal is admissible.

2. *Interpretation of claim 1*

The claimed apparatus consists only of an immersion box with a number of structural features ("closed on all sides, shaped like a frame", "porous pipes" and "cage-like housings"). The structural features of the wave

soldering installation itself may not be regarded as features of the apparatus. In view of the description and the drawings of the patent, it is further to be understood that all porous pipes and their cage-like housings are part of the immersion box.

According to the view of the opposition division the meaning of the term "cage-like" implies something open, in contrast to a sheet, which represents a fully closed surface (cf. 2nd paragraph of the Point 3.5 of the Reasons for the decision). The Board does not share this interpretation. Since the patent does not provide any clear indication for the meaning of the expression "cage-like", the feature "cage-like housing" may be interpreted in the broadest sense, covering also housings formed of closed-surface sheet metal, as long as they comprise at least one outlet opening for the delivery of inert gas.

3. *Novelty of claim 1 of the main request*

3.1 D1 discloses in the figure and the accompanying passages of the description an apparatus (1) for inerting a wave soldering installation having a solder bath (2) and a conveying system for producing one or more solder waves (5,6), in particular suitable for soldering electric printed circuit boards (column 1, lines 3-14), having an immersion box which is closed on all sides, shaped like a frame (column 2, lines 53-55), which can be immersed in the solder bath and which has pipes (9, 10, 13) to distribute nitrogen (col. 2, lines 56-59), one pipe (13) being arranged inside the immersion box in a cage-like housing (12) with an outlet opening, the cage-like housing (12) being

designed such that the pipe (13) is arranged therein in such a way that the pipe (13) essentially cannot be struck by solder splashes produced during the operation of the wave soldering installation.

D1 does not disclose porous pipes but discloses generally the use of gas diffusers which are preferably perforated diffusers (e.g. column 2, lines 32/33).

D1 also does not disclose that, as far as the pipes 9 and 10 are concerned, the pipe**s** are arranged inside the immersion box in cage-like housing**s** such that they essentially cannot be struck by solder splashes.

3.2 Consequently, the subject-matter of claim 1 is new over D1 (Article 54(1) and (2) EPC).

3.3 The appellant argued that the feature cage-like housings and its protective function in respect of splashes was disclosed in the figure of D1, as implemented by the sheet metal arrangements around the pipes 9 and 10. The Board however cannot agree with this interpretation. Although the pipes 9 and 10 appear to be encased by the arrangement consisting of the vertical and horizontal wall elements of the hood (1,8) and the adjacent respective walls delimiting the solder wave channels, it is nevertheless not directly and unambiguously derivable that in particular the latter walls are features of the immersion box (see item 2 above). Rather, they appear to be part of the solder wave equipment.

3.4 The respondent contested that the feature "immersion box which is closed on all sides, shaped like a frame"

would be anticipated by the hood known from D1. However, in this respect, the Board considers the appellant's arguments convincing. The figure of D1 schematically represents a longitudinal section through a wave soldering installation comprising a hood. The statement in column 2, lines 52 to 55, in particular the expressions "*Abdeckhaube*" (covering hood) and "*eingehaust*" (enclosed), as well as the statement at the end of claim 1, can only be understood in the sense that the immersion box of D1 must be closed on all four sides, and is consequently shaped like a frame.

4. *Inventive step of claim 1 of the main request*

4.1 The distinguishing features of claim 1 over the apparatus known from D1 relate to multiple independent technical problems, which are, on the one hand, to provide for an alternative efficient gas diffuser, and on the other hand, to provide for an installation which may be operated for as long as possible without interruption and easy maintenance (see patent, column 2, line 57 to column 3, line 2).

4.2 The Board considers that the solutions to these problems as defined in claim 1 of the patent are obvious for the reasons given below, so that claim 1 as granted does not comprise an inventive step (Article 56 EPC).

4.2.1 Porous pipes used to distribute inert gas are well known in the art of wave soldering installations. D1 makes reference in the introductory portion to D5, relating to a process of inerting the atmosphere over a solder bath by using gas diffusers. It would have been

obvious for the skilled person to use the gas diffusers of D5 in the form of porous tubes (D5, column 5, lines 20-22, 41-43; Fig. 4) in an installation according to D1, and thereby to arrive without inventive effort at diffusers comprising porous pipes.

4.2.2 Furthermore, D1 already discloses a single cage-like housing (12) around the central pipe (13). Although the above identified technical problem is not explicitly mentioned in D1, the technical effect achieved by this cage-like housing (12), and in particular by its downwards directed parts, namely the protection of the pipe from solder splashes of the adjacent solder waves, would be immediately apparent to the skilled person. It would also be immediately apparent to the skilled person that this would reduce the risk of blocking the openings of the gas diffusers and hence extend the period between necessary cleaning operations. It does not amount to an inventive activity to apply to a given apparatus a feature which has already been applied at other positions of the apparatus where the same problems arise. Providing all diffusers with the known type of cage-like housing would also lead to easier maintenance of the apparatus.

4.3 The respondent argued that the problem was neither mentioned in the prior art nor would D1 suggest the claimed arrangement. This argument does not convince the Board because, as has been stated above, the arrangement around the central diffuser pipe (13) would be immediately recognised by the skilled person as providing the function of protecting the pipe against solder splashes. Hence, although this part of the problem to be solved is not explicitly mentioned in D1,

it is nevertheless immediately apparent to the skilled person.

4.4 Also the Board cannot agree with the argument whereby the respondent questioned how at least some of the pipes in D1 would not necessarily be reached by solder splashes. Although it appears correct that the diffuser pipes (9) and (10) may be reached by solder splashes, this is not the case for the central pipe (13). For the considerations of inventive step it is not decisive that the claimed feature "cage-like housing" and its function is present for all pipes of the installation, but that there is at least one instance of such feature providing the claimed function.

5. *Admissibility of auxiliary requests 1 and 2*

5.1 Both auxiliary requests were filed after the respondent's reply to the grounds of appeal, and more particularly almost two weeks after the time limit set by the Board of Appeal in its communication annexed to the summons to oral proceedings. These requests have therefore to be considered as late filed and may be admitted and considered at the Board's discretion (Article 114(2) EPC and Article 10b(1) of the Rules of Procedure of the Boards of Appeal).

5.2 In particular, the requirement that the amendments should be clearly allowable is of utmost importance in the present case, since the respondent did not attend the oral proceedings, so that not even minor amendments could be obtained without adjournment of the procedure.

5.3 The two auxiliary requests comprise a number of immediately apparent formal deficiencies. None of the two sets of claims is accompanied by a correspondingly adapted description, so that inconsistencies would arise between the invention as defined in the respective independent claims and the description, leading to a lack of clarity of the claims (Article 84 EPC). Furthermore, the claims of both requests have been amended in a way which possibly leads to inclusion of subject-matter not disclosed in the application as originally filed (Article 123(2) EPC). In claim 1 of the first auxiliary request the features of granted claims 1 and 4 have been combined and the feature "without striking the pipes" has been isolated from the remaining features of granted claim 5 and added to this combination, without there being an immediately apparent basis for this change. Moreover, dependent claim 2 of the first auxiliary request comprises the features of granted claims 3 and 5, so that now the features of granted claims 1, 4 and 5 are claimed in combination, whereas granted claim 5 only depended on claims 1 or 2, but not on claim 4. Also claims 4, 8 and 9 depended on claims 1 to 3, 1 to 7, 1 to 8, respectively, although the corresponding granted claims 6, 10, 11 each depended only on granted claims 1 or 2. The second auxiliary request comprises similar modifications in dependent claims 4-7, 11 and 12. No basis has been indicated by the respondent for the amendments in the dependent claims. Finally, with respect to claim 1 of the first auxiliary request, serious doubts exist whether the amendment would be sufficient to change the finding with respect to inventive step. Arguments as to how these amendments might change the finding on novelty and/or inventive

step for the main request have not been provided by the respondent.

5.4 Since the sets of claims of the first and second auxiliary requests give rise to the above questions, they are not clearly allowable and can thus not be admitted into the proceedings.

Order

For these reasons it is decided that:

1. The decision is set aside.

2. The patent is revoked.

The Registrar The Chairman

G. Rauh P. Alting van Geusau