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D E C I S I O N
of 21 January 2003

Case Number: T 0748/02 - 3.2.3

Application Number: 98305366.1

Publication Number: 0890808

IPC: F27D 3/02, C03B 35/18

Language of the proceedings: EN

Title of invention:
Insulating of furnace rolls

Applicant:
Ask Technica Corporation

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0748/02 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 21 January 2003

Appellant: Ask Technica Corporation
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 6 March 2002 refusing European patent application No. 98 305 366.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. T. Wilson
Members: U. Krause
J. P. B. Seitz

Summary of Facts and Submissions

I. The appeal contests the decision of the Examining Division, dated 6 December 2001 and issued in writing on 6 March 2002, to refuse European Patent application No. 98 305 366.1 for lack of inventive step in view of documents EP-A-0 473 926 (D1) and JP-A-9 125 157 (D4). The latter document was cited in the application and a copy thereof, together with an English translation, was submitted to the European Patent Office on 13 October 2000.

II. The applicant (hereinafter denoted appellant) filed the notice of appeal 25 April 2002, the appeal fee having been paid on 24 April 2002. The statement of the grounds of appeal, including a revised set of claims 1 to 3, was received on 28 June 2002.

With communication of 29 October 2002 the Board informed the appellant that the claims on file related to subject-matter extending beyond the content of the application as filed (Article 123(2) EPC) but that claims amended to meet this objection could be considered to meet the requirement of inventive step but.

A further set of amended claims 1 to 3 was submitted on 20 December 2002, including independent claims 1 and 3 having the following wording:

"1. An insulating roll comprising:

a roll body comprising a metal conduit (1) arranged to pass cooling water therethrough, and a thermally insulating material positioned axially of and around said metal conduit (1); and

a metal tube (7) formed of a heat-resistant metal and fitted to cover said roll body;

characterised in that

said insulating material comprises a plurality of discs (6) formed of an inorganic material which does not consist of metal or asbestos;

the metal tube (7) is mounted at one end (7a) on a stepped portion (3aA) provided in a fixed flange (3), and is securely attached to the stepped portion (3aA) of the fixed flange (3), the fixed flange (3) being secured to one end (1a) of the conduit (1) on its outer periphery;

the metal tube (7) is mounted at the opposed end (7b) on an outer periphery defined on a movable flange (4), and is capable of relatively moving on the movable flange (4), the movable flange (4) being movably mounted at the opposite end of the metal conduit (1), and being so structured as to be urged against nuts (5) interengaged with a screwed portion (1b) of the metal conduit (1) and movable relative to both the conduit (1) and the tube (7) by rotating the nuts (5);

and said discs (6) are tightly packed by means of the nuts (5) so as to fill a space defined between the conduit (1), the metal tube (7), the fixed flange (3) and the movable flange (4)."

"3. An insulating roll comprising:

a roll body comprising a metal conduit (1) arranged to pass cooling water therethrough, and a plurality of discs (6) formed of an inorganic material which does not consist of metal positioned axially on and around said metal conduit (1);

and a sleeve fitted to cover said roll body;

characterised in that

the sleeve is formed of a sintered ceramic and is mounted at one end (7a) on a stepped portion (3aA) provided in a fixed flange (3), and is securely attached to the stepped portion (3aA) of the fixed flange (3), the fixed flange (3) being secured to one end (1a) of the conduit (1) on its outer periphery;

and the sleeve is mounted at the opposed end (7b) on an outer periphery defined on a movable flange (4), and is capable of relatively moving on the movable flange (4), the movable flange (4) being movably mounted at the opposite end of the metal conduit (1), and being so structured as to be urged against nuts (5) interengaged with a screwed portion (1b) of the metal conduit (1) and movable relative to both the conduit (1) and the tube (7) by rotating the nuts (5);

and further characterised in that

said discs (6) are tightly packed by means of the nuts (5) so as to fill a space defined between the conduit (1), the metal tube (7), the fixed flange (3) and the movable flange (4)."

III. The Appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of:

- claims 1 to 3 submitted on 20 December 2002;

- description pages 7, 12 and 13 as originally filed, pages 1, 9 and 10 submitted on 25 April 2000, pages 2, 3, 5, 6, 8 and 11 submitted on 9 December 2002 and page 4 submitted on 20 December 2002;

- Figure sheets 1/3 to 3/3 submitted on 9 December 2002.

IV. The arguments of the Appellant can be summarized as follows:

In D4, the metal tube was secured to a fixed flange at one end and axially movable at its other end on a flange which was fixed on the metal conduit, rather than movably mounted thereon. The particulate insulation material was unable to bear a load on the

roll and required a seal to prevent it from escaping. Document D1 disclosed an insulating roll where the insulation was provided by packed discs held in place by nuts on a threaded end stud and covered with an outer coating or load-bearing tube supported on the discs. Thus, a combination of D4 with D1 would merely suggest that if the particulate insulation of D4 were to be replaced with the discs of D1 one would not need to support the outer tube on the flanges compressing the discs but merely support it on the discs themselves.

Reasons for the Decision

1. The appeal meets the provisions mentioned in Rule 65(1) EPC and is, therefore admissible.

2. Compared with the corresponding original independent claims, the claims 1 and 3 on file have been amended in a number of ways by specifying the material of the discs and the mounting of the metal tube or sleeve, the movable flange and the discs. The inorganic material of the discs is further defined, in claim 1, as being thermally insulating and not consisting of asbestos. This definition is supported by the object of providing an insulating roll having the low thermal conductivity of the prior art roll including thermally insulating fiber or mortar (page 4, first and second paragraph, in combination with page 3, lines 7 to 10 of the original description), and further based on page 6, lines 14 to 20 of the original description. The mounting of the metal tube or sleeve on the fixed and movable flanges, as defined in the characterising part of claims 1 and 3, is supported by the description on page 7, lines 2 to 10 and 13 to 15. The cooperation of the nuts

with the movable flange and the screwed portion of the metal conduit for tightly packing the discs is derivable from the original description on page 6, lines 8,9 and 20 to 23.

The description was amended to adapt it to the amended claims and to include an acknowledgement of the relevant prior art. Further, several clerical mistakes and obvious errors were corrected.

Thus, the claims and description on file are not open to an objection under Article 123(2) EPC.

3. In the decision under appeal it was found that the subject-matter of claims 1 and 3 was obvious in view of a combination of documents D4 and D1 because a skilled person would consider replacing the powder or mortar insulation of D4 by a plurality of discs compressed by a movable flange, as shown in Figure 2 of D1, in order to solve the problem that the known insulation tends to lose its capacity of supporting the outer tube, thereby causing the outer tube to warp. The Board cannot concur with this assessment.

4. Document D4 discloses an insulating roll comprising a roll body (22) with a metal conduit (31) arranged to pass cooling water therethrough, a thermally insulating material (26,42) positioned axially of and around said metal conduit and a metal tube (24) formed of a heat-resistant material and fitted to cover the roll body. The metal tube (24) is mounted at one end on a fixed flange (41) and at the opposed end on an outer periphery of a further flange (48) so as to permit relative movement of the opposed end with respect to the further flange due to thermal expansion. The further flange (48) is denoted as "movable ring" in the translation of D4 but this is in contrast to the fixed mounting shown in Figure 8. Further, the function of

flange (48) to define the space for the thermally insulating material and to provide a supporting surface for the axial movement of the expanding and contracting metal tube does not require the flange to be movable relative to the inner metal conduit. It is, therefore, concluded that the term "movable ring" is misleading and will be understood by the skilled reader as referring to the movability of the outer metal tube on this ring, rather than its movability on the inner metal conduit.

As set forth on page 13, lines 12 to 17 of the translation of D4, the surface temperature of the roll shall be controlled, by adjusting the heat conductivity of the thermally insulating material, so as to reach a predetermined temperature which does not generate build-up. Specifically, the surface temperature shall be reduced to a value of less than 800˚C by means of a heat insulating material having a heat conductivity of at least "0.3 kcal/m.time.˚C" (see page 15, lines 7 to 10 of the translation of D4). Only a limited number of materials are found suitable, namely silica sand, foundry sand, volcanic ash and clayey soil. Silica sand is preferred because it maintains, by its ability to flow, the "cooling effect" even if the roll body expands (see paragraph 0040 on pages 15 and 16 of the translation of D4). It is, therefore, evident that the thermally insulating material of D4 is chosen to meet very specific requirements, i.e. it must have a thermal conductivity above a defined minimum value, i.e. a limited insulating capacity only, in order to "cool" the outer tube to a maximum admissible temperature, and it must maintain this cooling capacity even if the outer tube expands. There is no indication in D4 that this filling of silica sand shall also support the outer tube. Since the insulation material of D4 has no supporting function, there cannot be any loss of the ability to support the outer tube, and the problem

identified in the decision under appeal does not exist. Rather, the tasks of supporting the tube and controlling its temperature are clearly separated, the former being achieved by the flanges located at the ends of the tube and the latter being achieved by the filling of silica sand.

5. D1 discloses a roll having tightly packed discs of thermally insulating material for supporting either embedded load-bearing members (Figures 2,3) or an outer sleeve (Figure 4) which may be made of metal or ceramic material. In the embodiment of Figure 4 the discs are held in a compressed state between flanges, which may be done by using the nuts shown in Figure 2, but the outer sleeve does not extend over the flanges and is, therefore, carried by the discs rather than by the flanges. Judging from the detailed description in columns 3 to 9 of that document, it is mainly concerned with the preparation of the discs from a ceramic fiber material which should be sufficiently heat-resistant to replace asbestos and sufficiently rigid to act as supporting material for the load-bearing members or the outer sleeve. There is no mention of any particular thermal insulation properties or of the ability of the material of the discs to control the surface temperature of the outer sleeve. It is therefore evident that the discs of D4 are prepared for providing heat resistant support material for the outer sleeve, which is in contrast to D1 where the insulating material is selected for controlling the surface temperature of the outer metal tube and has no supporting function. Thus, the skilled person could not expect the discs of D1 to be a suitable material for replacing the insulation of D4.

6. It is noted that even in the case that a skilled person turned to D1 for considering the discs as an insulation to be utilised in the roll of D4, he would not arrive

at the subject-matter of claims 1 and 3 as regards the manner in which the outer metal tube is supported. As set forth above, the outer tube of D4 is supported on two flanges (41,48), which are both fixed relative to the inner metal tube, because the particulate insulation material shall have the ability to flow for maintaining heat transfer even if the outer tube expands, and cannot, therefore, support the outer tube. D1 shows a movable flange (43) serving as a push-ring for compressing the stack of discs and being neither intended nor suitable for supporting the outer metal tube which covers the discs only. Thus, neither D4 nor D1 provides a pointer towards a movable flange or ring which is able and designed, as in the subject-matter of claims 1 and 3, to perform the dual task of laterally supporting and compressing the stack of discs and of supporting the outer tube. The Board is convinced that this combined function of the flanges requires further considerations of a skilled person going beyond the teaching of the prior art and beyond those measures which are normal or typical in the art.

7. It is concluded that the subject-matter of claims 1 and 3 is not rendered obvious by documents D4 and D1. Since the other documents cited in the Search Report are less relevant, these claims together with dependent claim 2 meet the requirement of Article 56 EPC.

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 grant a patent on the basis of the following documents:

Claims: 1 to 3 submitted on 20 December 2002 with letter of 19 December 2002,

Description: pages 7, 12 and 13 of the application as filed;
pages 1, 9 and 10 submitted on 25 April 2000 with letter of 20 April 2000;
pages 2, 3, 5, 6, 8 and 11 submitted on 9 December 2002 with letter of 5 December 2002;
page 4 submitted on 20 December 2002 with letter of 19 December 2002;

Drawings: sheets 1/3 to 3/3 submitted on 9 December 2002 with letter of 5 December 2002.

The Registrar: The Chairman:

A. Counillon C. T. Wilson