BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File Number: T 667/90 - 3.3.2

Application No.: 81 300 804.2

Publication No.: 0 035 376

Title of invention: A process for the preparation of aluminium-containing high-energy explosive compositions

Classification: C06B 21/00

D E C I S I O N
of 20 January 1993

Applicant: Dyno Industrier a.s.

Opponent: AB Bofors

Headword: Explosive compositions/DYNO

EPC Article 56

Keyword: "Inventive step - no - obvious development"

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 667/90 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 20 January 1993

Appellant : (Opponent)
AB Bofors

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Decision under appeal :
Interlocutory decision of the Opposition Division of the European Patent Office dated 19 June 1990 concerning maintenance of European patent No. 0 035 376 in amended form.

Composition of the Board :

Chairman : P.A.M. Lançon
Members : I.A. Holliday
E.M.C. Holtz

Summary of Facts and Submissions

I. European patent No. 0 035 376 relating to a process for the preparation of aluminium-containing high-energy explosives was granted on the basis of nine claims contained in European patent application No. 81 300 804.2.

II. The Appellant filed an opposition against the granted patent. Of the documents cited the following remain relevant to the present decision:

(4) US-A-2 981 618
(6) FR-A-1 180 530.

III. The Opposition Division, in the interlocutory decision under appeal, proposed the maintenance of the patent in amended form. Claim 1 reads as follows:

"1. A process for the preparation of a castable high-energy explosive composition comprising trinitrotoluene (TNT), crystalline explosive of the RDX or HMX type, aluminium powder, phlegmatising agents and stabilisers consisting of wax and optionally lecithin and nitro-cellulose (NC), characterised by the following steps:

A. dispersing crystals of RDX or HMX in water with wax, under heavy stirring and at a temperature above the melting point of the wax, and subsequently adding to the dispersion aluminium powder which has been treated in order to tolerate water but excluding the use of aluminium powder which has been coated with paraffin, synthetic resins, gums, mineral animal, vegetable and synthetic waxes or mixtures thereof, whereafter the mixture is optionally cooled to separate the explosive as granules which may optionally, be filtered off and dried;

B. melting TNT and dispersing it in hot water under heavy stirring, optionally with the addition of wetted NC and lecithin, subsequently reducing the temperature to below 80°C, so that the dispersed explosive droplets solidify and can be separated as granules and, optionally, dried; and

C. mixing the products from A and B in proportions corresponding to the composition of the desired explosive composition ready for use after filtering and drying of the granules; or melting a mixture of granules produced according to step A and step B together and casting them on a drum, ribbon or plate to produce a so called plate granulate; or combining steps A and B in the same reactor before any part of the dispersed phases has solidified."

In the opinion of the Opposition Division, the closest prior art was represented by document (4) which relates to the known dry process for preparing castable mixtures of TNT, RDX and aluminium. According to the decision, none of the other documents cited suggested replacing the said dry process with a wet grinding process in accordance with the claims of the patent in suit.

The coating of aluminium with wax (inter alia) according to document (6) would render it tolerant to water. However, the Opposition Division accepted the Patentee's argument that such a wax-coated aluminium would be unsuitable for the process currently claimed and accordingly the disclaimer proposed by the Patentee was allowed.

IV. The Appellant lodged an appeal against the said decision; oral proceedings took place on 20 January 1993.

Both in the written procedure and at the oral proceedings, the Appellant argued that the disclaimer, which had been

introduced to substantiate inventive step, was inadmissible since it failed to exclude all the materials embraced by document (6). It was also argued that the claim now embraced methods of passivating aluminium that had not originally been disclosed. Having regard to the offer of the Respondent to amend the disclaimer of Claim 1 in accordance with his objections, arguments under Articles 83 and 84 EPC advanced in the written procedure were not pursued at the oral proceedings.

The Appellant also argued that aluminium treated in accordance with document (6) would be suitable for use in the process of the patent in suit. Furthermore, each of the variants of step (A) of Claim 1 of the disputed patent were disclosed in (6) and a passage in the description thereof indicated that the wet dispersion process disclosed therein was also applicable to other aluminium containing explosives. In the light of this teaching, it would have been obvious to add TNT to the product of Example 3 of (6) and so arrive at the process of the patent in suit.

V. In refuting the above arguments, the Respondent maintained that the disclaimer was not introduced in order to substantiate inventive step but to exclude from the scope of the claim the form of treated alumina according to (6) which would not have worked in the claimed process. The Respondent also requested that the disclaimer be amended to include petroleum wax, thus bringing it into line with the materials referred to in the description of (6).

The Respondent, whilst agreeing that document (4) was the closest prior art, argued that there was a difference between the explosives produced by the dry process disclosed therein which were of lower density than those produced by the wet process of the patent in suit.

The wet grinding process of the patent in suit depended for its success on an interaction between aluminium, wax and RDX (or HMX). The Respondent argued that aluminium coated with wax according to (6) would not be suitable for this process; the wax coating would inhibit the interaction and the coated aluminium particles would tend to agglomerate. It was also argued that the hexal explosive disclosed in (6), which contained RDX, aluminium and low amounts of wax was quite different from the hexotonal produced by the process of the disputed patent; the latter contained considerably larger amounts of wax and fusible material (TNT).

It was further argued that the teaching referred to on page 2 of document (6) concerning the application of the process to other aluminium containing explosives was of a very general nature. Having regard to its products, the explosives industry was very conservative in that it was reluctant to transfer technology from one class of explosive to another. The Respondent argued that both documents (4) and (6) were old and that there was no reason to combine their teachings.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent requested that the appeal be dismissed and the patent maintained with a disclaimer adapted to the exact wording of document (6).

Reasons for the Decision

1. The appeal is admissible.

2. The Board is satisfied that the disclaimer as amended at the oral proceedings is admissible.

2.1 In accordance with established case law, in cases where there is overlap between what is claimed and the state of the art, it is permissible to exclude specific prior art by means of a disclaimer, even if the original documents provide no basis for such an exclusion (cf. e.g. T 4/80, OJ EPO 1982, 49).

2.2 In T 313/86 dated 12 January 1988, the Board also expressed the view that the same principles apply when a smaller partial area of the generally defined subject-matter is to be excluded not in view of the state of the art but because it does not solve the underlying technical problem (Reasons, point 3.5), (cf. also T 170/87, OJ EPO 1989, Reasons, point 8.4 ff).

3. After examination of the prior art, the Board concludes that the claimed subject-matter is novel. Since novelty is not in dispute, there is no need to consider the matter any further.

4. The patent in suit relates to a process for the preparation of a castable high-energy explosive composition containing aluminium.

4.1 The Board agrees with the Opposition Division that document (4) can be regarded as the closest state of the art. The said document relates to a high explosive filler composition for novel underwater munitions which, like the product of the claimed process at issue, corresponds to a

single component castable mixture for the end user. The processes for the preparation of the explosive composition outlined in column 6, lines 19-32 of (4) correspond to the prior art acknowledged on page 2, lines 18-45 of the patent in suit. Such methods involve either the dry mixing of rounded particles of RDX, TNT or aluminium or a melt mixing of RDX and TNT followed by dispersion of aluminium particles in the melt. Each process involves the handling of aluminium powder which is well known to be a safety hazard since in contact with moisture, hydrogen can be generated with a consequent risk of explosion.

4.2 The problem to be solved vis-à-vis the stated prior art can thus be seen in developing a process for the preparation of such a castable explosive composition which avoids the hazards associated with aluminium powder.

4.3 According to the claims, the solution lies in the use of aluminium powder treated in order to tolerate water and by using a process of wet grinding.

Having regard to the examples which appear in the patent in suit, the Board is satisfied that the problem has been solved in a plausible manner.

5. It remains to consider whether or not the said solution involves an inventive step as required by Article 56 EPC.

5.1 The problems associated with the use of powdered aluminium are concisely set out on page 2, lines 46-66 of the patent in suit. The proprietor acknowledges at line 59 on page 2 that the existence of such problems can be regarded as common knowledge within the explosives industry. It is thus apparent that such problems pose a hazard not only for the consumer but also for the manufacturer including those concerned with the dry mixing process disclosed in

document (4). That it was the case is shown by document (6) which also deals with the manufacture of aluminium containing explosives.

5.2 Document (6) proposes a solution to the problem of handling aluminium powder whereby the aluminium particles are coated with a layer of paraffins, synthetic resins or a variety of natural and synthetic waxes. It must be admitted that by this coating, aluminium has been rendered tolerant to water as desired in the patent in suit (see page 3, line 20 of the patent in suit). Examples 1 and 2 of document (6) disclose coating with a paraffin and with beeswax respectively. According to Example 2, 100 Kg of aluminium powder are coated with 30 Kg of beeswax. In Example 3, the product of Example 2 (45 Kg) is wet ground with 150 Kg hexogen (RDX) in 650 ml water with agitation at 60°C to obtain an explosive of the hexal type. It is furthermore stated in (6) in the left-hand column on page 2 that such a process is by no means limited to the preparation of hexal but also applicable to other aluminium containing explosives.

5.3 The Respondent has argued that this teaching is of a very general nature and that methods used to prepare hexal are quite different from those used to prepare hexatonal.

5.3.1 However, the Board notes the specific embodiment of the process defined by Claim 6 of the patent in suit. This specific process involves as a first stage dispersing RDX crystals in water together with wax and optionally a phlegmatising agent, at a temperature above the melting point of the wax. Aluminium powder treated to tolerate water is then added with vigorous stirring to obtain granules which are filtered and dried. The said granules may subsequently be mixed with TNT in order to obtain the required hexatonal.

5.3.2 The Respondent admitted at the oral proceedings that the process of Claim 6 came closer to that of document (6) than the other variants claimed. Having regard to the beeswax coating on the granules used in Example 3 of (6), the process constitutes in effect a mixing of RDX, wax and aluminium in order to obtain a product which would be substantially the same as that obtained using the process prescribed by the above-mentioned Claim 6. In other words, the product would contain wax in the proportions normally present in explosives of the hexatonal type. Accordingly, adding TNT to the product of Example 3 of (6) would lead in an obvious manner to the process of Claim 6 of the disputed patent.

5.3.3 The Appellant has not demonstrated unexpected results for any of the alternative process variants encompassed by Claim 1, which are essentially concerned with the appropriate point to add the TNT. Thus, having arrived at the process of Claim 6, which is a preferred embodiment of Claim 1, it would be within the routine experimental duties of one skilled in the art to devise the other variants set out therein.

5.4 At the oral proceedings, the Respondent attempted to distinguish the powdered (low density) products obtained by the dry mixing process of document (4) and analogously the particulate products obtained by the wet grinding process of (6) from the cast products (high density) obtained by the process currently claimed. The Board is not convinced that such a distinction actually exists. The product obtained according to the description in column 6, lines 19-24 of (4) would be granular. However, having regard to its constituents, at a temperature above the melting point of TNT, the granules could be melt loaded or cast into shell cases to obtain an explosive in the high density state. It is to be noted that the product of

the first stage of Claim 6 of the patent in suit is described as an "explosive in the form of granules" which may be melted together with TNT by casting. In any event, both the products claimed in document (4) and those of the patent in suit are defined as "castable" explosives.

5.5 As an argument in favour of the disclaimer, the Respondent maintained throughout the proceedings that aluminium treated according to document (6) would be unsuitable for use in the process of the patent in suit. Having regard to the analogy between the respective processes discussed in points 5.3.1 and 5.3.2 above, the opposite views expressed by the Appellant and the absence of experimental evidence, the Board considers this to be an unsubstantiated assertion.

5.6 The Respondent argued that both (4) and (6) were old documents. Having regard to their age and to the conservative nature of the explosives industry, it would not be justified to combine them. This argument must be considered in association with the comment of the Appellant at the oral proceedings that, presumably for reasons of secrecy, very few patents are filed by the explosives industry. Having regard to the limited prior art available and to the analogy between the processes set out above, the combination is, in the Board's opinion, justified.

5.7 Having regard to the preceding paragraphs, the Board concludes that Claims 1 and 6 lack inventive step and accordingly the patent must be revoked.

6. In the absence of an auxiliary request, it is not necessary for the Board to consider the patentability of the other claims particularly the independent Claim 7.

However, in relation to the last mentioned, it is noted that there appears to be insufficient support in the description for a restriction of the patent to this embodiment.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. European patent No. 0 035 376 is revoked.

The Registrar: The Chairman:

P. Martorana P.A.M. Lançon

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