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Datasheet for the decision of 2 May 2013

Case Number: T 1426/10 - 3.2.07

Application Number: 03703544.1

Publication Number: 1476288

IPC: B28B 3/02, B30B 11/02, B22C 15/10

Language of the proceedings: EN

Title of invention:
A method and equipment for compacting materials

Patent Proprietor:
Norsk Hydro ASA

Opponent:
Outotec GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56
EPC R. 116(1)
RPBA Art. 12(4), 13(1)

Keyword:
"Change of position in appeal proceedings concerning admittance of late filed requests during opposition proceedings has no impact on examination whether the opposition division exercised its discretion correctly (point 1.1.5)"
"Admittance of late filed requests, A, B and D - no, C - yes (points 1.1.7, 1.2, 1.3)"
"Inventive step - no, solution to both problems obvious (points 5.1, 5.3)"

Decisions cited:
G 0007/93

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1426/10 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 2 May 2013

Appellant: (Patent Proprietor)
Norsk Hydro ASA
Drammensveien 260
NO-0240 Oslo (NO)

Representative:
Berg, André
Norsk Hydro ASA
Patent and Trademark Department
Drammensveien 260
NO-0240 Oslo (NO)

Respondent: (Opponent)
Outotec GmbH
Albin-Köbis-Strasse 8
D-51147 Köln (DE)

Representative:
Christl, Hermann
Patentanwalt,
Pohlhausenstrasse 52
D-53332 Bornheim (DE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 29 April 2010 revoking European patent No. 1476288 pursuant to Article 101(3)(b) EPC.

Composition of the Board:

Chairman: H. Meinders
Members: H.-P. Felgenhauer
I. Beckedorf

Summary of Facts and Submissions

I. The proprietor (appellant) filed an appeal against the decision of the opposition division revoking European patent No. 1 476 288.

The appellant requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of one of the sets of claims filed as
auxiliary request A with letter of 27 August 2010,
auxiliary request B with letter of 17 March 2011,
auxiliary request C with letter of 21 March 2013, and
auxiliary request D during the oral proceedings.

The respondent (opponent) requested the appeal to be dismissed.

II. Claim 1 of request A reads as follows:

"A method for compacting a material, in particular vibration of "green mass" in a moulding process for the creation of mould bodies for the production of electrodes for the melting industry, in particular the aluminium electrolysis industry, comprising equipment with two mould parts, at least one of which has vibration applied to it during the compaction process, the mould parts are mutually physically integrated during vibration by means of a static compressive force that may consist of at least one spring, the mould parts consist of a lower table equipped with mould walls and an upper plumb designed to move downwards towards the table as a consequence of the intermediate

mass being compacted and in which the table is supported by a base,
characterised in that
the plumb has vibration applied to it, and that the mould parts are directly connected by the spring(-s) (k3), where the spring (k3) has minimal damping".

Claim 1 of request B reads as follows:

"A method for compacting a material, by vibration of "green mass" in a moulding process for the creation of mould bodies for the production of electrodes for the melting industry, in particular the aluminium electrolysis industry, comprising equipment with two mould parts, the mould parts are mutually physically integrated during vibration by means of a static compressive force, the mould parts consist of a lower table equipped with mould walls and an upper plumb, the plumb has vibration applied to it and is further designed to move downwards towards the table as a consequence of the intermediate mass being compacted and in which the table is supported by a base,
characterised in that
the mould parts are directly connected by a spring(-s) (k3), where the spring (k3) has minimal damping".

Claim 1 of request C reads as follows

"Equipment for compacting a material, in particular vibration of "green mass" in a moulding process for the creation of mould bodies for the production of electrodes for the melting industry, in particular the aluminium electrolysis industry, comprising equipment with two mould parts that are vibrated in the vertical

direction consisting of a lower table equipped with mould walls and an upper plumb designed to move downwards towards the table as a consequence of the intermediate mass being compacted and in which the table is supported by a base, the table is supported against the base by means of at least one spring (k1) and possibly a damper element (d1), the mass (ma) is compacted within a vacuum chamber (Vr) in which a vacuum is provided, the vacuum chamber (Vr) is delimited by means of mould walls (Fv1, Fv2), the table and a vacuum lid (Vk), and where the mould parts are mutually physically integrated by means of a static compressive force, which may consist of at least one spring,
characterised in that
the plumb has vibration applied to it and that the mould parts are directly connected by the spring (-s) (k3) between the table and the plumb via a structure that can be height-adjustable and that also extends up from the table and has a part that can be located above the plumb, which structure is permanently connected to the table".

Claim 1 of request D reads as follows:

"Equipment for compacting a material, in particular vibration of "green mass" in a moulding process for the creation of mould bodies for the production of electrodes for the melting industry, in particular the aluminium electrolysis industry, comprising equipment with two mould parts that are vibrated in the vertical direction consisting of a lower table equipped with mould walls and an upper plumb designed to move downwards towards the table as a consequence of the

intermediate mass being compacted and in which the table is supported by a base, the table is supported against the base by means of at least one spring (k1) and possibly a damper element (d1), the mass (ma) is compacted within a vacuum chamber (Vr) in which a vacuum is provided, the vacuum chamber (Vr) is delimited by means of mould walls (Fv1, Fv2), the table and a vacuum lid (Vk), and where the mould parts are mutually physically integrated by means of a static compressive force, which may consist of at least one spring,
characterised in that
the plumb has vibration applied to it and that the mould parts are directly connected by the spring (-s) (k3) between the table and the plumb via a structure that can be height-adjustable and that also extends up from the table and has a part that can be located above the plumb, which structure is permanently connected to the table and that the spring (k3) has minimal damping and also has a progressive spring force so that the compressive force is constant regardless of longitudinal changes to the spring".

III. Prior art

The following documents are referred to in the present decision

D1 EP-B-1 476 288 of the opposition proceedings and

D4 "Vibrocompacting Machines for the Moulding of Green Anodes – Process Development from the Equipment Supplier's Point of View" by M. Beilstein and M. Spangehl, in Light Metals

1998, Proceedings of the technical sessions presented by the TMS Aluminum Committee at the 127th TMA Annual Meeting, San Antonio, Texas, February 15-19, 1998, pages 745-752

filed with the reply to the statement setting out the grounds of appeal.

IV. According to the impugned decision the subject-matter of claim 1 as granted lacks novelty with respect to the method for compacting according to D1.

Spring 17 of the equipment of D1 has been considered as having the same function as the spring defined by the last feature of claim 1 as granted, namely to directly connect the two mould parts. Furthermore the spring of D1 has been considered as having minimal damping as disclosed in the description of the patent in suit for the spring referred to in claim 1 (reasons, point II.4).

Furthermore, according to the impugned decision an auxiliary request with a claim 1 comprising the features of claims 1 and 16 as granted, proposed to be filed during the oral proceedings, has not been admitted. Due to its late filing its admission has been considered as being unfair vis-à-vis the respondent (opponent), who had objected to the admission of this request. The appellant (proprietor) has not raised any objection concerning the non-admission of the request. A second auxiliary request referred to in the minutes of the oral proceedings before the opposition division (points 2 and 3), which likewise has not been admitted, had a claim 1 which in addition to claim 1 of the first

auxiliary request comprised the first feature of claim 3 as granted.

Claim 1 of this request corresponds to claim 1 of present request A.

V. The submissions of the appellant relevant for the present decision can be summarised as follows:

(a) Concerning the request proposed to be filed during the oral proceedings before the opposition division the latter exercised its discretion incorrectly in not admitting it. This request was intended to comprise the features of claims 1 and 16 of the patent as granted, could not have been a surprise for the respondent (then opponent) or the opposition division and could thus have been treated. The reason for the late filing of such a request was that in its preliminary opinion the opposition division had not clearly stated in its preliminary opinion that the subject-matter of claim 1 lacked novelty over D1. There was thus no apparent need to defend claim 1 of the patent as granted in that respect and to file auxiliary requests in advance. The finding of the opposition division that the subject-matter of this claim lacked novelty then made an auxiliary request necessary.

(b) Requests A and B filed during the appeal proceedings both having a claim 1 which corresponds to the claim 1 intended to be filed as an auxiliary request during the oral proceedings before the opposition division should be admitted

in the appeal proceedings. These requests have been filed sufficiently in advance of the oral proceedings before the Board and should not be of any surprise to the respondent nor to the Board.

(c) Request C should be allowed considering that it has been filed within the time limit set by the Board in its annex to the summons to oral proceedings and that its claim 1 is directed to equipment as defined by claims 14, 17 and 18 of the patent as granted.

(d) The equipment of claim 1 according to request C is distinguished over that of D1, which latter can be considered as constituting the closest prior art, by the features that the mass is compacted within a vacuum chamber, the plumb has vibration applied to it and the mould parts are directly connected by the spring(-s) k3.

(e) Provision of the vacuum chamber has the effect that the green mass can be compacted more densely while at the same time essential parts of the equipment like the spring(-s) k3 can be arranged outside the vacuum chamber which leads to such parts not being affected by the harsh environment present within the vacuum chamber. Thus the lifespan of such parts is increased and their maintenance is facilitated.

(f) The combination of the features that the plumb has vibration applied to it and the mould parts are directly connected by the spring(-s) k3 between the table and the plumb has the effect that the

dynamic behaviour of the equipment is improved. Thus a larger portion of the applied vibration contributes to the green mass being compacted while a lesser portion of the vibration is lost as noise or as vibration going into the basis.

(g) Since the arrangement of the vacuum chamber, such that essential elements remain outside of it and the application of vibration to the plumb while the mould parts are directly connected by the spring(-s) k3 is neither suggested by any of the documents considered nor obvious from their combined consideration the equipment of claim 1 involves an inventive step.

(h) Request D should be admitted despite the fact that it has been filed during the oral proceedings before the Board since its claim 1 further limits the equipment of claim 1 according to request C in a straightforward manner by the addition of the features of claim 3 of that request. Filing of a claim 1 in which properties of an important element of the equipment, namely the spring k3, are further defined cannot be seen as presenting a surprise. Moreover, it should be admitted since the subject-matter of its claim 1 *prima facie* involves an inventive step since D1 neither discloses that the air bellows provided between the table and the plumb has such properties and since consideration of the further prior art D4 does not suggest provision of a particular bellows which has the defined properties.

VI. The submissions of the respondent relevant for the present decision can be summarized as follows:

(a) The opposition division exercised its discretion correctly since the request proposed to be filed during the oral proceedings before the opposition division did, at that time, come as a surprise. At present in the appeal proceedings such a request, and correspondingly requests A and B, could be dealt with in substance. However, the subject-matter of claim 1 of neither one of these requests does not involve an inventive step.

(b) The same essentially applies with respect to the subject-matter of claim 1 of request C since the equipment defined is obvious starting from the equipment of D1 as closest prior art and further considering the embodiment of D4 according to which the plumb has vibration applied to it. Together with the embodiments of D4 in which the table has vibration applied to it D4 can be seen as evidence for the fact, also explicitly acknowledged in the patent in suit, that for the equipment concerned it is known to apply vibration either way, namely by vibrating the plumb or the table.

(c) Neither the features distinguishing the equipment of claim 1 according to request C over that of D1, which relate to the mass being compacted within a vacuum chamber, nor the distinguishing feature that the plumb has vibration applied to it can be considered as leading to subject-matter involving inventive step. The feature of the mass being

compacted within a vacuum chamber does not involve a technical teaching that goes beyond the – undisputed - generally known provision of a vacuum chamber. The feature that the plumb has vibration applied to it has to be seen as leading merely to an alternative manner of applying vibration to one of the two mould parts which are suited therefor, which cannot be considered as contributing to inventive step.

(d) Request D should not be allowed into the proceedings since it has been filed late (during the oral proceedings before the Board) and since it is apparent that the subject-matter of its claim 1 does not comprise any further features when compared to claim 1 of request C which could *prima facie* lead to subject-matter involving an inventive step.

Reasons for the Decision

1. Admissibility of requests A, B, C and D

1.1 *Admissibility of requests A and B*

1.1.1 It is undisputed that the claims 1 of requests A and B filed with the grounds of appeal correspond in substance to the claims 1 of the two requests proposed to be filed during the oral proceedings before the opposition division, which did not admit them (cf. impugned decision, point III.1 of the reasons; minutes of the oral proceedings before the opposition division, point 2).

1.1.2 According to the impugned decision the request was considered late filed (Rule 116 EPC) and its admission could be seen as an unfair behaviour vis-à-vis the opponent. Furthermore, according to the impugned decision the respondent objected to the admission of this request and the appellant did not raise any objection against the non-admission of it (cf. point IV above).

1.1.3 During the oral proceedings before the Board the appellant only argued that at the time in its view the subject-matter of claim 1 as granted (main request during the opposition proceedings) was clearly novel and involved inventive step. Based on this understanding it saw no reason to file amended requests prior to the oral proceedings before the opposition division. Only when the opposition division decided on lack of novelty did the need for auxiliary requests arise.

1.1.4 As indicated by the Board during the oral proceedings it should overrule the way in which the opposition division has exercised its discretion in not admitting a request / requests corresponding to requests A and B only if it comes to the conclusion that the opposition division has exercised its discretion according to the wrong principles, or without taking into account the right principles, or in an unreasonable way (G 7/93, OJ EPO 1994, 775, point 2.6 of the reasons).

The Board in the annex to the summons to oral proceedings (in the following: the annex) indicated that it does not appear that the opposition division

exercised its discretion in this respect wrongly (point 7.1.1).

The appellant has neither in the written part of the appeal proceedings nor during the oral proceedings argued that the opposition division exercised its discretion wrongly in not admitting such requests. The subjective assessment of the appellant concerning novelty and inventive step with respect to the subject-matter of claim 1 as granted (cf. point V(a) above) relates to internal reasons on the part of the appellant, therefore cannot be considered as relating to an objection concerning the exercise of discretion by the opposition division.

Due to the lack of any objection against the exercise of discretion on the part of the opposition division and due to the fact that the Board could not establish on its evaluation any mistakes in the exercise of the discretion, the Board saw, as indicated during the oral proceedings, no reason for changing its assessment in that respect as given in the annex.

1.1.5 The change in the position of the respondent, which, during the oral proceedings before the Board, declared that it does not object to the admission of such a request and, more precisely, of requests A and B into the appeal proceedings, has no impact on the examination of whether the opposition division exercised its discretion correctly, since in this examination only the circumstances at the time at which the opposition division exercised its discretion can be considered. In that respect what counts is that at that time the respondent objected to the admission of such

auxiliary requests during the course of the oral proceedings. For a negative exercise of discretion this suffices, particularly since according to the impugned decision the appellant did not object to the non-admission.

1.1.6 The Board thus comes to the decision that the opposition division exercised its discretion correctly in not admitting the proposed auxiliary request / requests.

1.1.7 Concerning the admittance of requests A and B, which undisputedly in substance correspond to the requests not admitted during the opposition proceedings, it is, as indicated by the Board during the oral proceedings, within its discretionary power not to admit requests that could have been presented or were not admitted in the first instance proceedings (Article 12(4) RPBA).

In exercising its discretion not to admit present requests A and B the Board considered, as indicated during the oral proceedings, that it would run counter to the purpose of appeal proceedings, namely to decide whether a first instance decision is correct or not, to decide on facts like presently given by requests A and B, which would have to be examined for the first time in the proceedings by the Board.

The Board further considered the declaration of the respondent that it is prepared to deal with requests A and B in substance and that for that reason it does not object to requests A and B being admitted. In the view of the Board this declaration cannot change the fact that admission of these requests would run counter to

the prevailing main purpose of appeal proceedings as referred to above.

The argument of the appellant that it was convinced until the end of the oral proceedings before the opposition division that the subject-matter of claim 1 of the main request was novel and involved an inventive step was also considered.

In this respect the Board is of the opinion that such a procedural conduct, which is solely based on a subjective assessment of novelty and inventive step by a party for which it is not guaranteed that the opposition division will share it, is contrary to a proper procedural conduct in opposition proceedings. Proper procedural conduct would have required the precautionary filing of auxiliary requests in due time, at the latest before the final date mentioned in the summons to oral proceedings by virtue of Rule 116(1) EPC. This holds in particular true since from the beginning of the opposition proceedings the respondent had argued with respect to lack of novelty and inventive step and the opposition division had indicated the necessity to examine novelty and inventive step in its annex to the summons.

1.2 *Admissibility of request C*

According to the appellant request C should be admitted considering that it has been filed within the time limit set by the annex of the Board and that its claim 1 is directed to equipment as defined by claims 14, 17 and 18 of the patent as granted.

The Board, considering that the subject-matter of claim 1 of this request essentially concerns equipment referred to in substance already in claim 1 of the request dealt with in the impugned decision and that the respondent did not object to request C being admitted into the appeal proceedings exercised its discretion to admit this request.

1.3 *Admissibility of request D*

1.3.1 Request D has been filed during the oral proceedings before the Board after the discussion of the subject-matter of claim 1 of request C concerning inventive step.

1.3.2 Claim 1 according to this request differs from claim 1 according to request C in that the features of claim 3 of the patent as granted have been added. These features concern properties of the spring k3 having minimal damping as well as a progressive spring force, so that the compressive force is constant regardless of longitudinal changes to the spring.

The respondent objected to the admission of request D at this late stage of the proceedings.

The appellant did not give a reason for the late filing of this request other than that it became apparent in the course of the oral proceedings that a further definition of the properties of the spring k3 might be necessary to improve its argumentation on inventive step over D1 and D4.

1.3.3 The Board, considering the exercise of its discretion under Article 13(1) RPBA, took account of the late filing of the request, the lack of a justification for the late filing and the objection against the admission of this request by the respondent. It further took into consideration that the late filing of this request cannot be justified as occasioned by new issues arising for the first time in the course of the oral proceedings before the Board. Indeed, the possible consideration of the dynamic behaviour of the equipment, to which the amendment of claim 1 relates, in the examination of inventive step has already been explicitly referred to in the annex (points 7.4.4 and 8.).

Request D should therefore have been filed at the latest in response to the annex and before the final date mentioned therein (point 9).

Considering these circumstances the Board exercised its discretion to not admit request D into the proceedings.

1.3.4 For completeness' sake and in addition to the procedural reasons given above which by themselves result in the non-admittance of request D, the subject-matter of its claim 1 cannot be considered as overcoming the objections raised and discussed in connection with inventive step with respect to the subject-matter of claim 1 of the previous request C (cf. point 2 below). The reason is that the feature of the spring k3 having "minimal" damping cannot be considered in the examination of inventive step since due to this wording the extent of damping remains

completely open as no reference basis for the relative expression "minimal" is given.

Correspondingly, the other feature of the progressive spring force remains largely undefined since no definition is given as to the extent of the "longitudinal changes to the spring" regardless of which the compressive force of the progressive spring (force) remains constant.

Furthermore, even if the further definitions concerning the spring k3 should be considered as contributing to the definition of this spring, this would still not be sufficient to define the dynamic behaviour of the equipment such that e.g. it could be properly distinguished over the dynamic behaviour of the equipment according to D1 (cf. the annex point 7.3.4).

2. *Subject matter of claim 1 according to auxiliary request C*

2.1 Claim 1 according to auxiliary request C is directed to equipment for compacting a material, in particular vibration of "green mass" in a moulding process for the creation of mould bodies for the production of electrodes for the melting industry, in particular the aluminium electrolysis industry.

This equipment comprises two mould parts that are vibrated in the vertical direction consisting of a lower table equipped with mould walls and an upper plumb designed to move downwards towards the table as a consequence of the intermediate mass being compacted.

The table is supported by a base via at least one spring k1 and possibly a damper element d1.

The mass ma is compacted within a vacuum chamber Vr in which a vacuum is provided, the vacuum chamber Vr is delimited by means of mould walls Fv1, Fv2, the table and a vacuum lid Vk.

The mould parts are mutually physically integrated by means of a static compressive force, which may consist of at least one spring.

According to the characterising features of claim 1 the plumb has vibration applied to it and the **mould parts are directly connected by the spring(-s) k3** between the table and the plumb.

This connection is via a **structure** that **can be** height-adjustable and that also extends up from the table and has a part that **can be** located above the plumb. This structure is permanently connected to the table.

2.2 The features concerning the **structure** are optional, as acknowledged by the appellant, since they are introduced by the wording "can be". As indicated by the Board during the oral proceedings they cannot be considered in the examination of inventive step.

2.3 Claim 1 does not, as referred to by the respondent and as indicated by the Board during the oral proceedings, define any parameter values concerning the masses, spring constants and dampers forming part of the equipment as defined in this claim. This applies correspondingly in respect of the vibration applied to

the plumb for which no definition is given concerning the magnitude of the excitation force as a function of time or frequency.

2.4 Thus, as likewise indicated by the Board during the oral proceedings, the subject-matter of claim 1 does not define the equipment to such an extent that a conclusion concerning its dynamic behaviour, i.e. the manner in which the two mould parts vibrate, can be reached.

Consequently, as further pointed out by the Board during the oral proceedings, effects relating to the dynamic behaviour of the equipment cannot be taken into consideration in the examination of inventive step.

3. *Disclosure of document D1*

It remained undisputed that the equipment known from D1 serves the same purpose as the one according to claim 1.

This equipment is thus for compacting a material, in particular vibration of "green mass" in a moulding process for the creation of mould bodies for the production of electrodes for the melting industry, in particular the aluminium electrolysis industry.

It further remained undisputed that this known equipment comprises, corresponding to the equipment of claim 1, two mould parts that are vibrated in the vertical direction consisting of a lower table 1 equipped with mould walls 2 and an upper plumb 3 designed to move downwards towards the table as a consequence of the intermediate mass 21 being compacted

(column 2, lines 27 – 36; figure) and in which the table 1 is supported by a base 10 (column 2, lines 4 – 9; figure).

The table is supported against the base 10 by means of at least one spring (cf. column 2, lines 6 – 9; figure: air bellows 6, 7).

The mould parts (plumb 3, table 1) are mutually physically integrated by means of a static compressive force, which may consist of at least one spring (column 2, lines 16 – 18; figure: bellows 17). The mould parts are ... connected by the spring (bellows 17) between the table and the plumb via a structure that can be height-adjustable (column 2, lines 10 – 18; figure: hydraulic adjustment unit / cylinder-piston unit 12, 13) and that also extends up from the table 1 and has a part that can be located above the plumb 3, which structure (frame 11, cylinder-piston unit 12, 13) is permanently connected to the table (cf. the figure).

4. *Features distinguishing the equipment defined by claim 1 over the equipment disclosed by D1 / effects of the distinguishing features / problems to be solved based on these effects*

4.1 The following features have been considered by the appellant as distinguishing the equipment according to claim 1 over the one disclosed by D1:

(i) the table is supported against the base by means of ... possibly a damper element

(ii) the mass is compacted within a vacuum chamber in which a vacuum is provided, the vacuum chamber is delimited by means of mould walls, the table and a vacuum lid,

(iii) the plumb has vibration applied to it,

(iv) the mould parts are **directly** connected by the spring between the table and the plumb.

4.2 The consideration of features (i) and (iv) as distinguishing features has been objected to by the respondent.

The Board is of the opinion that, as indicated during the oral proceedings, these features cannot be considered as distinguishing features.

4.2.1 Feature (i) is not distinguishing for the reason that it refers to a damper element as an optional element. An additional reason is that the structure of D1 comprises bellows 6 mounted on elements 8, 9 (as shown in the figure) which normally include some damping and thus a damper element as defined in claim 1 is disclosed for which the claim in any case does not define any further the damping properties.

4.2.2 Concerning the direct connection of the table and the plumb by a spring according to feature (iv) the appellant referred to the embodiment of figure 6 and the schematic presentation of figure 4. In its view such a direct connection via the two springs ½ k3 is immediately apparent from figure 4. For the Board the disclosure of the embodiment of figure 6 is more

relevant when it concerns the understanding of the term "directly" of feature (iv) since this embodiment is the sole one supporting claim 1 since it is the only embodiment where the equipment has a vacuum chamber (cf. paragraph [0012]). According to this embodiment the mould parts are connected via bolts B1 and B2, yoke A, springs k3 and supporting structure between the table and the plumb (cf. paragraphs [0014], [0023]).

The Board considers, in line with the argumentation of the respondent, that the connection between the table and the plumb according to D1 via the air bellows 17, the cylinder-piston unit 12, 13 and the yoke 11 (cf. the figure) as being likewise a direct one in the sense of feature (iv).

Concerning the understanding of the term "directly" in feature (iv) the appellant referred to a further aspect, namely that the supporting structure shown on either side of the equipment of figure 6, by which the yoke A can be adjusted in its height, can be a cylinder-piston unit. The appellant asserted that the cylinder and the piston are held in a fixed relationship during the time the equipment is used for compacting. Since on the contrary the piston of the cylinder-piston unit 12, 13 of D1 can move within the cylinder while the equipment is used for compacting the bellow 17 does not "directly" connect the table and the plumb as defined by feature (iv).

This argument can, as indicated by the Board during the oral proceedings, not be considered for the understanding of the term "directly" in feature (iv) already for the reason that it is not based on a

feature of claim 1. It thus needs no further examination to what extent it is disclosed in the patent in suit that the cylinder and piston of the cylinder-piston unit in question are held in a fixed relationship while the equipment is used for compacting.

For corresponding reasons this argument cannot, as likewise indicated by the Board during the oral proceedings, be considered in the examination of inventive step.

4.3 Since features (i) and (iv) cannot be considered as distinguishing features, particular effects of these features on the dynamic behaviour of the equipment as referred to by the appellant cannot be taken into consideration either. Concerning feature (i) this applies already due to the fact that these are optional features. Concerning feature (iv) this applies taking into account that claim 1 does not define the equipment such as to allow a conclusion concerning its dynamic behaviour (cf. point 2.4 above). Furthermore, since the connection of the mould parts of the equipment of D1 corresponds to the one according to feature (iv) it has to be assumed that the known connection has the same effect.

4.4 Concerning the group of **distinguishing features (ii)** it remained undisputed that **compacting of the mass within a vacuum chamber** facilitates the compacting and the quality of the compacted mould bodies is improved since compacting under vacuum reduces the negative effects of gases and steam arising during the compacting of the mass in question.

4.5 Concerning **distinguishing feature (iii)** the appellant referred to advantageous effects on the dynamic behaviour of the equipment resulting from the **plumb having vibration applied to it**. These effects, which according to the respondent have to be weighed against disadvantages resulting from such an excitation, cannot be considered since as indicated above (point 2.4) the definition of the equipment according to claim 1 does not allow a conclusion concerning its dynamic behaviour.

4.6 Since the only effect which can be considered as resulting from the distinguishing features is the one relating to the group of features (ii), namely to reduce negative effects resulting from air, gases and steam being comprised in the green mass to be compacted or arising therefrom during the compacting process the **– first - problem** to be solved starting from the equipment of D1 can be formulated as modifying the known equipment such that negative effects due to the creation of gases and steam during the compacting process can be reduced.

4.7 The **– second – problem** to be solved in view of distinguishing feature (iii) can be seen in finding an alternative way to excite the mould such that the green mass is vibrated.

5. *Obviousness*

5.1 As referred to by the respondent the negative effects with respect to the compacting process of air and gases entrapped in the green mass to be compacted as well as the quality of the created mould body are known e.g. from D4 (cf. the section "Vacuum System" of page 749)

but also a way to reduce these negative effects, namely to fit the mould with a vacuum system.

Since it is apparent that, in order to solve the **first problem** referred to above (point 4.6), a vacuum chamber as known from D4 can be added to the equipment of D1 such that the mass can be compacted within a vacuum, the equipment of claim 1 does not involve an inventive step (Article 56 EPC).

5.2 The above result holds true considering the argument of the appellant that the manner in which the vacuum chamber is provided according to claim 1 leads to a further advantageous effect since the spring k3 is outside the harsh and unfavourable environment prevailing in the vacuum chamber during compacting which facilitates access to this spring and reduces its wear. The reason is that, as indicated by the Board during the oral proceedings, claim 1 does not comprise a feature defining the arrangement of the spring k3 relative to the vacuum chamber. Furthermore, an arrangement according to which parts, not required within the vacuum chamber, can be protected from the environment prevailing inside the vacuum chamber by their arrangement outside the vacuum chamber appears in any case to be evident for the skilled person.

5.3 A motivation for the solution to the **second problem** is likewise given by D4, which in its figure 4 (pages 747, 748) shows various types of equipment of the kind concerned which either comprise means mounted such that the table is excited (cf. Types 1 and 3) or, alternatively, that corresponding to feature (iii) the plumb is excited (Type 4).

Since starting from the equipment of D1 and considering D4 as further prior art it is apparent that an alternative manner to excite the mould is via an excitation of the plumb as known from D4. Since the equipment of D1 can be modified without any essential structural change of the equipment being required the solution to the second problem according to claim 1 cannot lead to the equipment defined by this claim involving an inventive step either.

Consequently neither the solution to the first problem nor the one to the second problem leads to the equipment as defined by claim 1 involving an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

K. Götz H. Meinders