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D E C I S I O N
of 10 September 2003

Case Number: T 0401/00 - 3.2.6

Application Number: 93870095.2

Publication Number: 0573402

IPC: D06F 67/08

Language of the proceedings: EN

Title of invention:

Industrial ironing machine and method for manufacturing a bed
to be used in such an ironing machine

Patentee:

Lapauw, Romain

Opponent:

Herbert Kannegiesser GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 83, 84, 123(2)

Keyword:

"Sufficiency of disclosure (yes)"

"Clarity (yes)"

"Admissible amendment (auxiliary request 2) (no)"

"Novelty (yes)"

"Inventive step (main and auxiliary requests 1 and 3) (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 0401/00 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 10 September 2003

Appellant: Herbert Kannegiesser GmbH
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
29 February 2000 concerning maintenance of
European patent No. 0573402 in amended form.

Composition of the Board:

Chairman: H. Meinders
Members: G. Pricolo
M.-B. Tardo-Dino
G. C. Kadner
M. J. Vogel

Summary of Facts and Submissions

I. The appeal is from the interlocutory decision of the Opposition Division of 29 February 2000 maintaining European Patent 0 573 402 in amended form.

In its decision the Opposition Division considered that the patent disclosed the invention sufficiently clearly to be carried out by the skilled person (Article 83 EPC) and that the subject-matter of independent claims 1 and 2 was novel and inventive in view of the following state of the art (insofar as relevant to the present decision):

D1: FR-A-1 235 155

D2: US-A-3 118 240

D3: DE-A-2 054 928

D5: DE-B-1 211 122

D6: DE-C-0 908 485

D7: DD-A-0 063 061

D8: DE-A-2 532 672

E2: Drawing N04-01-3066 Goudsche Machinefabriek B.V.

E3: Order from Goudsche Machinefabriek B.V. to Omega Engineering dated 18 February 1992

E4: Freight document Omega Engineering to Goudsche
Machinefabriek B.V. dated 19 March 1992

E5: Invoice Omega Engineering to Goudsche
Machinefabriek B.V. dated 24 march 1992.

In the opposition proceedings a witness, Mr Oonk, had
been heard.

II. Against this decision the opponent filed an appeal on
14 April 2000, paying the appeal fee on that same date.

The Appellant filed its statement of grounds of appeal
on 29 June 2000.

In the ensuing exchange of submissions the Respondent
(patentee) relied *inter alia* upon:

AST2: Leaflet "Thermplate", A. Leering Enschede

AST3: Declaration by Mr Slotman.

III. Oral proceedings were held on 10 September 2003.

The Appellant requested setting aside of the decision
under appeal and revocation of the patent. It withdrew
its request for correction of the minutes of the oral
proceedings before the Opposition Division in respect
of statements made by the Respondent in those
proceedings, having received, with the communication of
the Board dated 21 July 2003, the internal note of the
Opposition Division dated 17 May 2000, sent to the
Board in respect of this request.

The Respondent requested rejection of the appeal, auxiliarily setting aside of the decision under appeal and maintenance of the patent with a set of 3 claims filed during the oral proceedings according to its first and third auxiliary request or as filed with its letter of 22 August 2003 (second auxiliary request).

IV. For the present decision only the wording of independent claim 1 is relevant. Of the main request this claim reads as follows:

"An industrial ironing machine comprising an ironing cylinder and a bed surrounding substantially half of the ironing cylinder, wherein the bed of the industrial ironing machine is composed of flexible stainless steel plates (1, 2), having besides a laser weld (4) along the outline, a series of welded spots (5) obtained by the laser technique, and wherein said plate (2) which in the operative position of the machine engages the ironing cylinder (3) has a thickness of between 3 and 5 mm, and said plate (1) which in the operative position of the machine is situated on the outer side has a thickness of between 0,80 and 1,20 mm, said flexible stainless steel plates (1, 2) being deformable so that they constitute a flexible entity which adjusts itself to the cylindrical surface of the ironing roller".

Claim 1 of the first auxiliary request is identical to claim 1 of the main request, with the addition that the ironing machine **further comprises means for keeping the bed pressed against the ironing cylinder.**

Claim 1 of the second auxiliary request is identical to claim 1 of the main request, with the addition that **the stainless steel plates are spaced from each other between the laser welded spots so as to provide flow channels for circulating a pressurised heating liquid.**

Claim 1 of the third auxiliary request is identical to claim 1 of the second auxiliary request, however with the difference that **the stainless steel plates are spaced from each other between the laser welded spots so as to provide flow channels for circulating steam.**

- V. The arguments of the Appellant can be summarised as follows:

Sufficiency of disclosure and clarity (Articles 83 and 84 EPC):

The patent in suit did not sufficiently disclose the invention so as to be carried out by the skilled person as it did not provide the necessary information on the laser welding parameters, the spacing and the size of the weld spots for the two plates to be welded together to form a flexible unit, nor on how the bed was capable of adapting **itself** to the ironing cylinder. If the patent were to be considered as sufficient in its description of the invention it would mean that the skilled person had extensive knowledge of the "pillow plate" technology; the same skilled person should then be considered when assessing inventive step.

To comply with the requirements of Article 84 EPC, all essential features of the invention should be comprised in the independent claims. This was not the case as the

spacing of 2 mm between the plates was described as essential in the description, however did not figure in claim 1.

Main request - Inventive step (Article 56 EPC)

For assessing inventive step the skilled person (see above) had detailed knowledge of the pillow plate technology as e.g. disclosed in AST2 (of which the availability to the public before the priority date of the patent in suit was supported by AST3) and of such products using stainless steel of different thicknesses (6 and 1,5 mm, thus in a 4:1 relationship) as evidenced by E2-E5, a prior use which had been acknowledged by the Respondent as having taken place before the priority date of the patent in suit.

The subject-matter of claim 1 of the main request differed from the ironing machine as disclosed in D7, which was the closest prior art for discussing inventive step, only by the following features:

- the use of stainless steel plates,
- the use of laser welding for connecting the two plates together,
- the use of an outer thin plate of 0,80-1,20 mm thickness together with a thicker inner plate of 3 to 5 mm.

The use of stainless steel plates and the laser welding technology, resulting in a pillow plate with plates of different thickness, was well known in heat exchangers,

as discussed on page 2 of AST2. Ironing in an industrial ironing machine was nothing other than applying heat and the use of stainless steel was well known in ironing, as disclosed in D8, which concerned the stainless steel plate sole of a hand-held iron. The inner plate of the ironing bed disclosed in D7 had a thickness of 2 to 4 mm, which allowed for the bed to be flexible. With the 4:1 relationship known for the industrially used pillow plates (see above) this meant for the inner plate a thickness between 0,50 and 1 mm, which fell within the range claimed. Knowing the production advantages of laser welding technology, which became industrially applicable in the early 90's, the skilled person, constantly in search for more efficient methods of producing the apparatuses under his responsibility, would apply it to the production of the ironing bed as known from D7 and thus arrive at the subject-matter of claim 1.

Since claim 1 did not exclude the presence of rigidifying means, such as pipes, along the longitudinal sides of the bed, this could not help in distinguishing its subject-matter over D7. The advantage of not having to perform an after-treatment on the pillow plate was not at issue, because claim 1 did not contain any feature related to this aspect. Further, this advantage was in any case a direct consequence of applying the pillow plate technology.

As concerns the question of determining the knowledge and level of experience of the skilled person, Mr Oonk could hardly be considered the skilled person in this case, as he never had anything to do with industrial ironing machines. If anybody, it was Mr Lapauw, the

inventor, who was working in the field of beds for ironing machines, i.e. somebody with knowledge of how to produce such beds.

Inventive step - first auxiliary request

The above reasoning applied also to claim 1 of the first auxiliary request, which only differed from claim 1 of the main request in that additionally means were present for keeping the bed pressed against the ironing cylinder. Firstly, it was evident from D7 that the ironing bed disclosed had to be held pressed against the cylinder in one way or the other, otherwise it would not perform its correct function. Secondly, that requirement was also explicitly mentioned in column 3, line 20 of D7. Thirdly, this was an aggregate feature not technically or functionally linked to the other features of this claim, thus further prior art could be cited against such a feature, for instance D5, which showed means for pressing the bed against the ironing cylinder.

Amendments (Article 123(2) EPC) - second auxiliary request

The amendment of claim 1 so as to now include the feature of the plates being spaced from each other by laser welding so as to provide flow channels for circulating a pressurised heating fluid now covered two possibilities: the fluid was externally pressurised so as to circulate in the channels (which could be considered as originally disclosed) and the fluid being internally under pressure (which was not originally disclosed as it could not be derived from the mention

of "steam" in the original application, the only feature coming close to it). Thus this amendment was not allowable. The first possibility was in any case known from D7, where the heating fluid also circulated.

Inventive step - third auxiliary request

The feature by which this claim distinguished itself from claim 1 of the main request, being the flow channels for circulating steam, could not support inventive step as the use of steam in industrial ironing was well known, for instance D7 mentioned this.

VI. The Respondent argued essentially as follows:

Sufficiency of disclosure

The skilled person in the present case had to be considered as being familiar with the "pillow plate" technology as evidenced by E2 to E5, of which the public availability was no longer contested. Document AST2 could not form part of the prior art as according to the German Court its date of public availability could not be unambiguously determined. Therefore the Respondent no longer acknowledged it as prior art; in any case AST2 did not provide more information than already available from E2 to E5. The skilled person for the purposes of inventive step thus had knowledge of the pillow plate technology as evidenced by E2 to E5.

For sufficiency of disclosure, however, that skilled person was additionally provided with the information as disclosed in the patent. That information, which pertained to the plate thicknesses and laser welding

around the outline as well as on spaced points within the outline as mentioned in the patent was sufficient to achieve not only the necessary flexibility enabling the bed to adapt itself to the cylindrical surface of the ironing cylinder (i.e. in the radial direction), but also a flexibility in the longitudinal direction of that cylinder. Moreover, Mr Oonk, the witness heard by the Opposition Division, who could be regarded as the skilled person, had stated that he was capable of producing the bed with the plates as provided by the Respondent (see minutes of the hearing of witnesses held on 18 October 1999, page 3), with the information of the patent at hand.

Main request - inventive step

D7 was an old document dating back to 1968, which disclosed an ironing machine having such disadvantages that the skilled person would not select it as a basis for further development: the two pipes along the two longitudinal sides made the bed rigid in the longitudinal direction, which was not the case for the bed of the invention. Their presence necessitated welding the plates to them, which resulted in stresses in the bed as well as in a necessary after-treatment of the weld locations to smoothen the plates in the area of the welds. Therefore, in accordance with the Case Law of the Boards of Appeal, the disclosure of D7 should not be used as closest prior art.

If D7 were to be taken as starting point the difference presented by the subject-matter of claim 1 lay in the choice of the different plate thicknesses, the use of stainless steel and the use of laser welding to achieve

a bed which was flexible in the radial direction as well as in the longitudinal direction. It further avoided machining the bed after welding, which was necessary when using spot welding and when using rigidifying pipes along the longitudinal edges as in D7.

None of the available prior art documents suggested the claimed measures to solve these problems. From E2 to E5 it was not evident that a flexible unit would result of which the inner surface was smooth and needed no after-treatment after welding. Neither did AST2, if that document were taken into account by the Board as prior art, disclose such features. The thought of using the pillow plate technology for making the bed of an industrial ironing machine was novel and also non-obvious, as also confirmed by the fact that Mr Oonk, a specialist in pillow plate technology, was surprised by the presence of Mr Lapauw, the inventor, at the Antwerp fair for refrigeration technology (see minutes of the hearing of witnesses, page 1, last paragraph).

First auxiliary request - Inventive step

Claim 1 of this request distinguished itself further by the means for keeping the bed pressed against the ironing cylinder, which were not disclosed in D7. As lack of inventive step of the subject-matter of claim 1 had been argued already on the basis of the combination of D7 and the pillow plate technology as evidenced by either E2 to E5 or AST2, one could not just add further documents like D5 to this combination.

Second auxiliary request - Amendments

The basis for this amendment could be found in the original application documents, page 4, line 26, 27: "Between the different welded spots 5, flow channels for the circulating fluid, usually steam, are formed." Furthermore, for an invention directed at industrial ironing machines, it was normal to use superheated steam at 190°C, which meant that the steam was under pressure, approximately 12 bar.

Third auxiliary request - inventive step

The added feature of the stainless steel plates being spaced from each other to provide flow channels for circulating steam made the subject-matter of claim 1 inventive over D7, as the relevant embodiment of D7 for claim 1 with this wording was not the embodiment of Figures 1 to 3, described in column 4, line 23 to column 5, line 18, but the second embodiment, of Figure 4 and column 5, lines 19 to 28. That embodiment involved steam pipes within the embossed heating chambers 5 and would clearly not be considered as starting point by the skilled person, as it necessitated too important technical changes.

Reasons for the Decision

1. The appeal is admissible.

2. *Sufficiency of disclosure and clarity of the claims*
(Articles 83 and 84 EPC)

- 2.1 The Board considers that the level of knowledge and skills of the skilled person to be taken into account for the purposes of assessing sufficiency of disclosure has to be the same as that for assessing inventive step. For the purpose of sufficiency of disclosure that knowledge is further supplemented by the information in the patent.

The person to be considered "skilled" in the present case is the engineer working in the production of industrial ironing machines, which involve beds surrounding in whole or in part an ironing cylinder. Such beds have to have, by their nature, a flexibility to stay in close proximity of that cylinder (otherwise the ironing effect is reduced), but also allow for (locally) different thicknesses of the materials to be ironed (so as to avoid excessive wear). Within the beds circulates a heating medium, so as to heat the materials ironed between the cylinder and the bed.

They are generally made of two spaced thin steel sheets, **welded** to each other, see for instance D2 and D7. Thus the skilled person in this field has to be well versed in the welding technology of thin steel sheets, for which in the beginning of the 90's, i.e. before the priority date of the patent in suit, laser welding became available.

2.2 For the production of the bed the patent in suit proposes the pillow plate technology, in which two thin steel sheets are first laser welded together along their outline as well as on a series of spots distributed over the surface, then the space between the plates is pressurized to deform one or both plates in order to provide a space in which a heating (or a cooling) medium can circulate. With sheets of the same thickness both deform, with sheets of different thicknesses the thinner sheet deforms preferentially. The patent in suit mentions the use of stainless steel plates, with a range of thickness of 3 to 5 mm for the inner plate and 0,80 to 1,20 mm for the outer plate, a spacing of about 2 mm between the plates, a pressure of 30 bars of the injection water to inflate the pillow and the mention that the pattern of the laser welded spots is arbitrary.

There is no mention of laser welding parameters, nor of the spacing and size of the spots, only the mention that the inner plate should not deform and maintain its continuous cross-section and that the resulting bed should be flexible so as to closely fit around the ironing cylinder and adapt itself to the cylindrical surface thereof.

2.3 In the Board's view, the skilled person referred to above is able to produce such a bed on the basis of the above referred disclosure in the patent only if he also masters the pillow plate technology, which allows him to achieve the indicated results.

This is also acknowledged by the Respondent in its letter of 3 January 2001, in which it argued that what the invention added to the state of the art was the laser welding of two stainless steel plates to each other to form a flexible unit and the choice of the different thicknesses of these plates. Once the thickness of the plates having been selected, the assembly of the plates would not be more than "routine work for the skilled person, given the fact that the method of laser welding and the principle of pillow plates are both known". With that letter AST2 was introduced into the appeal proceedings by the Respondent as proof of such knowledge. Furthermore, E4 was mentioned as equivalent proof.

- 2.4 Thus, in order to comply with the requirements of Article 83 EPC the skilled person has to be considered as also knowing how to apply the pillow plate technology as disclosed in AST2 and E2 to E5. In that respect the Board wishes to note that it considers AST2 to form part of the prior art for the patent in suit. This conclusion is based on AST3, which is a declaration of Mr Slotman, managing director of A. Leering, the company for which the brochure AST2 had been produced, stating that the brochure in question was printed in March 1991, as well as on the consideration that it would be against normal practice for such companies not to distribute such brochures to their customers. Moreover, the Respondent had acknowledged AST2 as prior art with its above mentioned letter.

The consequence of the above is also that the skilled person to be taken into account for the assessment of inventive step has to be considered as having this same level of knowledge and skills.

- 2.5 The Respondent further argued that it was evident from the information in the patent in suit that the bed should involve not only a flexibility for adapting itself to the cylindrical surface of the ironing cylinder, i.e. in the radial direction, but also a longitudinal flexibility. The latter was due to the absence of any rigidifying means in the longitudinal direction of the bed, as could be derived by the absence of a mention thereof in the description of the patent in suit and the fact that no such means were shown in the drawings.

The Board considers that the patent in suit does not provide support for that contention. The drawings are indicated as being schematic (column 2, lines 22 to 28), thus cannot provide the information that no rigidifying means are present in the longitudinal direction. Moreover, the drawings show parts in cross section which could very well be such means. Further, the description does not mention anything of this kind, which, if it were an important aspect of the invention, surely would have merited a reference, as was done for the flexibility in the radial direction. It is also not evident to the skilled person that a pillow plate construction is flexible in the longitudinal direction if that plate is in a semi-cylindrical configuration for accommodating an ironing cylinder, as by definition such an arrangement rigidifies the bed in a longitudinal direction. Finally, this longitudinal

flexibility cannot be derived from the reference in the description of the patent in suit to the advantage of the invention (of not having to perform milling operations on the bed), as it is not indicated where and because of what structural feature this milling operation otherwise would have to have taken place.

Thus the feature of the longitudinal flexibility of the bed does not unambiguously form part of the invention as disclosed in the patent in suit.

- 2.6 The Appellant contended that the patent did not sufficiently disclose how the bed was able to adjust **itself** to the cylindrical surface of the ironing cylinder, as no means were disclosed for this purpose; the hydraulic cylinders mentioned in the description could not provide that function.

The Board considers that this feature follows from the thickness of the steel plates used and from the laser welded spots within the outline of the two plates being arranged in rows; thus the flexibility of the bed in the radial direction, i.e. adaptability to the cylindrical surface of the ironing cylinder, is guaranteed.

For the above reasons the requirements of Article 83 EPC are thus considered fulfilled.

- 2.7 The description does not mention the 2 mm spacing as being an essential feature of the invention for providing a flexible bed, other small spacings appear to be equally feasible when applying the pillow plate technology, thus claim 1 need not mention this spacing

of the plates to comply with the requirements of Article 84 EPC.

3. *Main request - claim 1 - closest prior art*

3.1 Lack of novelty of the subject-matter of claim 1 of the set of claims maintained by the opposition division, which forms the main request, has not been argued by the Appellant and is thus not an issue in the present appeal. The Board has verified that none of the available prior art in the file discloses all features of claim 1 of the main request.

3.2 Closest prior art for the discussion of inventive step is considered by the Board to be D7.

The Respondent argued that D7 was not the proper starting point for discussing inventive step as it was a document dating from 1968, i.e. relatively old. The skilled person had no good reason to take D7 as a basis for further development because the bed shown therein was rigid in the longitudinal direction due to the two longitudinal pipes at the edges of the bed, to which the two plates of the bed were welded. The latter feature meant that the bed was in any case to be machined after welding and that stresses were still present therein, due to the welding.

The Board is not convinced by this argument for the following reasons:

First, since the alleged flexibility in the longitudinal direction finds neither a counterpart in the claim in the form of a technical feature, nor a

sufficient disclosure in the patent in suit (see point 2.4 above), it cannot help in excluding D7 as prior art.

Second, the present wording of the claims does not require the plates to be directly welded to each other, but allows for these plates to be connected to each other via pipes or any other means extending in the longitudinal direction.

Third, this document is the most appropriate starting point, as it not only is concerned with an ironing bed which is **flexible** in the radial direction (see column 1, lines 1 to 3, column 3, line 55, column 4, lines 32, 33 and 55 to 59), but also relates to the problem the claimed invention tries to solve: avoiding stresses in the bed, resulting from the welding of the plates as well as reducing costs in producing the bed (column 3, lines 46 to 53 of D7 in comparison with column 3, lines 25 to 32 of the patent in suit).

Fourth, D7 mentions explicitly why the weld lines connecting the inner plate and the outer plate to the pipes are at diametrically opposite sides of the pipes, namely to avoid stresses. Further, the absence of the necessity to machine the bed after welding finds no counterpart feature in claim 1, thus cannot serve to exclude D7 as prior art.

Fifth, there is no evidence that the field of ironing machines has such a high rate of development that a document like D7 would not be taken into consideration, while obsolete because of its publication as early as 1968. The search performed for the application which

led to the present patent only revealed D1, published in 1960; of the documents relating to industrial ironing machines produced in opposition there is only one document (D3) which is more recent than D7, having been published in 1972. However, that document relates to electrically heated ironing beds, is thus less relevant prior art.

4. *Main request - inventive step (Article 56 EPC)*

4.1 The patent in suit uses D1 as prior art to distinguish over; however, this prior art is more remote than D7 as it does not relate to an ironing bed, flexible in the radial direction, made of thin steel plates, as does the ironing bed disclosed in D7. Thus in respect of that closer prior art the problem to be solved has to be objectively redefined.

4.2 D7 is considered to disclose an industrial ironing machine from which the ironing machine of claim 1 differs in that:

- the steel plates are made of stainless steel,
- the welds along the outline of the bed and at the spots have been produced by laser welding,
- the external plate has a thickness of between 0,80 and 1,20 mm, combined with an inner plate of 3 to 5 mm thickness.

The bed of D7 has the disadvantage that the outer plate has to be preformed to provide the channels for circulating the heating fluid, which complicates the

method of producing it, thus making it costly, and that the steel plates of the bed are susceptible to corrosion.

The invention therefore sets itself as goal to simplify the production of the ironing bed, thus make it more economical (see column 3, line 25 of the patent in suit), and to provide a more durable bed.

4.3 The use of stainless steel plates instead of normal steel plates for the bed (D7 does not mention what kind of thin steel plates are used) is considered by the Board as being a normal design measure for the skilled person, in view of the humid, hot atmosphere present in ironing. It is also documented for industrial ironing machines in D3, page 2, line 23: "... die neue Mulde besteht aus V2A-Blech". Also D6, page 2, lines 35 to 37, referring to a chromium nickel steel plate ironing bed ("Chromnickelstahl"), points in that direction.

4.4 Remains the question of how to economize on the production of the ironing bed. There is no doubt that it is normal practice for the skilled person to strive at rendering the products under his responsibility cheaper in production, or at improving their quality without increasing costs. For being able to do this he has to keep track of the latest developments in manufacturing processes.

The skilled person for inventive step being the same person as for the assessment of sufficiency of disclosure, see point 2.3 above, the result is that he knows about the latest developments in welding techniques used on thin steel plate material, like

laser welding, as well as the new technologies used for producing steel plate heat exchangers, like the pillow plate technology, which also uses laser welding.

It can be expected of him that he considers these technologies for application in the production of the ironing bed for the industrial ironing machine as disclosed in D7.

- 4.5 The pillow plate technology is for instance documented in AST2 and E2 to E5.

AST2, a leaflet for the product "Thermplate" filed by the Respondent as evidence of the pillow plate technology available before the date of priority of the patent in suit, discusses and shows curved heat exchangers for heating and cooling, made with this technology, which consists of laser welding (as confirmed by the declaration AST3) two stainless steel plates around the periphery as well as on spots within the periphery, after which pressure is applied to the space between the plates, which deforms both plates (if they are of the same thickness) or one plate specifically (the thinner of the two).

Documents E2 to E5 are accepted by both parties and the Board as evidence of a prior use by delivery of a "template" or "trog" (trough) by Omega Engineering B.V. to the "Goudsche Machinefabriek" before the priority date of the patent in suit.

E2 is a drawing showing a trough with a cross-section in the form of a "W", the two bottom parts having a radius of 220 mm, the trough having a length of

approximately 3000 mm. The plate thicknesses are 6 and 1,5 mm, and they are made of stainless steel (steel 1.4404 and 1.4301). The welded points have a spacing of 45x45 or 45x60 mm. The pressure used to inflate the outer plate is mentioned as 45 bar, the minimum spacing between the plates is 2,5 mm. The drawing has the reference "N04 013066" and is dated "17.12.91".

E3 is the order with number 92000723 from "Goudsche Machinefabriek" to "Omega Engineering" for the laser welding of "tempplate [sic] 6 mm x 1,5 mm" according to drawing N04013066" and is dated "18.02.92". E4 is the freight document dated 19.03.92 for delivery from "Omega Engineering" to the "Goudsche Machinefabriek" of a product with "upper plate thickness 6 mm" and "lower plate thickness 1,5 mm", with reference to drawing number "N04-01-3066". E5 is the invoice to "Goudsche Machinefabriek" dated 24.3.92 for order number 92000723, for "laser welding of one pillow plate 1,5x6 mm", and is marked "paid 11.5.92". all these dates are prior to 5.6.92, the priority date of the patent in suit.

- 4.6 The advantages of this technology are easily recognized by the skilled person: faster production through the use of laser welding, the inner plate remains flat while inflating the thinner outer plate and the arrangement can withstand high pressures. From the laser welding technology of thin plates as such it is known that less stress in the finished product results, due to the limited extent of the heat application to the plates to be welded.

The Board considers these advantages to provide a clear enough indication to the skilled person that this technology should be applied in the production of the ironing bed as known from D7. This is all the more so where D7 is directly concerned with avoiding welding stresses in the bed (see column 3, lines 46 to 53).

- 4.7 The Respondent argued that from AST2 and E2 to E5 it was not clear that the resulting bed, if produced according to those teachings, was a **flexible unit** adjusting itself to the cylindrical ironing surface. The skilled person therefore would not further consider this technology.

The Board finds that this feature is one which is already present as an important feature in the bed according to D7, see column 1, lines 1 to 3, column 3, line 55, column 4, lines 32, 33 and 55 to 59 as well as the claims. The flexibility is achieved with an inner plate thickness of 2 to 4 mm, the outer plate thickness is not explicitly mentioned. The skilled person will wish to maintain such an important feature when contemplating the application of other teachings.

In any case, in view of its size of 745 mm width and approximately 3000 mm length, also the trough of E2 to E5 will have at least some "flexibility" with the plate thicknesses of 6 mm for the inner plate and 1,5 mm for the outer plate. In that respect it has to be noted that the claimed range of 3 to 5 mm for the inner plate and 0,80 to 1,20 mm for the outer plate for an ironing machine with a cylinder diameter of 600 to 1600 mm, apparently resulting in a "flexibility" of the bed, is quite close to the thicknesses of 6 and

1,5 mm for the inner and outer plates of the trough of E2 to E5. It can hardly be imagined that this difference would have to lead to the conclusion that the trough disclosed in E2-E5 is **not** "flexible".

- 4.8 The Respondent further argued that the skilled person would also not contemplate the application of these teachings as it was not clear whether the inner plate would or would not need **after-treatment**, after the welding.

The Board observes that this aspect does not find its counterpart as a feature in the claim, thus cannot help in inventively distinguishing the subject-matter of claim 1 over the prior art.

- 4.9 The Respondent finally argued that D7 taught to use two plates of the **same thickness**, thus the skilled person would not use different thicknesses as shown in E2 to E5 and in one range of products shown in AST2.

Apart from the fact that D7 is silent on the thickness of the outer plate, thus does not give a specific indication to either of the two possibilities, the Board is of the opinion that the requirement for the inner surface of the ironing beds to be continuous, smooth and to provide sufficient heat exchange is quite clear to the skilled person, not only from D7 ("durchgehende Plättfläche" in column 4, line 34), but also from the other available prior art on the subject of ironing beds. He will thus have no reason to dispense with this feature, particularly if the pillow plate technology offers him the possibility to maintain this feature by having a thicker inner plate which does

not deform and a thinner outer plate for creating the channels for the heating fluid.

As the pillow plate technology as documented by E2 to E5 employs a 4:1 ratio for the inner plate: outer plate thickness, the skilled person, when applying this teaching, will at first try out the same ratio for determining the thickness of the outer plate in combination with the existing inner plate thickness of 2 to 4 mm as disclosed in D7, which provides him with a radial flexibility and a smooth ironing surface. This will lead him to 0,5 to 1,0 mm for the outer plate thickness, with the result that these thicknesses fall within the ranges claimed in claim 1.

For the above reasons inventive step has to be denied for the subject-matter of claim 1 of the main request (Article 56 EPC).

5. *First auxiliary request - inventive step*
(Article 56 EPC)

In claim 1 of this request is added the feature that further are comprised "means for keeping the bed pressed against the ironing cylinder".

Firstly, the Board considers that it is hardly imaginable that the ironing machine as shown in D7 would **not** have means for keeping the bed pressed against the ironing cylinder. Otherwise there would be no need for the explicitly mentioned flexibility in the radial direction or the rigidity in the longitudinal direction. Any ironing bed should remain pressed

against the ironing cylinder otherwise it would not perform its function.

Secondly, such means are well known in the field of industrial ironing machines, see e.g. D5, Figures 4 and 5.

The conclusion is therefore that this further feature cannot lead to this claim 1 involving inventive step..

6. *Second auxiliary request - Amendments*
(Article 123(2) EPC)

6.1 The amendment of claim 1 involves the addition of the feature that the stainless steel plates are "spaced from each other between the laser welded spots so as to provide flow channels for circulating a pressurized heating fluid".

Basis for this amendment is considered by the Respondent to be found in column 3, lines 12 to 14 of the A-publication, i.e. page 4, lines 25 to 27 of the application documents as originally filed.

This passage reads: "Between the different welded spots 5, flow channels for the circulating fluid, usually steam, are formed". The term "pressurised" is not mentioned.

For the Board this term covers an **external** source being present for circulating the heating fluid, as well as that the **fluid itself is under pressure**. If this feature is to be allowed, both possibilities should

have been originally disclosed, to comply with the requirements of Article 123(2) EPC.

- 6.2 From the fact that the heating fluid circulates, it could be derived that **external** pressure is applied to achieve this circulation.

However, in that case there would be no distinction over D7, which also discloses this feature, the heating fluid - which in itself is not under pressure ("drucklos") - being described as circulating through the heating pipes 5 (see column 4, lines 63 to 65 of D7).

For the possibility of the fluid **itself being under pressure** only the reference to "steam" is available. The Board considers the latter insufficient to provide the direct and unambiguous disclosure of the liquid being "pressurized", as "steam" is not necessarily under a pressure above atmospheric pressure.

Claim 1 of the second auxiliary request is therefore not allowable pursuant to Article 123(2) EPC.

In any case, as will be discussed in point 7.2 below, even if the reference to "steam" in the context of industrial ironing should provide sufficient basis for the term "pressurized heating liquid", the subject-matter of this claim would not involve an inventive step.

7. *Third auxiliary request - inventive step*
(Article 56 EPC)

7.1 In claim 1 of this request the above mentioned feature of the "pressurised heating fluid" has been replaced by "steam".

There is basis for this in the application as originally filed, page 4, lines 25 to 27, thus the requirements of Article 123(2) EPC are fulfilled.

7.2 For the discussion of inventive step of the subject-matter of this claim it should not be overlooked that the claim is a "product claim" for an industrial ironing machine with an ironing cylinder and a specific type of bed, the bed being characterised by a number of specific **technical** features (stainless steel plate thicknesses, type of welding connection, resulting in a specific construction), an **indication of intended use** (the bed is to be used with circulating steam) and a **functional** feature (deformability of the plates so as to result in radial flexibility of the bed).

Indications of intended use of a claimed product only result in a technical limitation for the product insofar as the product should be **suitable** for the intended use.

In the present case the Board finds that the claimed plates being spaced between the laser welded spots so as to provide flow channels for circulating steam is such an indication of intended use, meaning only that the resulting channels should be suitable for circulating steam.

7.3 The Board fails to see why the bed of the ironing machine resulting from the obvious application of the pillow plate technology to the production of the bed disclosed in D7, as discussed in point 4 above, would **not** allow for the circulation of steam.

Firstly, the plates used are stainless steel plates, the outlines of those sections of the plates which are to be inflated are laser welded, within such outline there is a regular pattern of laser welded spots, thus channels result.

Secondly, even if "steam" should indicate "superheated steam under approximately 12 bar pressure" as essentially argued by the Respondent for the second auxiliary request, the pillow plate technology with its high pressure (e.g. 45 bar in E2) used to inflate the plates will guarantee that the end product is capable to withstand such "superheated steam".

As a result, the assessment of inventive step of the subject-matter of claim 1 of this request is not different from the one discussed in point 4 above for the main request.

7.4 The Respondent argued that for this claim only the second embodiment of D7 could be considered the closest prior art, as it concerns the use of steam for heating the ironing bed. That embodiment gave the skilled person even less reason to apply the pillow plate technology, in view of the steam pipes within the heating channels.

The Board is not convinced by this argument in view of the reasons given above, point 7.3. However, even if that embodiment were to be taken as starting point, the skilled person still would pursue the same goal, namely the simplification of the production of the ironing bed by application of new manufacturing technologies, like the pillow plate technology. Knowing that such heat exchangers can withstand high internal pressures, it will be obvious for him to dispense with the complicated construction of the ironing bed and replace it by one made with the pillow plate technology.

Finally, the use of steam is generally known for industrial ironing machines, see for instance D2, column 1, lines 25 and 30 and Figure 3, showing an ironing bed for use with steam, without extra pipes between the inner and the outer plate.

The third auxiliary request thus also fails for lack of inventive step of the subject-matter of claim 1 (Article 56 EPC).

- 7.5 None of the requests of the Respondent being allowable, the patent must be revoked.

Order

For these reasons it is decided that:

The patent is revoked

The Registrar:

The Chairman:

M. Patin

H. Meinders