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**Datasheet for the decision
of 17 December 2021**

Case Number: T 0597/15 - 3.4.01

Application Number: 08797423.4

Publication Number: 2147583

IPC: H05H1/34

Language of the proceedings: EN

Title of invention:

PLASMA ARC TORCH CUTTING COMPONENT WITH OPTIMIZED WATER
COOLING

Patent Proprietor:

Hypertherm, Inc.

Opponents:

Thermacut, k.s

L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET
L'EXPLOITATION DES PROCEDES GEORGES CLAUDE

Headword:

Plasma arc torch / HYPERTHERM

Relevant legal provisions:

EPC Art. 123(2), 84

RPBA Art. 12(4)

RPBA 2020 Art. 13(2)

Keyword:

Amendments - allowable (no)

Claims - clarity (no)

Late-filed facts - request could have been filed in first
instance proceedings (yes)

Late-filed request - admitted (no)

Decisions cited:

T 1689/12



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Case Number: T 0597/15 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 17 December 2021

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
23 January 2015 concerning maintenance of the
European Patent No. 2147583 in amended form.**

Composition of the Board:

Chairman P. Scriven
Members: B. Noll
 C. Almberg

Summary of Facts and Submissions

- I. Two oppositions were filed against the patent.

- II. During proceedings before the Opposition Division, the proprietor submitted an amended set of claims as its main request, and various auxiliary requests. At the start of oral proceedings before the Opposition Division, there were a main request and fourteen auxiliary requests. During those proceedings, auxiliary requests 1-4 and 6-14 were withdrawn, and the remaining auxiliary request 5 was renumbered as 1. The proprietor also submitted new auxiliary requests 2 and 3; but the first of these was later withdrawn, and the second renumbered as 2.

- III. The Opposition Division found that the main request and auxiliary request 1 did not comply with Article 123(2) EPC, but that auxiliary request 2 met the requirements of the Convention.

- IV. The decision was appealed by the proprietor and by opponent 2.

- V. With the statement of grounds of appeal, the proprietor submitted claims for a main request and auxiliary requests 1-15. The main request and auxiliary requests 1-14 are the same as the requests submitted in response to the summons to oral proceedings before the

opposition division. Auxiliary request 15 is the form held allowable by the Opposition Division.

- VI. In reply to the appeal of opponent 2, the proprietor submitted claims for auxiliary requests 16 and 17.
- VII. In a communication sent with a summons to oral proceedings, the Board set out its preliminary view that the main request and auxiliary request 5 failed to comply with Article 123(2) EPC, and auxiliary requests 15-17 with Article 84 EPC as regards clarity. The Board indicated that auxiliary requests 1-4 and 6-14 were unlikely to be considered in the appeal proceedings.
- VIII. In response to the summons to oral proceedings, the proprietor submitted claims of an auxiliary request 18.
- IX. At oral proceedings, the proprietor requested that the appealed decision be set aside and that the patent be maintained on the basis of one of
- the main request or auxiliary requests 1 to 15, filed with the statement of grounds of appeal; or
 - auxiliary requests 16 and 17, filed with the reply to the appeal of opponent 2; or
 - auxiliary request 18, filed in response to the summons to oral proceedings.

X. The opponents requested that the appealed decision be set aside and that the patent be revoked.

XI. Claim 1 of the main request reads (reference signs omitted):

*A shield for a plasma arc torch comprising:
an exterior surface defining a
conductive contact portion for exchanging
heat with an adjacent torch component;
a fluid flow path; and
a sealing component disposed between
the conductive contact portion and the
fluid flow path;
wherein the fluid flow path is defined, at
least in part, by a curvilinear surface;
and wherein the sealing component maintains
a fluid-tight seal between the shield and
the adjacent torch component, therefore
preventing and/or limiting fluid from
exiting the plasma arc torch.*

XII. Claim 1 of auxiliary request 5 reads:

*A shield for a plasma arc torch, the shield
having a front portion and a rear portion,
the shield comprising:
an exterior surface defining a
conductive contact surface portion for
exchanging heat with an adjacent torch
component;
a fluid flow path; and
a sealing component disposed between
the conductive contact portion and the*

fluid flow path;

wherein the fluid flow path is a cooling channel that is defined, at least in part, by a curvilinear surface;

wherein a shoulder portion allows for conductive cooling between the shield and an adjacent torch component, the shoulder portion including the contact surface portion, the shoulder portion being positioned between the front portion and the rear portion, wherein the shoulder portion is dimensioned such that sufficient heat transfer can occur from the front portion of the shield to the rear portion of the shield;

wherein the exterior surface of the shield defines a groove;

and wherein the sealing component provides a fluid-tight seal between the shoulder portion and the cooling channel and prevents fluid from the cooling channel from leaking to the shoulder portion or the contact surface of the front portion of the shield.

XIII. Claim 1 of auxiliary request 15 reads:

A shield for a plasma arc torch, the shield having a front portion and a rear portion, the shield comprising:

an exterior surface defining a conductive contact surface portion for exchanging heat with an adjacent torch component;

a fluid flow path; and

a sealing component disposed between the conductive contact portion and the fluid flow path; and a shoulder portion positioned between the front portion and the rear portion; wherein the fluid flow path is a cooling channel that is defined, at least in part, by a curvilinear surface; wherein the shoulder portion allows for conductive cooling between the shield and an adjacent torch component, the shoulder portion including the contact surface portion that allows for the thermal conductivity between the shield and the adjacent torch component, and wherein the shoulder portion is shaped such that the contact surface between the exterior surface of the shield and an interior surface of the adjacent torch component allows for sufficient heat transfer between the adjacent torch components, and the shoulder portion is dimensioned such that sufficient heat transfer can occur from the front portion of the shield to the rear portion of the shield; wherein the exterior surface of the shield defines a groove, wherein the groove is located between the conductive contact surface and the shaped portion of the exterior surface of the shield and wherein the sealing component is at least partially disposed within the groove; and wherein the sealing component provides a fluid-tight seal between the shoulder portion of the shield and the cooling channel and prevents fluid from the cooling

channel from leaking onto the shoulder portion or the contact surface of the front portion of the shield.

- XIV. Claim 1 of auxiliary requests 16 and 17 are identical, and add, (to the end of claim 1 of auxiliary request 15)

*[... the shield];
wherein the adjacent torch component includes a retaining cap.*

- XV. Claim 1 of auxiliary request 18 reads as follows:

*A plasma arc torch comprising:
a torch body connected to a power supply;
an electrode disposed within the torch body;
a shield having a front portion and a rear portion, the shield having an exterior surface defining a conductive contact surface portion for exchanging heat with an adjacent torch component;
the adjacent torch component, which is a retaining cap;
a convective cooling structure comprising a concave curvilinear portion that defines at least a portion of a cooling channel;
a sealing component dimensioned and configured to provide a fluid seal between the conductive contact portion and the convective cooling structure;
and a shoulder portion positioned between the front portion and the rear portion;*

wherein the shoulder portion allows for conductive cooling between the shield and the adjacent torch component, the shoulder portion including the contact surface portion that allows for thermal conductivity between the shield and the adjacent plasma torch component, wherein the shoulder portion is shaped such that the contact surface between the exterior surface of the shield and an interior surface of the adjacent torch component allows for sufficient heat transfer between the adjacent torch components, and the shoulder portion is dimensioned such that sufficient heat transfer can occur from the front portion of the shield to the rear portion of the shield;

wherein the exterior surface of the shield defines a groove, wherein the groove is located between the conductive contact surface and the shaped portion of the exterior surface of the shield and wherein the sealing component is at least partially disposed within the groove;

and wherein the sealing component provides a fluid-tight seal between the shoulder portion of the shield and the cooling channel and prevents fluid from the cooling channel from leaking onto the shoulder portion or the contact surface of the front portion of the shield.

XVI. The parties' submissions, in so far as relevant to the Board's decision, are given in detail in the reasons, below.

Reasons for the Decision

The patent, background

1. When a plasma arc torch is used for cutting metal at high speed, the torch's nozzle is subject to high mechanical and thermal stresses due to molten metal from the workpiece. The invention aims at protecting the nozzle from excessive wear caused by these stresses.

Main request, claim 1, added subject-matter

2. Claim 1 is not directed to the nozzle as such, but seeks protection for a shield for a plasma arc torch. A relative location when the shield is mounted on the torch, and how it performs its shielding function are not explicitly specified in claim 1. However, it is implicit that the shield, when mounted, is located close to the orifice from which the plasma is ejected towards the workpiece.
3. Claim 1 of the patent defines the same features as claim 1 of the application as originally filed. It was amended only in respect of the two-part form. Claim 1 of the main request adds that the sealing component *maintains a fluid tight seal* and so prevents or limits *fluid from exiting the plasma arc torch*.
4. A shield, considered on its own and separate from the remaining components of the torch, is not directly and unambiguously derivable from the original description, but only from original claim 1. The added wording

defines a technical function of the shield. A fluid-tight seal is described in paragraph 100 of the application as filed. However, this function is described, in this paragraph, only in an arrangement of a shield mounted on a torch tip and with the sealing component sitting in a groove and in functional interaction with an adjacent torch component. It is not described as a technical function of the shield alone.

5. A shield, separate from other components, which has the technical function of being a fluid-tight seal is not directly and unambiguously derivable from the application as filed.
6. The proprietor submitted that the skilled person, having a mind of willing to understand the invention, would directly and unambiguously understand, from the application as originally filed, that a shield having a curvilinear surface defining a fluid flow path, a further surface for dissipating heat by heat conduction, and a sealing component arranged between the curvilinear surface and the further surface was the core of the invention. It was directly derivable by the skilled person that, in the present case, the inventive technical effect was obtained by an interaction of the shield with a further torch component.
7. The proprietor referred to an arrangement of plug and socket, in which an inventive effect was obtained by a joint use of plug and socket and for which it was generally accepted that separate claims could be allowed for the plug and the socket. In analogy, the proprietor in the present case should be entitled to obtain protection for the shield which created an inventive effect by a joint use with other components

of the torch.

8. The Board agrees that a claim may be directed to a shield as a single component of a group of interacting components forming a torch. However, when a claim directed at a single component is amended by the addition of features defining a technical function which is only obtained by an interaction between the components of the group, such an amendment may extend beyond the original disclosure.
9. In the present case, the technical effect is not an isolated function, provided by the shield alone. Defining the shield as having this function is a limitation, which is not directly and unambiguously derivable from the application documents as filed.
10. The subject-matter of claim 1, therefore, extends beyond the content of the application as originally filed. The main request does not comply with Article 123(2) EPC.

Auxiliary request 5, claim 1, added subject-matter

11. The shield defined by claim 1 of auxiliary request 5 extends beyond the content of the application as originally filed for the reasons given above. Auxiliary request 5 thus does not comply with Article 123(2) EPC.

Auxiliary request 15, claim 1, clarity

12. Claim 15 defines the shape and dimensioning of the shoulder portion by technical effects to be achieved, namely that it allow for "sufficient" heat transfer

between adjacent torch components and between the front and rear portions of the shield.

13. The proprietor argued that the meaning of "sufficient" was clear to the skilled reader, in the context of the claim. It only expressed that there was cooling. The skilled person could clearly distinguish whether or not there was cooling of the shield.
14. The Board is not persuaded by this view. The meaning of "sufficient" is that there is cooling and that the extent thereof meets a requirement. It must be enough for some, here unspecified, purpose. The meaning is not only that cooling is not *de minimis*.
15. For these reasons, claim 1 lacks clarity. Auxiliary request 15 is, therefore, not allowable (Article 84 EPC).

Auxiliary requests 16, 17, claim 1, clarity

16. The definition of "sufficient" heat transfer means claim 1 is unclear in each of auxiliary requests 16 and 17, for the same reasons as for claim 1 of auxiliary request 15. Auxiliary requests 16 and 17 are thus not allowable (Article 84 EPC).

Auxiliary requests 1-4 and 6-14, admissibility

17. Auxiliary requests 1-4 and 6-14 were filed and withdrawn before the the Opposition Division (see point II, above).

18. The primary object of appeal proceedings is to review the appealed decision in a judicial manner - not to examine, for the first time, requests which, following withdrawal, were not subject of that decision (Articles 12(2) and 25(1) RPBA 2020).
19. Furthermore, when reintroduced with the statement of grounds of appeal in 2015, the matter of admission of auxiliary requests 1-4 and 6-14 into the proceedings fell within the scope of Article 12(4) RPBA 2007 (see Article 25(2) RPBA 2020).
20. Under Article 12(4) RPBA 2007, the Board has the power to hold inadmissible requests which could have been presented in the first instance proceedings.
21. This discretion applies, by analogy, to requests which were filed and then withdrawn during the first instance proceedings, since such a course clearly shows that these requests could have been maintained in those proceedings (see Case Law of the Boards of Appeal, 9th ed., V.A.4.11.3.f and, for example, T 1689/12, reason 1.2, third paragraph).
22. By withdrawing auxiliary requests 1-4 and 6-14 before they were considered by the Opposition Division, the proprietor chose not to have a reasoned decision on them that the Board could later review.
23. It may be that in some unusual circumstances a withdrawn request could be admitted, if re-submitted. However, no such unusual circumstances are apparent in the present case.

24. For these reasons, the Board decided not to admit auxiliary requests 1-4 and 6-14 into the appeal proceedings, i.e. not to take them into account.

Auxiliary request 18, admissibility

25. Auxiliary request 18 was filed after notification of the summons to oral proceedings before the Board. Its admission is, therefore, subject to Article 13(2) RPBA 2020, the late stage of appeal proceedings during which the board can also rely on the criteria applicable under Article 13(1) RPBA 2020.
26. Claim 1 includes the wording which the Board finds unclear in auxiliary requests 15 to 17. This objection is not *prima facie* overcome in this request (see Article 13(1), fourth paragraph RPBA 2020).
27. For this reason, the Board does not admit auxiliary request 18 into the appeal proceedings.

Conclusion

28. Since there is no request on file on which the patent can be maintained, the patent has to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chair:



H. Jenney

P. Scriven

Decision electronically authenticated