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D E C I S I O N
of 24 October 1997

Case Number: T 1021/93 - 3.2.5

Application Number: 89307775.0

Publication Number: 0353977

IPC: B29C 47/02

Language of the proceedings: EN

Title of invention:
Apparatus for forming plastics coated tube

Applicant:
KiTECHNOLOGY B.V.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1021/93 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 24 October 1997

Appellant: KiTECHNOLOGY B.V
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Decision under appeal: Decision of the Examining Division of the European Patent Office posted 19 July 1993 refusing European patent application No. 89 307 775.0 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: G. O. J. Gall
Members: A. Burkhart
W. D. Weiß

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the Examining Division on the refusal of the application No. 89 307 775.0.

The Examining Division held that the application did not meet the requirements of Article 56 EPC (lack of inventive step), having regard to the following prior art documents:

D1: WO-A-88/03084 and

D2: US-A-3 952 937.

II. Oral proceedings before the Board of Appeal were held on 24 October 1997.

(i) The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the documents, as originally filed, (main request), or on the basis of claims 1 and 2 according to the "subsidiary request II" presented during the oral proceedings.

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

"1. Apparatus for forming a plastics coated metal tube comprising means for forming a continuous strip of metal into a U-shape, a forming bush for folding the strip into an overlapping tube, a mandrel extending through the forming bush, a locating sleeve for locating the tube as it passes over the mandrel, welding means for welding the overlapping tube as it passes through the locating sleeve and means for

extruding plastics material from the mandrel onto the inner surface of the tube as it passes over the mandrel, characterised in that the welding means comprises an ultrasonic welding wheel and drive means for the welding wheel, the drive means being capable of driving the welding wheel at a peripheral speed identical to the speed at which the overlapping tube is drawn past the wheel."

Claim 1 according to the "subsidiary request II" differs from claim 1 of the main request in that the welding wheel is characterised as being "independently driven".

(iii) The appellant argued essentially as follows:

It was the aim of the invention to improve the quality of the welding seam of a plastics coated thin-walled metal tube. The inventor of the patent application had employed an inventive activity by realising that it was the free-wheeling welding wheel of the welding apparatus according to document D1 which caused a low quality welding seam and by replacing this free-wheeling welding wheel by a welding wheel having its own drive means capable of driving the welding wheel at a peripheral speed identical to the speed at which the overlapping tube is drawn past the wheel.

The person skilled in the art looking for an improvement of the apparatus of document D1 in the sense that the quality of the welding seam was improved had considered a very large number of factors which could be modified to achieve this aim, like the quality of the tube metal, the thickness of the metal strip, the welding

pressure, the surface properties of the welding wheel, the amount of welding energy, the pulling speed and the pulling tension exerted on the metal tube, etc.

The person skilled in the art would not consider the manner of how the welding wheel was driven when looking for an improvement of the welding seam.

There could be seen no incentive for the person skilled in the art to replace the free-wheeling welding wheel of the apparatus according to document D1 by the actively driven welding wheel of the apparatus according to document D2, which document did not relate to the production of plastics coated thin-walled metal tubes and was primarily concerned with the construction of a specific surface of the anvil means in order to avoid friction between the inner tube surface and the anvil in the machine direction.

The combination of the documents D1 and D2, in order to question inventive step of the subject-matter of the application, was an undue hindsight approach with the knowledge of the present invention.

The apparatus of claim 1 according to the main request as well as according to the "subsidiary request II", therefore, involved an inventive step.

Reasons for the Decision

1. *Novelty*

Document D1 represents the closest prior art. This document discloses an apparatus for forming plastics coated metal tube from a continuous metal strip that has been rolled about a longitudinal axis. The welding means of this apparatus comprises an ultrasonic welding wheel. Document D1 is silent about the manner of how the welding wheel is driven.

The apparatus of claim 1, as originally filed (main request), differs from the apparatus known from document D1 in that it comprises drive means for the welding wheel, the drive means being capable of driving the welding wheel at a peripheral speed identical to the speed at which the overlapping tube is drawn past the wheel.

The apparatus known from document D2 comprises all the features of claim 1, except the feature "means for extruding plastics material onto the inner surface of the tube".

Therefore, the subject-matter of the originally filed claim 1, as well as the subject-matter of the "subsidiary request II", is novel.

2. *Inventive step*

2.1 Problem

The problem underlying the invention consists in improving the quality of the weld seam of a plastics coated metal tube formed by rolling a metal strip into an overlapping tube and welding the overlap of the tube, prior to extruding plastics material onto the surface of the welded tube.

2.2 Solution

The patent application solves this problem by providing in the apparatus known from document D1 the welding wheel with drive means, which is capable of driving the welding wheel at a peripheral speed identical to the speed at which the overlapping tube is drawn past the wheel.

2.3 The afore-mentioned solution is obvious to the person skilled in the art.

Document D1 is silent about the manner of how the welding wheel is driven. Therefore, the person skilled in the art who wants to put into practise the apparatus disclosed in document D1 has to choose a suitable driving means for the welding wheel. He will consider either to choose a free-wheeling drive, i.e., a drive in which rotation of the wheel is caused by the movement of the advancing tube to be welded, or an actively driven wheel drive, i.e., a drive in which rotation by the wheel is caused by a separate driving means independent from the tube advancing drive.

Being confronted with the afore-mentioned problem to be solved by the tube forming and welding apparatus, the person skilled in the art would choose a welding wheel drive with its own drive means as disclosed in document D2, for the following reasons.

Document D2, which - by the way - stems from the applicant of the patent application in suit, deals with the production of tubes which are made by ultrasonically welding the longitudinal edge portions of continuous metal strip that has been rolled about a longitudinal axis to form a tubular product.

The person skilled in the art learns from document D2 that a high quality weld seam can be achieved, if both the outer friction between the moving rolled strip and

the welding wheel and the inner friction between the rolled strip and the anvil (i.e., the mandrel supporting the rolled tube during welding) in the machine direction are minimised (see abstract, and column 4, lines 2 to 7 and lines 39 to 45). According to the teaching of document D2, friction minimising on the outside of the tube to be welded is achieved by the provision of drive means for the welding wheel which is capable of driving the welding wheel at a peripheral speed identical to the speed at which the overlapping tube is drawn past the wheel (see claim 9 and column 4, lines 2 to 7) and friction minimising on the inside of the tube to be welded is achieved by providing parallel supporting strips on the surface of the anvil (see claim 1 and column 4, lines 24 to 45).

Therefore, the person skilled in the art is incited by the teaching of D2 to use also in an apparatus according to document D1 for forming a plastics coated tube a tube rolling and welding device as disclosed in D2, in order to take advantage of this device with respect to the weld seam quality, and thus, the person skilled in the art would arrive at the apparatus according to claim 1 of the patent application.

The fact that document D2 is primarily concerned with a specific anvil means having a specific surface does not prevent the person skilled in the art from proceeding in the way as set forth above, since the apparatus of D1 does not exclude the possibility of using the specific anvil disclosed in document D2 together with welding wheel driving means disclosed therein.

The argumentation of the appellant that the person skilled in the art looking for an improvement of the weld seam had the choice amongst a large number of operational parameters and would not consider the manner of how the welding wheel is driven, is not

convincing.

It is true that it is known to the person skilled in the art that the quality of a tube weld seam depends on a large number of operational parameters, as enumerated by the appellant, and that the person skilled in the art in the first instance would consider optimising these parameters before modifying the construction of the apparatus of document D1.

On the other hand, however, the person skilled in the art would not neglect the clear teaching of document D2 that a high-quality tube weld seam can be obtained by using the apparatus disclosed therein, and would therefore apply the teaching of D2, at least as a last measure, if the measure of optimising the operational parameters of the apparatus according to document D1 would not be successful.

2.4 Therefore, the subject-matter of claim 1 as originally filed does not involve an inventive step in the meaning of Article 56 EPC.

3. Claim 1 according to the "subsidiary request II" differs from claim 1 as originally filed in that the feature "independently driven" has been added, in order to qualify the drive of the welding wheel.

This feature, however, is already present in the apparatus disclosed in document D2. From the disclosure of D2, cf. column 4, lines 4 to 7 and column 6, lines 49 and 50, it is clear to the person skilled in the art that the welding wheel is independently driven from the drive of the advancing tube. Otherwise, a zero velocity differential between the engaging surfaces of the tube and the welding wheel and a separate speed control of the welding wheel would not be possible.

Consequently, also the subject-matter of claim 1 according to the "subsidiary request II" does not involve an inventive step with respect to the disclosure of documents D1 and D2, for the same reasons as set out under point 2 above.

4. Therefore, neither the main request nor the "subsidiary request II" presented by the appellant are allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Townend G. Gall