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Datasheet for the decision of 17 June 2016

Case Number: T 1443/11 - 3.2.08

Application Number: 99118592.7

Publication Number: 1004389

IPC: B23K9/12, B23K9/09

Language of the proceedings: EN

Title of invention:
Short circuit welder

Patent Proprietor:
Lincoln Global, Inc.

Opponent:
ESAB AB

Headword:

Relevant legal provisions:
EPC Art. 100(a), 100(b), 100(c)

Keyword:
Grounds for opposition - subject-matter extends beyond content of earlier application (no) - insufficiency of disclosure (no)
Novelty - (yes)
Inventive step - (yes)

Decisions cited:

Catchword:

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Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1443/11 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 17 June 2016

Appellant: (Patent Proprietor)	Lincoln Global, Inc. 22801 St. Clair Avenue Cleveland, Ohio 44117-1199 (US)
Representative:	Grosse Schumacher Knauer von Hirschhausen Patent- und Rechtsanwälte Frühlingstrasse 43A 45133 Essen (DE)
Respondent: (Opponent)	ESAB AB Box 8004 402 77 Göteborg (SE)
Representative:	Awapatent AB P.O. Box 11394 404 28 Göteborg (SE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 28 April 2011 revoking European patent No. 1004389 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairwoman	P. Acton
Members:	M. Foulger
	P. Schmitz

Summary of Facts and Submissions

I. The appellant (patent proprietor) lodged an appeal against the decision of the opposition division, dispatched on 28 April 2011, revoking European patent no. 1 004 389.

II. The opposition division held that the patent as granted contained subject-matter which went beyond that of the application as originally filed. They further held that the subject-matter of claim 1 of the then valid 1st, 2nd, 3rd, 5th and 6th auxiliary requests did not involve an inventive step, auxiliary request 4 did not fulfill the requirements of Article 123(2) EPC.

III. The notice of appeal and the statement of the grounds of appeal were filed in due form and within the prescribed time limits.

IV. Oral proceedings took place before the Board of Appeal on 17 June 2016.

V. The appellant requested that the decision under appeal be set aside and the opposition be rejected, or in the alternative, that the patent be maintained in amended form on the basis of one of the auxiliary requests 1, 2, 3, 4, 4b, 5, 6, 6b or 7 as filed with the letter dated 16 May 2016.

VI. The respondent (opponent) requested that the appeal be dismissed.

VII. The independent claims of the main request (patent as granted) read as follows:

a) Claim 1

"A method of short circuit arc welding the end of a first workpiece to the end of a second workpiece by use of a welding bug having a welding electrode feeder and a mechanism to drive the welding bug along a track on the outside periphery of workpiece which comprises:

a. continuously moving said bug along during said welding;

b. melting said electrode (50) by an electric wave comprising a short circuit transfer portion and a controlled melting portion;

c. applying an initial welding pass to the adjacent ends of said first and second workpiece which form a gap there between from outside said first and second workpiece and using a welding electrode (50) fed to said workpiece to form a puddle between the ends of the workpiece; and

d. during said initial pass varying the speed of said welding bug and/or the feed rate of said welding electrode (50) without stopping said welding bug while said welding bug is continuously moving about said track on said workpiece to maintain the end of the welding electrode (50) ahead of the welding puddle; and

characterized in that

e. the polarity of the welding current is controllably changed during a welding process to obtain a desired weld puddle heat."

b) Claim 33

"An apparatus for welding two spaced ends of a first workpiece and to a second workpiece at a gap there between by use of a welding bug including an electrode feeder, a welding head, a welding electrode and a mechanism to guide said welding bug along a track positioned closely adjacent to said gap around the periphery of said workpiece which comprises:

a. a speed controller to continuously move the welding bug about said workpiece during the formation of a weld bead, said speed controller controlling the speed of said welding bug during said weld formation;

b. a power source for melting said electrode creating a series of current pulses constituting a welding cycle with a short circuit transfer portion and a plasma arc melting portion, said current pulses in said cycle each having a given electrical polarity of said advancing electrode with respect to said two workpieces,

c. a connector to connect the welding head of said bug to said power source; and

d. **characterized in that** the apparatus includes a polarity selector to controllably select the polarity of said pulses in said cycle between a first polarity with said electrode being positive and a second polarity with said electrode being negative."

The further requests are not relevant for this decision.

VIII. The following documents are referred to in this decision:

D1: GB-A-2 002 276
D2: US-A-5,676,857
D4: US-A-4,485,293
D5: US-A-5,349,159
D6: US-A-4,861,965
D7: US-A-4,947,021
D11: US-A-4 877 941

IX. The appellant argued essentially the following:

i) Article 100(c) EPC

The modifications made during examination (feature (e) of claim 1) were based on paragraph [0020] of the published application. Feature (e) should be read in conjunction with features (c) and (d) of the preamble which related to the initial welding pass and defined the weld puddle subsequently referred to in feature (e). Thus, there had been no unallowable intermediate generalisation in claim 1.

ii) Article 100(b) EPC

The invention as claimed was described in a manner sufficiently clear and complete that the person skilled in the art could carry it out.

It was not necessary to give values for all the possible parameters because the person skilled in the art was accustomed to determining such parameters as part of their daily work. If necessary the person skilled in the art would use trial and error to

determine such parameters.

The ground of opposition under Article 100(b) EPC did not therefore prejudice the maintenance of the patent as granted.

iii) Inventive step - Claim 1

D2 disclosed the features of the preamble of claim 1. The problem to be solved was, according to the patent [0006], to provide a method for making a root pass without the weld bead protruding into the pipe interior. Polarity control of the welding current to control weld puddle heat in other welding processes may have been known from D4 - D7 and D11. However, D2, column 6, lines 51-52, taught that "[t]he use of the surface tension transfer (STT) power source is most essential". As the STT process known at the priority date of the patent did not involve controlling the polarity of the welding current, such a modification would be contrary to the teaching of D2; consequently the person skilled in the art would have been dissuaded from making any modification to the STT power source.

D1 did not disclose features (b),(d) and (e) of claim 1. Thus, even if this document could be considered as being the most relevant prior art, the combination with the teaching of D2 would not lead to the subject-matter of claim 1 in an obvious manner because feature (e) would still be lacking.

iv) Novelty - Claim 33

D1 did not disclose a control of the bug speed during weld formation and consequently feature (a) was not disclosed in D1. Moreover, D1 did not disclose feature

(d) of claim 1 because even though a.c. welding was mentioned in the discussion of the prior art, there was no mention of a polarity selector to controllably select the polarity of the pulses in the cycle between a first polarity with the electrode being positive and a second polarity with the electrode being negative.

The subject-matter of claim 33 was therefore new.

v) Inventive step - Claim 33

The combination of the teachings of D1 and D2 did not lead to the subject-matter of claim 33 because neither document disclosed feature (d) of the claim.

The subject-matter of claim 1 therefore involved an inventive step.

X. The respondent argued essentially the following:

i) Article 100(c) EPC

The characterising part of claim 1, feature (e), was not related in any way to the features of the preamble, in particular features (c) and (d), because it referred to a welding process. From the application as filed, it was apparent that, to solve the problem posed, it was important to control the weld puddle heat in the initial pass. This information was not however contained in claim 1 and thus the subject-matter of the patent had been extended beyond that of the application as originally filed.

ii) Article 100(b) EPC

The person skilled in the art was not given any hint

how to carry out the invention claimed. In particular no values for the voltage, current or timing of the welding current were given. How the desired weld puddle temperature was established was also not disclosed. Thus the patent specification neither told the skilled person how to determine the desired result nor how to achieve it.

iii) Claim 1 - inventive step

D2 disclosed the preamble of claim 1. If the process according to this document solved the problem of weld protrusion through to the pipe interior, then the problem to be solved was merely to provide an alternative process. Alternatively, the problem could be seen as being to better control the formation of the weld bead such that the projection through to the other side of the workpieces was minimised.

In either case D4 and D11 proposed welding processes where the weld puddle heat was controlled by changing the welding current polarity. This was also known from D5 - D7. The person skilled in the art would recognise that such a control would solve the problem posed and therefore apply it to the process known from D2. The person skilled in the art would therefore arrive at the subject-matter of claim 1, without using inventive activity, by combining the teachings of D2 and one of D4, D5, D6, D7 or D11.

Moreover, the skilled person, starting from D1 as closest prior art, in combination with the teaching of D2 would also arrive at the subject-matter of claim 1 without an inventive step being involved.

The subject-matter of claim 1 did not involve an

inventive step.

iv) Novelty - Claim 33

D1 disclosed all features of claim 33. Fig. 1 showed a welding bug. The feature (a) of claim 1 was implicit in the disclosure of D1 because such a welding bug necessarily has a speed control. The welding in D1 was of the MIG type which implied a short circuit transfer portion and a plasma arc melting portion. Thus feature (b) was also known from D1. As shown in Fig. 1 the welding head was connected to the power source as required by feature (c) of the claim. Furthermore D1 disclosed, page 1, lines 50-51, an a.c. power supply which equated to feature (d).

Therefore the subject-matter of claim 33 was not new with respect to D1.

v) Inventive step - Claim 33

Even if the novelty of the subject-matter of claim 33 were to be recognised, then it did not involve an inventive step in view of the disclosure of D2.

Reasons for the Decision

1. Added subject-matter - Article 100(c) EPC

Claim 1 as granted comprises claim 1 as originally filed together with features (b) and (e).

Feature (e) is taken from paragraph [0020] of the application as published. It is true, as argued by the respondent, that feature (e) merely refers to a welding process, however the weld puddle is mentioned in features (c) and (d) of the preamble of claim 1 which both refer to the initial welding pass. Thus the term "a weld puddle heat" as well as the characterising feature of claim 1 must logically refer to the heat of the weld puddle already mentioned and thus as applying to the initial pass. Hence the claim contains all the steps necessary to solve the problem and there has been no unallowable intermediate generalisation.

The subject-matter of the patent does not therefore extend beyond that of the application as originally filed.

2. Sufficiency of disclosure - Article 100(b) EPC

It is true that values of current, voltage, gap dimensions, etc. are not given in the patent specification. However, for the person skilled in the art, in this case the welder, the determination of such values belongs to their daily work. The skilled person would therefore be able to reproduce the invention without undue burden and any inventive effort by using their technical knowledge and, if necessary, trial and error.

Moreover, although the specification neither describes what the desired puddle heat is nor how this is determined, again this is a matter which the skilled person, i.e. the welder, would use their technical knowledge, supplemented if necessary by experiment, to determine. The welder would observe the welding process and adjust the heat input accordingly, e.g. by controlling the welding current or the polarity.

The patent specification therefore discloses the invention in a manner sufficiently clear and complete for the skilled person to carry it out.

3. Inventive step - Claim 1

It has not been disputed that D2 discloses the preamble of claim 1.

The problem to be solved is, according to the patent [0006], to provide a method for making a root pass without the weld bead protruding into the pipe interior. It was argued that this problem was already solved by the method of D2 and that a less ambituous problem such as providing an alternative method was appropriate. Although the process of D2 does indeed improve the previously known methods in that no clamps or back-up shoes are necessary inside the pipe (see D2, col. 2, l. 57-61), there is still scope to improve this process to minimise protrusion and reduce burn through (see D2, col. 2, l. 51-52 and l. 54). The objective technical problem to be solved is therefore to provide a method for making a root pass whereby the weld bead protrusion into the pipe interior is minimised.

This problem is solved by the characterising part of

claim 1 (feature (e)) in that "the polarity of the welding current is controllably changed during a welding process to obtain a desired weld puddle heat."

It is generally known that the electrode polarity has an effect on the welding process. With the welding wire as the anode a large amount of heat is applied to the base metal. To weld thin plates it is therefore recommended to switch polarity so that the welding wire forms the cathode. In this case the welding wire is used more quickly (D4, col. 4, l. 64 - col. 5, l. 7 and col. 6, l. 12-25). In order to arrive at an optimum between these two factors D4 suggests that the operator can select a ratio of forward and reverse polarity (col. 6, l. 50-58). D5 also teaches this (see claim 1, figs. 1 and 11) and this is also known from D6, D7 and D11.

However, D2 relates to a surface-tension-transfer (STT) power source. This type of power source is described in D2, col. 6, l. 52, as being "most essential". No evidence has been submitted to show that at the priority date of the patent, the use of polarity control for a STT power source was known. Thus the "most essential" power source of D2 did not include polarity control.

Thus starting from D2, the person skilled in the art would not move away from a STT power source as it was known at the priority date of the patent. Without a specific hint that a polarity control could be applied to a STT power source, which none of the cited documents provide, the person skilled in the art would have been dissuaded from making such a change because of the description of STT as being "most essential". Consequently, the person skilled in the art would have

needed to have used inventive activity to do so.

Considering D1 as closest prior art, this document discloses the use of an a.c. current, see p. 1, l. 50-51. However, it does not disclose the characterising feature of claim 1 (feature (e)) because there is no mention of the polarity of the welding current being controllably changed. As discussed above, this feature is also not known from D2 and consequently the combination of the teachings of D1 and D2 does not lead to the subject-matter of claim 1.

The subject-matter of claim 1 therefore involves an inventive step.

4. Claim 33 - novelty

D1 discloses an apparatus for welding two spaced ends of a first workpiece and to a second workpiece at a gap there between by use of a welding bug including an electrode feeder, a welding head, a welding electrode and a mechanism to guide said welding bug along a track positioned closely adjacent to said gap around the periphery of said workpiece - see D1, Fig. 1.

D1 further discloses the use of an a.c current in the discussion about the prior art, see p. 1, l. 50-51. Feature (d) of claim 33, however, defines the apparatus as including a polarity selector to controllably select the polarity of said pulses. Thus this feature requires more than just an a.c. power supply. D1 however makes no mention of such a polarity selector and thus feature (d) of claim 33 is not known from D1.

The subject-matter of claim 33 is thus new.

5. Claim 33 - inventive step

Considering D1 as the closest prior art, as discussed above, at least feature (d) of claim 33 is not known from this document. Moreover this feature is also not known from D2. The combination of the teachings of D1 with those of D2 does not therefore lead to the subject-matter of claim 33.

Therefore the person skilled in the art would not have arrived at the subject-matter of claim 33 without an inventive step being involved.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The opposition is rejected.

The Registrar: The Chairwoman:

C. Moser P. Acton

Decision electronically authenticated