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D E C I S I O N
of 25 November 1998

Case Number: T 0107/96 - 3.2.5

Application Number: 86307730.1

Publication Number: 0219301

IPC: B24B 5/42

Language of the proceedings: EN

Title of invention:

Improved microfinishing apparatus and method

Patentee:

Industrial Metal Products Corporation

Opponents:

- (01): Supfina Grieshaber GmbH & Co.
(02): Maschinenfabrik Ernst Thielenhaus GmbH
(03): Nagel Maschinen- und Werkzeugfabrik GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 84, 87, 123(2)

Keyword:

- "Clarity (yes)"
"Priority claim (valid)"
"Inventive step (yes, after amendment)"

Decisions cited:

-

Catchword:

-



Case Number: T 0107/96 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 25 November 1998

Appellant:
(Opponent 01)

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Decision under appeal: Interlocutory decision of the Opposition Division of the European Patent Office posted 12 December 1995 concerning maintenance of European patent No. 0219301 in amended form.

Composition of the Board:

Chairman: A. Burkhart
Members: P. E. Michel
J. H. Van Moer

Summary of Facts and Submissions

I. The appellants (opponents) lodged appeals against the interlocutory decision of the opposition division maintaining the patent No. 0 219 301 in amended form.

Opposition was filed against the patent as a whole and based on Articles 100(a), (b) and (c) EPC.

II. From the multiplicity of documents cited before the opposition division the following documents are also relevant for this decision:

D1: US-A-1 905 821

D2: US-A-1 908 048

D4: 3M-brochure "Imperial Brand Micro Finishing Film Rolls" A-AMFFRF(81.5)R2

D7: Affidavit of Mr Reiser

D11: Fachberichte für die Oberflächentechnik

D12: 3M-brochure "Imperial Brand Micro Finishing Film Rolls" A-AMFRB(81.05)R

D16: 3M-brochure "Mechanical Tips When Using Imperial Brand Microfinishing Film"

D17: Brochure "Stone-Microfinish, a well proven technology", Thielenhaus Microfinish Corp.

D19: EP-A-0 161 748

P1: US-Priority document No. 608201 for D19

P2: US-Priority document No. 785498 for the patent in suit

III. Oral proceedings before the Board of Appeal were held on 25 November 1998.

(i) The appellants (opponents) requested that the decision under appeal be set aside and the European patent No. 0 219 301 be revoked. The appellant/opponent 1 requested further that the cost decision made by the opposition division in paragraph 14 of the decision be set aside.

(ii) The respondent (patentee) requested that the appeal be dismissed (main request) or that the patent be maintained in amended form on the basis of auxiliary requests 1 or 2 presented during the oral proceedings.

(iii) Claim 1 according to the main request reads as follows:

"1. A machine (10) for microfinishing a cylindrical surface of a workpiece (18), said machine using an abrasive tape (30) as the machining agent, comprising: a pair of shoe assemblies (62,62) each having means for attaching the tape and having at least one

rigid surface to press the tape into abrasive contact with a workpiece surface, two arms (22) which support respective ones of the shoe assemblies, and means for causing relative rotation between the workpiece and the shoe assemblies such that relative movement between the workpiece surface and the tape (20) occurs as the workpiece is rotated, relative to the tape, characterised in that said abrasive tape (30) is made from a substantially incompressible polymeric plastics film material, and in that the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle greater than 120° at the axis of the cylindrical contour of the workpiece and said rigid shoe surface has a shape corresponding to the desired workpiece surface shape."

Claim 1 according to the auxiliary request 1 reads as follows:

"1. A machine (10) for microfinishing a cylindrical surface of a workpiece (18), said machine using an abrasive tape (30) as the machining agent, comprising: a pair of shoe assemblies (62,62) each having means for attaching the tape and having at least one rigid surface to press the tape into abrasive contact with a workpiece surface, two arms (22) which support respective ones of the

shoe assemblies, and means for causing relative rotation between the workpiece and the shoe assemblies such that relative movement between the workpiece surface and the tape (20) occurs as the workpiece is rotated, relative to the tape, characterised in that the abrasive tape (30) is made from a substantially incompressible polymeric plastics film material, and in that the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle of at least of 135° at the axis of the cylindrical contour of the workpiece and said rigid shoe surface has a shape corresponding to the desired workpiece surface shape."

Claim 1 according to the auxiliary request 2 reads as follows:

"1. A machine (10) for microfinishing a cylindrical surface of a workpiece (18), said machine using an abrasive tape (30) as the machining agent, comprising: a pair of shoe assemblies (62,62) each having means for attaching the tape and having at least one rigid surface to press the tape into abrasive contact with a workpiece surface, two arms (22) which support respective ones of the shoe assemblies, and means for causing relative rotation between the workpiece and the shoe assemblies such that relative

movement between the workpiece surface and the tape (20) occurs as the workpiece is rotated, relative to the tape, characterised in that the abrasive tape (30) is made from a substantially incompressible polymeric plastics film material, and in that the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle about 160° at the axis of the cylindrical contour of the workpiece and said rigid shoe surface has a shape corresponding to the desired workpiece surface shape."

IV. The appellants argued essentially as follows:

Claim 1 according to the main request did not comply with Article 84 EPC, since the terms "rigid surface", "substantially incompressible film material" and "the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle greater than 120° at the axis of the cylindrical contour of the workpiece" were not clear.

The priority claim of the patent in suit of 8 October 1985, based on US-patent application No. 785 498 (P2) was invalid, since the invention of the patent in suit had been already disclosed in an earlier US-patent application, namely the US application No. 608 201 filed on 7 May 1984 (P1), from which the European patent application EP-A-0 161 748 (D19)

claimed priority. In this earlier US application P1 a microfinishing machine was disclosed which comprised all the features of claim 1, including the claimed tape contact angle which was clearly shown in Figures 4, 11 and 13 of P1. The priority claim of the patent in suit being invalid, document D19 was state of the art according to Article 54(2) EPC.

If the Board did not share this view of the appellants and considered the priority claim of the patent in suit to be valid, document D19 had to be considered as a state of the art with respect to Article 54(3) EPC.

The subject-matter of the patent in suit was not novel with respect to the disclosure of D19. The content of D19 was identical with the content of the patent in suit, except that the contact angle of the tape around the workpiece now claimed in the patent in suit was not mentioned expressis verbis in D19. However, the person skilled in the art regarding Figures 4, 11 and 13 of D19 was immediately aware that the contact angle of the tape was greater than 120°.

Moreover, the subject-matter of claim 1 of the main request did not involve an inventive step having regard to the prior art documents D1 (D2) and D4 (D12).

With respect to the disclosure of the documents D4 or D12 and the advantages set out therein, the person skilled in the art would replace in the microfinishing machine known from documents D1 or D2 the abrasive coated paper or cloth tape by the 3M-abrasive coated

tape recommended in D4 (D12), which tape consisted of incompressible polymeric plastics film material, and thus, the person skilled in the art would arrive, without the exercise of any inventive activity, at a microfinishing machine comprising all the features of claim 1 of the main request.

Documents D16 and D17 would not prevent the person skilled in the art from using the 3M tape in a microfinishing machine according to D1 or D2 having rigid inserts. D16 did not dissuade from the use of rigid inserts but mentioned inserts having a hardness of 80 to 90 Shore A, which was only slightly below the hardness used in the machine according to claim 1, and which inserts, in a general sense, also had to be considered as rigid inserts. Also the teaching of D17 did not lead away from the combination of rigid inserts with an incompressible tape, since the respective paragraph thereof suggesting not to use rigid inserts in a paper polishing method related to a specific final polishing step, wherein any alterations of the geometry of the workpiece surface should be avoided.

The alleged new effect of the combination of rigid inserts with incompressible tape, namely the capability of correction of geometric imperfections during the microfinishing step, could not support an inventive step. Firstly, this effect was not new but already present in the prior art techniques according to documents D1 or D2. Furthermore, this effect was also known from document D11, which mentioned that it was generally possible in band-finishing methods to correct

the geometry of the workpiece surface. Secondly, the effect could at most be considered as a bonus-effect, which was obtained as an additional advantage of the obvious combination of the teachings of documents D1 (D2) and D4 (D12).

Claims 1 and 16 of auxiliary request 1 were not allowable with respect to Article 123(2) EPC, since the feature "angle of contact of the tape greater than 135°" was not disclosed in the originally filed application documents.

Claims 1 and 15 of the auxiliary request 2 differed from claims 1 and 16 of the main request only in that the angle of contact of the tape is said to be "about 160°" instead of "greater than 120°". This difference did not involve an inventive step having regard to the prior art documents D1, D2 and D11 disclosing a tape contact angle extending around the major part of the workpiece circumference.

V. The respondent argued essentially as follows:

Claim 1 according to the main request complied with Article 84 EPC.

In the light of the patent specification it was clear that the term "rigid surface" meant that the hardness of the insert surface exceeded 90 durometer, the term "substantially incompressible polymeric plastics film material" meant that the film is relatively incompressible as compared with paper or cloth, and the

term "range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface" designated, in accordance with Figure 4 the range of contact of the abrasive tape with the circumference of the workpiece between the points of contact of the outer edges of the left-hand and the right-hand rigid shoes of each shoe assembly.

The patent in suit was entitled to the claimed US priority P2. The earlier US application according to the priority P1 was totally silent about the feature of claim 1 "the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle greater than 120° at the axis of the cylindrical contour of the workpiece". The drawings of P1 were mere schematic drawings and could not serve as a basis for the determination of the dimension or extent for a minimum rigid shoe supported contact range of the tape with the circumference of the workpiece.

The subject-matter of the patent in suit was novel over the disclosure of D19. The content of D19 did not go beyond the content of P1, and therefore, D19 - as well as P1 - did not disclose the rigid shoe supported contact range of the tape as claimed in claim 1.

The subject-matter of claim 1 of the main request involved an inventive step with respect to the prior art documents.

Claim 1 comprised essentially four measures, namely

- (i) use of a microfinishing machine having rigid shoes according to document D1 (D2),
- (ii) use of an abrasive tape made from a substantially incompressible polymeric plastics film material,
- (iii) use of shoes having a surface corresponding to the desired workpiece surface shape, and
- (iv) use of a large range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface.

By the combination of these measures, the microfinishing machine was able to correct geometric imperfections in the finished workpiece surface.

The person skilled in the art could find no suggestion for this combination of measures and its beneficial result in the prior art.

The problem underlying the invention, namely to provide a microfinishing machine which is capable of correcting geometric imperfections in finished surfaces, was addressed neither in D1 (D2) nor D4 (D12). Therefore, the person skilled in the art had no reason to combine the teachings of these documents. Moreover, D4 (D12) did not disclose the feature "incompressible plastics film tape".

At the time when the patent in suit was filed, the

technical development proceeded from the assumption that rigid inserts could not be combined with incompressible film tapes. In document D16, which dated from 1983, i.e. a time shortly before the priority date of the patent in suit, only non-rigid inserts were recommended for use in combination with the microfinishing film tape according to D4 (D12). Moreover, D17 stated that the use of rigid inserts with abrasive tapes would be a disadvantage for the microfinishing step. Also document D11 did not teach the use of rigid inserts in a microfinishing process and was silent about the problem underlying the invention.

Moreover, none of the aforementioned documents disclosed the features (iii) and (iv) mentioned above and their beneficial wedging effect forcing the workpiece to assume the desired cylindrical configuration.

The independent claims according to the auxiliary requests 1 and 2 defined larger ranges of rigid surface support, which resulted in a remarkable increase of the average correction of geometry of the workpiece in terms of roundness as was demonstrated by the affidavit of Mr Reiser (D7).

At least the subject-matter of the auxiliary requests 1 and 2 involved an inventive step, since none of the prior art documents pointed to this beneficial effect of a larger rigid surface support.

Reasons for the Decision

1. Extent of protection and interpretation of claim 1 of either the main, first or second auxiliary request.
 - (a) The term "rigid surface" has to be construed as meaning that the surface of a shoe assembly has a hardness of greater than 90 durometer (Shore A), as can be seen from column 5, lines 39 to 42, column 6, lines 22 to 25 and claim 9 of the patent in suit.
 - (b) The term "the abrasive tape is made from a substantially incompressible polymeric plastics film material" means that the plastics film tape is relatively incompressible as compared with paper or cloth tapes, as can be seen from column 7, lines 5 to 9 of the patent in suit.
 - (c) The term "the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle greater than 120° at the axis of the cylindrical contour of the workpiece" means the range of contact of the abrasive tape with the circumference of the cylindrical workpiece, defined as circumference angle C between the points of contact of the outer edges of the left-hand and right-hand rigid shoes of each shoe assembly, as can be seen from Figure 4 and the corresponding part of the description on column 7, lines 35 to 38 of the patent in suit.

As can be learnt from Figure 13, the said "angle" includes the circumferential contact range of a non-rigid shoe (612) intermediate the rigid shoes on both sides of the non-rigid shoe (612).

Based on the above interpretations (a), (b) and (c), the subject-matter of the independent claims of either the main, first and second auxiliary requests is clear in the meaning of Article 84 in connection with Article 69 EPC.

2. *Priority claim*

2.1 The EPO does not normally check the validity of a priority right during examination. A check must be made, however, if relevant prior art has been made available to the public within the meaning of Article 54(2) EPC on or after the priority date claimed and before the date of filing (e.g. an "intermediate document"); see Guidelines C-V,2.1.

According to the Guidelines D-III,5., last sentence, the matter of priority must be subjected to a substantive examination in the course of opposition proceedings if state of the art is invoked in connection with a ground for opposition under Article 100(a) in relation to which the priority date is of decisive importance.

In the present case, an "intermediate document", namely document D19, has been invoked during the opposition proceedings, and therefore, the matter of priority

claim of the patent in suit has to be investigated.

Document D19, which stems from the proprietor of the patent in suit, was filed on 7 March 1985 and published on 21 November 1985 and claims priority from the earlier previous US-application No. 608 201, dated 7 May 1984, (P1).

The patent in suit was filed on 7 October 1986 and claims priority from later previous US-application No. 785 498, dated 8 October 1985 (P2).

- 2.2 In "Case Law of the Boards of Appeal of the EPO, 1996, page 183, Chapter IV-C, first and second paragraphs" it is stated:

"In principle, only the first application in a state party to the Paris Convention can form the basis of a priority right. In the EPC this is made clear in Article 87(1).

If, apart from the application whose priority is being claimed in the subsequent European application, an earlier previous application was also filed (particularly outside the priority period), it must be established whether the invention claimed in the subsequent application was disclosed in the earlier application, which would render a priority claim based on the later previous application invalid. The same principles have to be applied as when establishing identity of invention between the application forming the basis of priority and the application claiming

priority. The question is whether the invention claimed in the subsequent application was already disclosed in the earlier previous application taken as a whole or only in the later one."

- 2.3 The subject-matter of the patent in suit contains the feature "the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle greater than 120° at the axis of the cylindrical contour of the workpiece", which feature was disclosed in the later previous US-application P2 in claims 29 and 38, and on page 9, last paragraph to page 10, first paragraph, in connection with Figure 4. In P2, page 10, first paragraph, a particular advantageous effect is also attributed to the large extent of the said "angle of contact".

The earlier previous US-application P1 is totally silent about the aforementioned feature "angle of contact" and its advantageous effect. It is true that Figures 4, 11 and 13 of P1 show a wrap-around angle of the abrasive tape around a considerable range of the circumference of the cylindrical workpiece. However, the said figures represent diagrammatic and schematic drawings and therefore, cannot serve as a basis for determining the extent of a minimum "angle of contact" as defined under point 1(c) above.

This view of the Board is in line with the established jurisprudence of the Boards of Appeal that dimensions obtained merely by measuring a diagrammatic representation of a document do not form part of the disclosure (see Case Law of the Boards of Appeal of the EPO, 1996, page 53, paragraph 2.4).

- 2.4 Hence, the said feature "angle of contact greater than 120°", and therefore, the subject-matter of the patent in suit was not disclosed in the earlier previous US-application P1 but only in the later previous US-application P2.

This means that the priority from US-application P2 claimed by the patent in suit is valid, with the consequence that document D19 represents a state of the art only in the sense of Article 54(3) EPC.

3. *Main request*

3.1 Novelty

The appellant/opponent 03 contended that the subject-matter of claim 1 was not novel over the disclosure of D19, since this document disclosed all the features of claim 1, including the feature "angle of contact of greater than 120°". The appellant was of the opinion that the latter feature was clearly derivable from Figures 4, 11 and 13 of D19, which showed a wrap-around angle of the tape about the workpiece lying in the range of "greater than 120°".

The Board cannot agree with this contention for the following reasons.

When assessing novelty of the subject-matter of the patent in suit with respect to D19, the same considerations apply as when assessing novelty of the subject-matter disclosed in P2 (priority document for the patent in suit) with respect to the subject-matter disclosed in P1 (priority document for D19) - see paragraphs 2.3 and 2.4 above.

Since the person skilled in the art does not find any guidance in the disclosure of D19 to the significance and advantageous effect of a large "angle of contact", he has no reason to focus his interest on the wrap-around angle shown in Figures 4, 11 and 13 of D19 and to think about how large that angle should be. In any case - as pointed out above - since these drawings are mere diagrammatic and schematic representations they cannot be relied upon as a basis for the disclosure of concrete numerical values for the "angle of contact".

Therefore, the diagrammatic and schematic drawings of D19 do not disclose either the minimum contact angle of 120° or the range of a contact angle of greater than 120° .

Consequently, the subject-matter of claim 1 is novel over the disclosure of D19.

Novelty with respect to the other prior art documents under consideration was not in dispute.

3.2 Inventive step

3.2.1 Closest prior art

The closest prior art is represented by document D2, which document discloses a machine for microfinishing a cylindrical surface of a workpiece using an abrasive tape as the machining agent, the said tape being made from paper or cloth, and comprising a pair of shoe assemblies each having means for attaching the tape and having at least one rigid surface to press the tape into abrasive contact with a workpiece surface, two arms which support respective ones of the shoe assemblies, and means for causing relative rotation between the workpiece and the shoe assemblies such that relative movement between the workpiece surface and the tape occurs as the workpiece is rotated relative to the tape.

From page 2, right-hand column, line 122 to page 3, left-hand column, line 11, in connection with Figures 4 and 5 of D2, it can be learnt that the rigid shoe surface has a shape corresponding to the desired workpiece surface shape.

Document D2 teaches on page 3, left-hand column, lines 4 to 11, in connection with Figure 4, that it is preferable that the rigid concave cylindrical jaw surface of a shoe assembly supports the abrasive tape and presses it into contact with the cylindrical workpiece so that the shoe assembly and the cylindrical

workpiece subtend a certain angle at the axis of the cylindrical contour of the workpiece. It is true that a numerical value of the "angle of contact" is not expressis verbis disclosed in D2 and that the drawings of D2 are schematic representations of the microfinishing machine disclosed therein. However, in the light of the aforementioned teaching of D2, the person skilled in the art is guided to focus his interest on the extent of the "angle of contact" shown in Figure 4 of D2, from which he would clearly derive that the said angle extends a large range around the circumference of the workpiece and, by mere visual estimate of the representation of Figure 4, he would readily identify an "angle of contact" having a dimension of about or somewhat above 120°.

Therefore, D2 also implicitly discloses the feature "the range of rigid surface supported abrasive contact between each shoe assembly and the cylindrical workpiece surface subtends an angle greater than 120° at the axis of the cylindrical contour of the workpiece" of claim 1.

It is true that document D2 represents a rather old state of the art. However, the respondent did not contest the view of the appellants that machines as disclosed in D2 were still in use at the priority date of the patent in suit and that D2 is to be considered as representing the closest prior art.

3.2.2 Problem underlying the invention

At the latest when reading document D4, the person skilled in the art was aware that abrasive coated tapes of paper or cloth have some drawbacks with respect to tear- and water-resistance, thickness, uniformity and flatness, which drawbacks could be avoided by the use of abrasive coated tapes of polymeric plastics film material.

Therefore, the problem underlying the invention to be solved with respect to the microfinishing machine according to document D2 is to eliminate the drawbacks associated with the use of abrasive tapes having a backing of paper or cloth.

3.2.3 Solution

The aforementioned problem is solved by the subject-matter of claim 1 of the main request in that in the microfinishing machine known from document D2 the abrasive coated tape having a backing of paper or cloth is replaced by an abrasive coated tape having a backing of incompressible polymeric plastics film material.

3.2.4 This solution is obvious in the light of the teaching of document D4.

Document D4 is a brochure of the company 3M, a supplier of abrasive coated tapes for microfinishing machines. This brochure was published in 1981 and, apparently, was intended to address manufacturers and users of microfinishing tools with the aim to persuade those manufacturers and users to buy the product of 3M offered therein. The "product" offered in D4 is an

abrasive coated tape having a backing of polyester, i.e. "a tape of incompressible polymeric plastics film material" in the sense of the interpretation given under paragraph 1(b) above. Hereinafter this abrasive coated tape is called the "3M-tape".

Document D4 discloses the following advantages of the 3M-tape over conventional abrasive coated tapes having a backing of paper or cloth:

- superior uniformity of the backing and therefore superior flatness of the tape (see page 1),
- reduced thickness of the tape, therefore a greater length of tape in a roll (up to 600 ft as compared to 150 ft for conventional tapes), resulting in 75% less down time for changing the rolls (see page 1),
- the tape is water-resistant and can therefore be used with less expensive "water soluble oil" (i.e. an oil-in-water emulsion) whereas conventional tapes with cloth or paper backing are not water resistant and require expensive regular oil (see page 1),
- improved tear resistance resulting in less down time due to broken rolls (see page 1), and
- the tape produces a finer finish (see page 2 of D4, table "case history").

These improvements and advantages provide sufficient reason for the manufacturer or user of microfinishing machines according to D2 to consider the 3M-tape of D4 as an advantageous alternative and replacement for previous tapes having paper or cloth backing.

Therefore, following the teaching of D4 and being confronted with the aforementioned problem, the person skilled in the art would use the 3M-tape in the microfinishing machine known from D2 instead of a conventional tape having a paper or cloth backing, and thus, would arrive in an obvious manner at the subject-matter of claim 1.

The respondent submits that a new effect, namely correction of geometric imperfections in the finished surface, was achieved by combining an incompressible plastics tape with rigid inserts, and that this new effect was neither addressed in D2 nor in D4, and that therefore the person skilled in the art had no reason to combine the teachings of those prior art documents.

The Board does not agree with this contention, for the following reasons.

It is true that the effect "geometric correction" is not mentioned in documents D2 and D4. However, as stated above, the combined use of the 3M-tape according to D4 in a machine having rigid inserts according to D2 was obvious, because it could be expected to produce exactly the various advantageous effects which are described in D4. The alleged new effect "geometric correction" has to be considered as an extra effect - so-called "bonus effect" - obtained as a result of the obvious combination of the teachings of the documents D2 and D4.

It is established jurisprudence of the Boards of Appeal that such a "bonus-effect" cannot substantiate an inventive step (see Case Law of the Boards of Appeal of the EPO, 1996, pages 113/114, Chapter 7.7.1).

Further, the Board considers to be unfounded the assertion of the respondent that the disclosures of documents D16 and D17 prevented the person skilled in the art from using a 3M-tape in a microfinishing machine having rigid inserts.

Document 16, which is a brochure of the 3M-company, gives mechanical tips when using the 3M-tape according to D4 in a microfinishing machine. From this document it can be learnt that a shoe hardness of "generally 80 to 90 Shore A is common". It is true that the shoe hardness referred to in D16 is below the shoe hardness

"of greater than 90 durometer (Shore A) chosen in the microfinishing machine according to claim 1 (see paragraph 1(a) above). However, it has to be noted that a hardness of 80 to 90 Shore A mentioned in D16 can, in a general sense, be considered as "rigid" and is just below a shoe hardness "greater than 90 Shore A" as recommended in the patent in suit. Moreover, the patent in suit does not contain any indication or proof that the use of shoes having a hardness of "greater than 90 Shore A" results in a superior, unexpected finishing effect when compared with the use of shoes having a hardness of between 80 and 90 Shore A.

In any case, there can be found no indication in D16 that the shoe hardness should be non-rigid or that the 3M-tape should only be used in combination with non-rigid shoes.

Document D17 is concerned with stone microfinishing and mentions under the chapter "paper or abrasive film polishing" that paper polishing could sometimes, but very rarely and with doubtful success, be practised after stone microfinishing on a second station of a stone microfinishing machine, and that in such a second final polishing step resilient back-up pads for the abrasive paper should be used, in order not to destroy the geometry and microfinish of the workpiece which was previously produced by stone microfinishing. This indication in D17 clearly refers to an optional second final polishing step which can be carried out after the proper stone microfinishing process during which the desired geometry and microfinish is produced.

Therefore, this indication in D17 does not prevent the person skilled in the art from using in a proper band-microfinishing station a combination of rigid shoes with a 3M-tape.

Consequently, from the disclosures of documents D16 and D17 no tendency or prejudice can be derived which would prevent the person skilled in the art from using a 3M-tape in a microfinishing machine having shoes of a hardness of greater than 90 Shore A.

3.2.5 Therefore, the subject-matter of claim 1 according to the main request does not involve an inventive step in the sense of Article 56 EPC.

3.3 For the above reasons, the main request of the respondent is not allowable.

4. *Auxiliary request 1*

Claim 1 according to auxiliary request 1 differs from claim 1 according to the main request in that the wording "greater than 120°" has been replaced by the wording "at least of 135°".

The only locations in the originally filed application documents, wherein the extent of the "angle of contact" is addressed are claims 18 and 38 and page 9, last paragraph. Therein, this angle of contact is said to be "greater than 120°" or "preferably about 160°". However, there can be found no basis in the originally filed application documents that the angle of contact should

be at least 135°.

Consequently, claim 1 according to auxiliary request 1 contravenes Article 123(2) EPC, and therefore, the auxiliary request 1 is not allowable.

5. *Auxiliary request 2*

5.1 Amendments

Claim 1 according to auxiliary request 2 differs from claim 1 of the patent as granted

- in that the angle of rigid contact is now specified as "an angle about 160°", and
- in that the feature "said rigid shoe surface has a shape corresponding to the desired workpiece surface shape" has been added.

The independent method claim 15 according to auxiliary request 2 differs from the independent method claim 18 of the patent in suit by the above-mentioned first amendment.

The above-mentioned first amendment is based on page 9, last paragraph, of the originally filed description, where it is stated that "the angle C should be ... preferably about 160°".

The above-mentioned second amendment is based on the originally filed claim 10.

The scope of protection of the independent claims according to auxiliary request 2 has been restricted by the above-mentioned amendments with respect to that of the independent claims of the granted patent.

The description has been adapted to the amended claims.

The amendments to the claims and to the description, therefore, do not offend against Article 123(2) and (3) EPC.

5.2 Novelty

The independent claims 1 and 15 of auxiliary request 2 correspond to the independent claims 1 and 16 of the main request, with the exception that now the contact angle is restricted to a value of "about 160°".

Therefore, for the same reasons as given under paragraph 3.1 above with respect to the subject-matter of the main request, also the subject-matter of auxiliary request 2 is novel.

5.3 Inventive step

The subject-matter of the independent claims 1 and 15 of auxiliary request 2 differs from the subject-matter of the independent claims 1 and 16 of the main request in that the extent of the angle of contact of "greater than 120°" is now restricted to a value of "about 160°".

The respondent submits that such a large angle of contact exerts an advantageous wedging effect on the workpiece, this effect resulting in a significant increase of material removal and, hence, significant improvement of the correction of the geometry of the workpiece. In this respect the respondent referred to the examples given in Mr Reiser's affidavit (D7), which illustrate that an angle of contact of "about 160°" produces significant improvements in the ability of the microfinishing shoe assembly to correct geometric imperfections in the workpiece when compared with a contact angle of "about 120°".

Since the said advantageous effect of a large contact angle of "about 160°" was not contested nor disproved by the appellants, and since there can be found no suggestion or hint in the prior art for increasing the contact angle to an extent of "about 160°" in order to obtain the said advantageous effect, the provision of the feature "angle of contact is about 160°" in the machine or the method according to claim 1 or claim 15 cannot be supposed to be obvious for the person skilled in the art, and therefore, the subject-matter of claims 1 and 15 according to auxiliary request 2 involves an inventive step in the sense of Article 56 EPC.

- 5.4 As the claims according to auxiliary request 2 represent a patentable invention with respect to Article 52(1) EPC, the auxiliary request 2 of the respondent has to be allowed.

6. *Apportionment of costs*

The Board does not share the view of the opposition division that the late citation of the document P1 (US-application No. 608 201) by the respondent/opponent 1 constituted "an abuse of the procedure". Document P1 was cited by the respondent/opponent 1 in order to question the claimed priority of the patent in suit. In the present case, the examination of the validity of the claimed priority is a decisive question for establishing the status of the prior art document D19. Such an examination has to be carried out "ex officio" at any stage of the proceedings and cannot be rejected either as "late-filed" or as abuse of procedure (see paragraph 2 above).

Therefore, the Board sets aside the order of apportionment of costs charged on the appellant/opponent 1 (see paragraph 14 of the decision of the opposition division).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in amended form on the basis of the following documents:

- Claims 1, 15 to 22 according to auxiliary request 2, filed on 25 November 1998,
- Claims 2 to 14 according to the main request, filed on 25 November 1998,
- description: pages 2 to 4 and 6 as granted, page 5, filed on 25 November 1998,
- drawings as granted.

The Registrar:

The Chairman:

A. Townend

A. Burkhart