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D E C I S I O N
of 9 July 1998

Case Number: T 0678/96 - 3.2.1

Application Number: 90307427.6

Publication Number: 0408268

IPC: B65D 17/50, B21D 51/38

Language of the proceedings: EN

Title of invention:
Method and apparatus for manufacturing a ring for a container closure

Patentee:
CarnaudMetalbox plc

Opponent:
Schmalbach - Lubeca AG

Headword:
-

Relevant legal provisions:
EPC Art. 56, 104

Keyword:
"Inventive step (no)"
"Apportionment of costs (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0678/96 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 9 July 1998

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 29 May 1996 revoking European patent No. 0 408 268 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane

J. van Moer

Summary of facts and submissions

I. European patent No. 0 408 268 was granted on 19 January 1994 on the basis of European patent No. 90 307 427.8.

Claim 1 of the granted patent reads as follows:

"A method of manufacturing a supporting ring (2) comprising:-

supporting sheet metal (46) on an outer support (68) of a lower die (44), said outer support (68) providing a cutting edge;

bringing a cooperating cutting edge (60) into contact with the sheet metal (46) to cut a blank from the metal (46) and to hold the cut edge of the blank;

forming a central aperture in the blank to provide a ring (2) forming at the inner periphery of the ring an upstanding annular wall (12) surrounded by a stepped annular ledge (8, 9, 10); and

on completion of said formation, folding the upstanding annular wall (12) so as to cause the free edge thereof to overlie the inner part (9) of the stepped annular ledge (8, 9, 10);

characterised in that step of forming the central aperture and the upstanding wall and stepped annular ledge are carried out by punching the central aperture in the blank while urging the periphery of the blank into contact with stamping surfaces (74) of the lower die (44) thereby to commence formation of the stepped annular ledge (8, 9, 10) so that it terminates at the inner side in an annular trough (11) which terminates at the inner side in the upstanding annular wall (12)."

Dependent claims 2 and 3 relate to preferred embodiments of the method according to claim 1.

Independent claim 4 reads as follows:

"Apparatus for manufacturing a supporting ring for a container closure, the apparatus comprising circular upper and lower dies (42, 44) having two sets of cooperating cutting edges (60, 66, 68, 76), the sets being spaced apart radially so as to cut an annular blank from sheet metal (46) supported by the lower die (44), and between said sets of cutting edges (60, 66, 68, 76) a set of cooperating stamping surfaces (64, 74) for stamping the annular blank to form a stepped annular ledge (8, 9, 10, 11) terminating at its inner side in an upstanding annular wall (12) and the lower die (44) having a draw portion (72) over which can be drawn the annular blank to form a peripheral formation (6)."

Dependent claim 5 relates to a preferred embodiment of the apparatus of claim 4.

II. The granted patent was opposed by the present respondents on all of the available grounds, namely lack of novelty and/or inventive step (Article 100(a) EPC), insufficiency of disclosure (Article 100(b) EPC) and inadmissible extension of subject-matter (Article 100(c) EPC).

The prior art documents relied upon for the ground of opposition under Article 100(a) EPC were the following:

(D1) EP-A-0 090 957

(D2) GB-A-2 022 474

(D3) EP-A-0 321 394

III. With its decision posted on 29 May 1996 the Opposition Division revoked the patent in its entirety on the ground that its subject-matter lacked inventive step having regard in particular to documents D1 and D3.

IV. An appeal against this decision was filed on 24 July 1996 and the appeal fee paid at the same time. The appellants (proprietors of the patent) requested that the contested decision be cancelled in its entirety.

The statement of grounds of appeal was filed on 25 September 1996. With the statement of grounds the appellants submitted a set of amended claims according to a (first) auxiliary request.

Claims 1 and 4 according to this request read as follows:

"1. A method of manufacturing a supporting ring (2) comprising:-

a) supporting sheet metal (46) on an outer support (68) of a lower die (44), said outer support (68) providing a cutting edge;

b) bringing a co-operating edge (60) into contact with the sheet metal (46) to cut a blank from the metal (46) and to hold the cut edge of the blank;

c) forming a central aperture in the blank to provide a ring (2) comprising a peripheral flange (6) a frustoconical wall (7) depending from the interior of the flange, a stepped annular ledge (8, 9, 10) and an upstanding annular wall (12) at the inner periphery of the ring; and

d) on completion of said formation, folding the upstanding annular wall by curling the wall (12) outwardly so as to cause the free edge thereof to overlie the inner part (9) of the stepped annular ledge (8, 9, 10); characterised in that the step (c) of forming the central aperture and the upstanding wall and stepped annular ledge is carried out by punching the central aperture in the blank while urging the periphery of the blank into contact with stamping surfaces (74) of the lower die (44) thereby to commence formation of the stepped annular ledge (8, 9, 10) so that it terminates at the inner side in the upstanding annular wall (12), the steps a), b) and c) being carried out in a single punch operation and in a single tool set, step d) being carried out in a second tool set."

"4. Apparatus for carrying out the method of manufacturing a supporting ring for a container closure according to claim 1, the apparatus comprising a single tool set comprising circular upper and lower dies (42, 44) having two sets of co-operating cutting edges (60, 66, 68, 76), the sets being spaced apart radially so as to cut an annular blank from sheet metal (46) supported by the lower die (44), and between said sets of cutting edges (60, 66, 68, 76) a set co-operating stamping surfaces (64, 74) for stamping the annular blank to

form a stepped ledge (8, 9, 10) terminating at its inner side in an upstanding annular wall (12) and the lower die (44) having a draw portion (72) over which can be drawn the annular blank to form a peripheral formation (6), whereby the cutting, stamping and drawing are carried out in a single punch operation using a single tool set."

V. With a counterstatement received on 11 April 1997 the respondents objected *inter alia* to the terms of claims 1 and 4 of the auxiliary request under Articles 123(2) and (3) EPC. As a consequence the appellants submitted on 25 July 1997 a set of claims according to a second auxiliary request, of which claims 1 and 4 read as follows:

"1. A method of manufacturing a supporting ring (2) comprising:

a) supporting sheet metal (46) on an outer support (68) of a lower die (44), said outer support (68) providing a cutting edge;

b) bringing a co-operating edge (60) into contact with the sheet metal (46) to cut a blank from the metal (46) and to hold the cut edge of the blank;

c) forming a central aperture in the blank to provide a ring (2) comprising a peripheral flange (6), an annular wall (7) depending from the interior of the flange, a stepped annular ledge (8, 9, 10) and an upstanding annular wall (12) at the inner periphery of the ring; and

d) on completion of said formation, folding the upstanding annular wall (12) to form an outwardly directed curl (11) so as to cause the free edge thereof

to overlie the inner part (9) of the stepped annular ledge (8, 9, 10);

characterised in the step c) of forming the central aperture and the upstanding wall and stepped annular ledge is carried out by punching the central aperture in the blank while urging the periphery of the blank into contact with stamping surfaces (74) of the lower die (44) thereby to commence formation of the stepped annular ledge (8, 9, 10) so that it terminates at the inner side in an annular trough (11) which terminates at the inner side in the upstanding annular wall (12), the steps a), b) and c) being carried out in a single punch operation and in a single tool set, step d) being carried out in a second tool set."

"4. Apparatus for carrying out the method of manufacturing a supporting ring for a container closure according to claim 1, the apparatus comprising a single tool set comprising circular upper and lower dies (42, 44) having two sets of co-operating cutting edges (60, 66, 68, 76), the sets being spaced apart radially so as to cut an annular blank from sheet metal (46) supported by the lower die (44), and between said sets of cutting edges (60, 66, 68, 76) a set co-operating stamping surfaces (64, 74) for stamping the annular blank to form a stepped annular ledge (8, 9, 10) terminating at its inner side in an annular trough (11) which terminates at the inner side in an upstanding annular wall (12) and the lower die (44) having a draw portion (72) over which can be drawn the annular blank to form a peripheral formation (6), whereby the cutting, stamping and drawing are carried out in a single punch operation using a single tool set."

VI. On 26 September 1997 the Board, in accordance with the auxiliary requests of both parties, issued a summons to oral proceedings to take place on 9 July 1998.

In a communication pursuant to Article 11(2) RPBA accompanying the summons the Board *inter alia* stated its provisional opinion that the subject-matter of granted claim 1 was novel, that the objection under Article 100(b) EPC had been adequately dealt with in the contested decision and that the original objection under Article 100(c) EPC against granted claim 5 could not be understood. It was also pointed out that the embodiment of Figure 7 of the patent specification did not fall within the scope of granted claim 1.

VII. On 29 June 1998 the appellants informed the Board that they would not be represented at the oral proceedings and requested a decision on the basis of their written submissions.

VIII. At the oral proceedings on 9 July 1998 the respondents requested that the appeal be dismissed and that the costs for the oral proceedings be apportioned in their favour.

IX. The written submissions of the appellants can be summarised substantially as follows:

The technical problem with which the claimed invention was involved was the development of a method and apparatus for the efficient manufacture of a supporting ring as disclosed in document D1. In particular, the aim of the invention was to reduce the number of

separate tool sets necessary for forming the supporting ring. Conventionally, each of the cutting and forming steps had been performed separately. According to the invention, however - particularly as now clarified in the claims of the auxiliary requests - all of the cutting and forming steps were performed in only two tool sets.

The Opposition Division had based its negative finding on inventive step on a hindsight combination of documents D1 and D3. It was true that the latter document disclosed a method of forming a supporting ring which involved the use of a single tool set. However, the form of that supporting ring bore no relationship to that of the one with which the invention was concerned.

X. In support of their requests the respondents put forward substantially the following arguments:

The reason that document D1, which showed a number of advantageous constructions of supporting ring, was silent about how to make them was that the person skilled in the art knew very well how to do this. It was a trivial engineering consideration to reduce as far as possible the number of forming stations necessary to produce the supporting ring from sheet metal stock. For the type of ring shown in document D3 the whole operation could be performed in one tool set. For the ring known from document D1, with which the claimed invention was involved, two tool sets were required as a consequence of the different geometry but nevertheless the same, very basic, principles were

involved. The use of the term "while" in claim 1 of all requests suggested that two specified steps were performed simultaneously. This was, however, a technical impossibility and it was clear from the description that in fact the two steps occurred sequentially. The same sequence of steps could be found in both documents D2 and D3.

By leaving their withdrawal from the oral proceedings so late, the appellants had deprived the Board of the opportunity of cancelling them, which would have saved the respondents the costs of attending them. It was therefore equitable that these costs be apportioned to them.

Reasons for the decision

1. The appeal complies with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.

2. *Background to the claimed invention; state of the art*

In general terms the contested patent is concerned with the manufacture of a supporting ring which in use is provided with a peelable diaphragm sealing the central aperture of the ring, the ring being attached to the open end of a container body to form a closure. Each of the documents D1, D2 and D3 relate to supporting rings of this basic type.

More particularly, the claimed invention is directed to the manufacture of a supporting ring of a configuration such as shown in Figures 3 or 4 of document D1. In this configuration the internal cut edge of the blank is folded or curled back outwardly to lie against a stepped annular ledge. The folded back portion provides part of the bonding zone for the diaphragm, the other part being provided by the radially outer part of the stepped annular ledge. In this way, the cut edge is sealed from the atmosphere and the contents of the container. No precise instructions as to the manufacture of the supporting rings are to be found in the document other than the statement that they are punched out of a sheet and then formed by deep-drawing or stamping.

The configuration of the supporting ring of document D2 is generally similar to that discussed immediately above with the exception that the annular ledge against which the innermost edge portion of the ring is folded back is not stepped. As a result the diaphragm can only be bonded to this folded back portion so that the cut edge of the blank, although shielded from the contents of the container, is open to the atmosphere. With reference to Figure 1, the document describes a sequence of steps for forming the ring from a sheet of stock material. After first cutting a circular blank from the sheet, the rim of the blank is then shaped by deep-drawing into a flat-lying "S" configuration, with an outermost downwardly open rim flange portion adjacent an upwardly open channel portion. The central opening is then punched out of the blank and thereafter the innermost portion is straightened out into an

upstanding vertical position by deep-drawing concomitantly with the formation of a part-circular trough between the bottom of the channel and the now upstanding innermost portion of the ring. Finally the innermost portion is folded outwardly about the part-circular trough to lie over the bottom of the channel. No tools for performing these operations are disclosed so that it is not clear whether each step is associated with a separate specific tool set.

The supporting ring disclosed in document D3, like that of document D1, also has an inner cut edge which is protected from both the atmosphere and the contents of the container. This is however achieved in a different way. In document D1 the portion of the ring to which the diaphragm is attached is formed by rolling up the inner portion of the ring to form a circular bead with the cut edge lying inside it and then flattening the bead to give a diaphragm attachment ledge comprising three thicknesses of material. Figures 2 to 7 show how the ring is cut and formed from a sheet of material in a single punch operation. In particular, after punching out a circular blank, formation of an attachment flange and punching out the central aperture (Figures 2, 3 an 4), the inner portion is extended by deep-drawing to form a depending wall (Figure 5) the bottom end of which is then subject to the rolling up and flattening steps (Figures 6 and 7) mentioned above.

3. *Main request*

Granted claim 1 sets out in its preamble the method steps implicit to the manufacture of a supporting ring

as disclosed in Figures 3 or 4 of document D1. The characterising clause of the claim requires that the step of punching out the central aperture in the blank is performed "while" the periphery of the blank is urged into contact with stamping surfaces "thereby to commence" formation of the stepped annular ledge. The use of the term "while", which as generally understood would require simultaneity, has been the subject of considerable discussion between the parties and formed the basis of the original objection under Article 100(b) EPC. The difficulty arises from the fact that it is clear from the description of the preferred embodiment, see lines 42 and 43 of page 5 of the patent specification, that the punching step is completed, albeit a fraction of a second, before the stamping and drawing step begins. In the light of the description the Board is therefore of the opinion that the term "while" in claim 1 has to be understood as meaning substantially simultaneously, in particular in the specific context that the stamping and drawing step follows immediately on the punching of the central aperture in the blank in a single operation of the tool set. It is therefore this interpretation of the claim that must be used when assessing novelty and inventive step.

This interpretation of the claim also disposes of the objection under Article 100(b) EPC, since there is no doubt that the invention when so understood has been sufficiently disclosed to enable if to be performed.

In the course of the proceedings the respondents initially disputed the novelty of the subject-matter of

granted claim 1 with respect to document D1. At the oral proceedings however they concentrated their attack, rightly in the view of the Board, on lack of inventive step since document D1, although it clearly discloses a supporting ring having all the physical characteristics of the ring set out in granted claim 1, does not disclose, either explicitly or implicitly, a method of manufacturing that ring which involves the two substantially simultaneous steps mentioned in the characterising clause of the claim. Nevertheless the Board is satisfied, particularly on the evidence of document D3, that the person skilled in the relevant art was well aware that punching and drawing steps could be performed substantially simultaneously in a single tool set and that he would self-evidently take this possibility into account when setting out to develop a quick and efficient method for manufacturing a supporting ring such as shown in Figures 3 or 4 of document D1. The fact that in document D3 the punching step is followed by the formation of a depending annular wall, whereas according to granted claim 1 it is an upstanding annular wall surrounding an annular ledge which is formed, is a mere design consideration which, given the general principles involved, is of no great significance. Indeed, in the "embodiment" of Figure 7 of the patent specification, which is not actually covered by claim 1, it is a depending wall rather than an upstanding wall which is formed, indicating that no real technical difference was seen between these two possibilities at the manufacturing level.

As a consequence of the above, the Board has reached

the conclusion that the subject-matter of granted claim 1 was obvious for the person skilled in the art and accordingly lacks inventive step (Article 56 EPC). The main request of the appellants must therefore be refused.

4. *First and second auxiliary requests*

Claim 1 of the first auxiliary request omits the feature of granted claim 1 that the stepped annular ledge terminates at the inner side "in an annular trough which terminates at the inner side" in the upstanding annular wall.

A corresponding objection under Article 123(3) EPC, together with some objections under Article 123(2) EPC, were raised by the respondents in their counterstatement of 11 April 1997, whereupon the appellants filed the claims according to the second auxiliary request in which all the objections were dealt with. The appellants did not however withdraw their first auxiliary request which must therefore be dealt with by the Board and accordingly is refused on the basis that its claim 1 infringes Article 123(3) EPC.

No objections under Articles 123(2) or (3) EPC apply to claim 1 of the second auxiliary request. In comparison with granted claim 1 it has now been specified that all of the steps (a), (b) and (c) apart from the outward folding of the upstanding wall are performed in a single punch operation in a single tool set, with the folding step (d) being performed in a second tool set.

The form of the ring has also been more closely defined as comprising a peripheral flange with an annular wall depending from the interior of the flange and the folding operation of the upstanding wall has been defined as producing an outwardly directed curl. Since all of these features of the ring are known *per se*, the question of inventive step of the subject of the claim comes down to whether it was obvious for the person skilled in the art to combine steps (a), (b) and (c) into a single punch operation and to use a second tool set for step (d). In general terms the person skilled in the art will strive for reasons of speed and efficiency to combine, where the geometry of the supporting ring allows it, as many steps as possible into a single punch operation, thus avoiding transfers of the blank between different working stations. The geometry of the supporting ring of document D3 allows all of the steps necessary to produce it from sheet metal to be performed in one tool set. With the geometry of the supporting ring set out in claim 1, however, where space is required to received the outwardly folded upstanding wall it is more convenient to separate the partly formed ring from the first tool set at this stage and to perform the folding operation in a second tool set.

Thus the Board is of the opinion that the subject-matter of claim 1 according to the second auxiliary request also lacks inventive step so that this request must likewise be rejected.

5. *Costs*

The Board can see no reason in the present case for departing from the normal rule that each party should bear its own costs (Article 104 EPC). The premise of the respondents that the Board did not have sufficient time to consider cancelling the oral proceedings once the appellants had said they would not be attending is incorrect. In fact, the period of 10 days involved gave the Board ample time to come to the conclusion that the oral proceedings should go ahead.

Order

For these reasons it is decided that:

1. The appeal is dismissed.

2. The request of the respondents for apportionment of costs is rejected.

The Registrar: The Chairman:

S. Fabiani F. Gumbel