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**D E C I S I O N**  
**of 16 July 2003**

**Case Number:** T 0088/03 - 3.2.3

**Application Number:** 00203711.7

**Publication Number:** 1067349

**IPC:** F27D 23/02, F27D 1/16,  
B08B 7/00, F27D 1/12

**Language of the proceedings:** EN

**Title of invention:**  
Device, system and method for on-line explosive deslagging

**Applicant:**  
Zilka, Francis and Zilka, Timothy

**Opponent:**  
-

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
"Inventive step - (yes) after amendment"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0088/03 - 3.2.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.3  
of 16 July 2003

**Appellants:**

Zilka, Francis  
318 Fitch Road  
Saratoga, NY 12866 (US)

and

Zilka, Timothy  
200 Lake Avenue  
Saratoga, NY 12866 (US)

**Representative:**

Metman, Karel Johannes  
De Vries & Metman  
Overschiestraat 180  
NL-1062 XK Amsterdam (NL)

**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 29 August 2002  
refusing European application No. 00203711.7  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** F. Brösamle  
**Members:** U. Krause  
J. P. B. Seitz

## Summary of Facts and Submissions

- I. The appeal is against the decision of the Examining Division dated 29 August 2002 to refuse European patent application No. 00 203 711.7 for lack of inventive step with regard to documents GB-A-823 353 ("D1") and LU-A-41 977 ("D2"). The application is a divisional application from earlier European patent application No. 98 903 494.7 filed as International application PCT/US98/00718 on 14 January 1998.
- II. The Applicants (hereinafter denoted Appellants) filed the notice of appeal on 23 October 2002 and paid the appeal fee on the same day. The notice of the grounds of appeal was submitted on 20 December 2002.

In a communication issued as an annex to summons to attend oral proceedings pursuant to Article 11(2) RPBA the Board made reference to a publication of VEB Deutscher Verlag für Grundstoffindustrie, Leipzig 1980, pages 344 to 351, cited as "VBB publication No. 541 070 8 (1980)" by the Appellants with letter of 10 August 2001 (hereinafter denoted "D3").

During oral proceedings held on 16 July 2003 the Appellants filed a set of amended claims 1 to 31 and a new description including insertion of a new page 2A. The amended claims include independent claims 1 and 13 having the following wording:

"1. A method for deslagging a hot, heat-exchange device (31), comprising the steps of:  
delivering a coolant to an explosive device (101), said coolant thereby cooling said explosive device (101) via a coolant-delivery apparatus (12, 106, 109);  
moving said coolant-delivery apparatus (12, 106, 109) and the explosive device (101) cooled thereby into said hot, heat exchange device (31), while so-cooling said explosive device (101) and thereby preventing the heat of said heat exchange device (31) from detonating said explosive device (101); and  
detonating said explosive device (101) at will, once said cooled explosive device (101) has been moved into a proper position,  
characterized in that  
said coolant cools said explosive device (101) wherever said explosive device (101) is moved within said heat exchange device (31), and in that  
said coolant-delivery apparatus (12, 106, 109) and the explosive device (101) cooled thereby are freely moved within said hot heat exchange device to a freely chosen position for detonation of the explosive device (101) within said heat-exchange device (31), and in that  
said detonation is effected while freely maintaining the explosive device in the desired position within the hot heat-exchange device."

"13. An explosives-based system for deslagging a hot, heat-exchange device (31) according to the method of one of the preceding claims, comprising:  
an explosive device (101);  
a coolant-delivery apparatus (12, 106, 109) delivering a coolant to said explosive device (101), said coolant thereby cooling said explosive device (101);

an explosive positioning system (12, 106, 112) enabling a force applied to said explosive positioning system (12, 106, 112) to move said coolant-delivery apparatus (12, 106, 109) and the explosive device (101) cooled thereby into said hot, heat exchange device (31) while so-cooling said explosive device (101), thereby preventing the heat of said heat exchange device (31) from detonating said explosive device (101); and detonating means for detonating said explosive device (101) at will; characterized in that said coolant cools said explosive device (101) wherever said explosive device (101) is moved within said heat exchange device (31), and in that said explosive positioning system (12, 106, 112) enables said force to be applied to said explosive positioning system (12, 106, 112) to freely move said coolant-delivery apparatus (12, 106, 109) and the explosive device (101) cooled thereby into a proper position for deslagging the heat exchange device (31) by detonation of said explosive device (101), and in that said explosive device (101) is adapted, while it is being cooled, to be freely positioned and held for detonation within said heat-exchange device (31) as desired."

III. The Applicants request that the impugned decision be set aside and that a patent be granted on the basis of the new claims 1 to 31 filed during the oral proceedings.

IV. In support of this request they submit essentially the following arguments:

The invention referred to a simple method and system for cleaning incinerators or boilers by introducing, through a manhole or other opening in the wall, a freely movable apparatus having an explosive charge for generating shockwaves for removing slag within the incinerator, which explosive charge was protected from the heat of the incinerator by the coolant to prolong the exposure time of the explosive charge in the hot environment. The essential difference vis-à-vis the prior art was to be seen in the free movability of the cooled explosive charge within the incinerator for positioning at an appropriate location for removing slag by detonating the explosive charge. The prior art disclosed in documents D1 to D3 required special loading chambers provided in the incinerator for the explosive charge, which was incompatible with a free movability. D1 was specific in that the heat-insulated explosive charge was introduced into a tap hole and along the tapping channel of a furnace for removing slag blocking that hole. In D2 blasting holes were drilled in the mass of the furnace and precooled before introducing the explosive charge which was held within the flow of coolant for protection. The blasting hole served the additional function of conducting the coolant flow, which was equally unsuitable for a freely movable device as the precooling. According to D3 the explosive charge was surrounded and cooled by a double jacket cooling pipe which was introduced into a blasting hole of a furnace either when preparing the blasting hole or immediately before firing.

## **Reasons for the Decision**

1. The appeal meets the requirements of Rule 65(1) EPC and is, therefore, admissible.
  
2. The subject-matter of the amended claims is properly based on the disclosure of the application as filed (Article 123(2) EPC) and of the earlier European patent application 98 903 494.7 to which the present divisional application relates (Article 76(1) EPC). In particular, the independent method and system claims 1 and 13 correspond to the original claims 12 and 1, respectively, with a first part based on document D3 and a characterising portion stating features not known from this prior art, and the feature relating to the - non-existing - requirement for preconfiguration of the heat exchange device, which was not disclosed in the earlier application, being omitted. The broadening of the claims 1 and 13, compared with the corresponding claims of the earlier application, by omitting the feature relating to the cooling envelope, is supported by the general definition of the invention, in the earlier application, in the paragraph bridging pages 2 and 3, and the statement in lines 11 and 12 of page 11, which both refer to the delivery of coolant to the explosive device by any means.

The dependent claims 2 to 12 and 14 to 31, corresponding to original claims 13 to 20, 35, 31, 32 and 2 to 11, 23 to 28, 36, respectively, are likewise based on the disclosure in the earlier application.

3. Novelty, which has never been in dispute, is clearly given because there is no available document disclosing a method or system as defined in the claims.
  
4. With regard to inventive step it has to be taken into consideration that method claim 1 as well as system claim 13, by referring to the deslagging method defined in claim 1, relate to the introduction and free movement of the coolant-delivery apparatus and the explosive device cooled thereby within the hot heat exchange device into a freely chosen position for detonation. Since D1, which was identified in the decision under appeal as the closest prior art, is concerned with cleaning a blocked tap hole by thrusting "the jacketed and primed explosive charge into the furnace through the tap hole from which the carbon plug has been removed until the desired positioning of the charge is achieved or the further movement of the assembly is prevented by an obstruction in the tapping channel" (page 2, lines 90 to 96), i.e. introducing the explosive charge at a predetermined place of a furnace and with a predetermined direction along the tapping channel, this free movement is a further feature distinguishing the claimed invention from D1, in addition to the coolant delivery (to the explosive charge) identified in the decision under appeal.

Whereas active cooling of the explosive charge by the coolant delivery may indeed be considered as a measure, known as such from documents D2 and D3, which a skilled person would consider for better protection of the explosive charge from the hot environment, this further distinguishing feature adds a new aspect in that it allows for a flexible deslagging of any parts of a heat



exchange device such as an incinerator or boiler, for example the tube rows of a boiler, rather than being restricted to a predetermined position in a furnace such as the tap hole. The real improvement achieved by the claimed method and system over D1 therefore resides in the elimination of the concept of using of the explosive in a predetermined and preconfigured location of a furnace such as the tap hole to thereby achieve a wider and more flexible use of explosives for deslagging all types of hot heat exchange devices.

This new aspect is rendered obvious neither by document D2 cited in the decision under appeal nor by document D3 referred to in the communication of the Board. Both documents relate to hot blasting slag or masonry in a furnace by introducing, as shown in figures 1 to 4 of D2 and in figure 4.15.1 of D3, a fluid-cooled explosive charge into a hole or loading chamber prepared in the furnace (the "trou de mine" of D2 and the "Laderaum" of D3) and igniting the charge at a predetermined point in time. Thus, whilst disclosing the concept of actively cooling the explosive charge for protection against the hot environment, the application of the explosive charge for deslagging is limited, as in D1, to deslagging of a furnace by introducing the explosive charge into a predetermined and preconfigured loading chamber prepared in the furnace.

The further documents cited in the Search Report, as far as they concern the removal of slag or deposits by explosives, relate either to cooling the deposits in an oven at predetermined locations before introducing explosive charges for breaking up the deposits (see e.g. US-A-2 840 365), or to uncooled explosive charges

mounted at predetermined positions directly on solid deposits (FR-A-2 567 426) or within an incinerator (US-A-5 211 135). Thus, these documents cannot suggest the free movement of a fluid-cooled explosive charge in a hot heat exchange device. The remaining documents are even less relevant.

5. In summary, the independent claims 1 and 13, together with the dependent claims, meet the requirements for patentability as defined in the 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 with the following documents:
  - (a) Claims 1 to 31 filed during the oral proceedings held on 16 July 2003,
  - (b) Description columns 1 to 10 filed during the oral proceedings held on 16 July 2003,
  - (c) Figures 1 to 4 as originally filed.

The Registrar:

The Chairman:

A. Counillon

F. Brösamle