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D E C I S I O N
of 6 September 1996

Case Number: T 0028/95 - 3.2.3

Application Number: 89307104.3

Publication Number: 0376433

IPC: E21B 29/00

Language of the proceedings: EN

Title of invention:
Cutting tool for removing packers or the like from wells

Applicant:
Tri-State Oil Tools, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - yes"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0028/95 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 6 September 1996

Appellant: Tri-State Oil Tools, Inc.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 2 August 1994 refusing European patent application No. 89 307 104.3 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. T. Wilson
Members: J. B. F. Kollar
L. C. Mancini

Summary of Facts and Submissions

I. European patent application No. 89 307 104.3, filed on 13 July 1989, and published on 4 July 1990 with publication No. 0 376 433 was refused by decision of the Examining Division dated 2 August 1994. The decision was based on Claims 1 to 16 submitted on 21 October 1992.

II.1. The stated ground for refusal was that the subject-matter of Claim 1 did not involve an inventive step with regard to the disclosure of documents D1 (US-A-4 717 290) and D2 (US-A-4 696 502) or with regard to the teaching of document D3 (EP-A-234 697) and document D2.

2. The cutting tool according to Claim 1 differed from the tool described in D1 in that the blades extended inwardly from the outer peripheral surface of the tool body. Blades extending inwardly from the outer peripheral surface of the tool body were known from D2. Since this document related to the same technical field of milling tools the skilled person was aware of its teaching and by professional routine was expected to combine this teaching with the teaching of D1 to arrive at the subject-matter of Claim 1.

3. Even if Claim 1 would be delimited to a mill for milling a packer this would not have saved Claim 1, since such subject-matter would have resulted from direct and thus obvious superposition of the teachings of D3 and D2.

III. On 12 October 1994 the Appellant (Applicant) filed an appeal against the decision of 2 August 1994, paying the fee at the same time.

The Statement of the Grounds of Appeal was received on 2 December 1994.

IV. The Appellant submitted substantially the following in support of the appeal:

(a) Document D1, in view of which the present application was refused for lack of inventive step, related to a type of cutting tool which is so remote from the cutting tool of the present invention in construction and function that the reference is not proper.

(b) References upon which the application was refused for lack of inventive step fail to disclose several elements of the present invention. The element-by-element analysis given in the contested decision fails entirely to point out a correlation between the claimed features and the cited references.

The references which were cited in the contested decision address two types of cutting tools - namely D1 and D3 pilot mills and D2 a dual mill - which are so different that the combination of said references would not, contrary to the decision of the first instance, lead the skilled person to the junk mill type of (end milling) tool claimed in Claim 1.

V. A new set of amended Claims 1 to 11 forming the appellant's main request was submitted on 19 August 1996. The independent Claim 1 reads as follows:

"1. An end milling tool for removing metal from a well bore or other tubular bore, comprising:

a tool body (22) adapted to be received within a tubular bore, and to be supported at its upper end for rotation about a longitudinal axis;

a plurality of blades (32, 34) at spaced intervals on the lowermost end (3) of said tool body (22) and extending downwardly therefrom, and inwardly from the periphery (24) of said tool body (22), each of said blades having a leading surface (36) relative to the direction of rotation of said tool,

characterised by further comprising:

a plurality of closely spaced cutting elements (42) secured to said leading surface (36) of each said blade (32, 34) below said lowermost end (30) in a plurality of uniform rows extending generally transverse to said longitudinal axis of said tool body (22), with each said cutting element (42) being of predetermined size and shape, arranged in a predetermined pattern, and formed of a material harder than the metal to be cut, each of said cutting elements (42) having an exposed front face (42A) forming a cutting face, a rear face (42B) mounted on said leading surface (36) of said blade (32, 34), a peripheral surface (42C) extending between said faces (42A, 42B), a relatively sharp edge (42D) formed at the juncture of said front face (42A) and said peripheral surface (42C), with said sharp edge (42D) being of arcuate shape for at least a segment of its length; and

a groove (42F) formed in said exposed from cutting face (42A) of each of said cutting elements (42), with a said groove (42F) extending generally along and adjacent to a said sharp edge (42D) of a said cutting element (42), and with a said groove (42F) being shaped to deflect a turning, cut from the metal to be milled,

outwardly from a said cutting face and back toward the metal, causing the turning to break into relatively short lengths."

Claim 1 is distinguished from the refused Claim 1 substantially in that the expression "A cutting tool" in the preamble has been changed into "An end milling tool" and the features of the refused Claim 10, relating to the embodiment of the cutting elements (42), have been incorporated into the characterizing portion.

VI. The Appellant requests that the decision under appeal be set aside and a European patent be granted on the basis of the amended Claims 1 to 11 submitted on 19 August 1996 or, alternatively, on the basis of the Claims 1 to 16 received on 21 October 1992.

Reasons for the Decision

1. The appeal is admissible.

2. There is no objection to the amended claims under Article 123 EPC, being adequately based on the original disclosure with the main claim delimited with respect to the state of art known to the applicant and substantiated in the introductory part of the description.

3. The problem with which the invention was concerned was to improve the cutting and milling efficiency as well as the rate of removal of the metal scrap material in the operation by milling tools of the kind specified in the preamble of Claim 1.

It is credible that this problem has been effectively solved by the improved blade design of the milling tool claimed in Claim 1, which provides a maximum milling action with minimal loading and minimal frictional contact between the blades and the upper end of the member which is to be disintegrated and removed - such a smooth and uniform milling action provides a formation of relatively short length and relatively thick turnings or chips permitting an efficient removal of scrap material from the well bore.

4. A closer study of the documents underlying the contested decision reveals that

- document D1 relates to a **pilot-mill** having a tool body sized and shaped to fit closely inside a tubular member to be cut, and **blades** which extend **only radially outwardly** from the body of the tool. The lower end of the tool body acts as the "**pilot**" portion of the tool, giving rise to the name "pilot mill";

- document D2 fails to disclose blades of any kind. Instead, it discloses **pads** of hardfacing material consisting of tungsten carbide particles suspended in a matrix of brazing alloy;

- document D3 relates to a cutter of **pilot mill** kind, one application of which is the removal of packers from oil well bores. The cutter comprises two sets of blades which are preferably helically mounted on the elongated body member of the cutter and which have different radial extension.

5. It follows from the above that the milling tool according to Claim 1 which belongs to the kind of cutters called "junk mills" differs from the pilot mill known from D1 not only in that the blades extend inwardly from the outer peripheral surface, as stated in the contested decision (page 5, second full paragraph), but moreover by the features disclosed in the characterizing portion of the valid Claim 1. Therefore, document D1 fails to disclose several claimed features and the objection to Claim 1 recited in the contested decision in view of the disclosure of D1 is thus incorrect.

6. Document D2 relates to a tool which is designed specifically for removing dual string packers. This tool thus serves for removing exactly the type of member which the pilot mill of the kind described in D1 could not possibly remove. The tool of D2 has an inner milling head which mills down through the centre of the packer to allow grasping the packer when it is cut loose from the tubular member by an outer annular shoe. This method of removal minimizes the amount of material which must be milled away in order to remove the packer from the tubular member. This tool is thus designed for a method which is directly opposite to the method performed by the pilot mill of D1 which mills away the entire member being removed.

7. The Board is therefore of the opinion that the person skilled in the art would not have combined the teachings of D1 and D2 to produce the milling tool of the junk mill kind as defined in Claim 1, particularly since the problem to be solved (see point 3 above) is not recognised in D1 or D2.

Similarly, a combination of document D3 relating to a cutter of pilot mill type with a pilot mill according to D1 would not, in the Board's opinion, have been contemplated by the skilled person to arrive at the cutting tool of the junk mill type claimed in Claim 1.

The Board cannot therefore concur with the grounds and conclusions of the impugned decision of the first instance.

8. None of the other documents cited in the search report relate to the claimed solution, so that a skilled person cannot be guided by their teaching towards that solution.

9. The subject-matter of Claim 1 according to the main request thus satisfies the requirements of Articles 52(1) and 56 EPC. The same applies to the subject-matter of Claims 2 to 11, since these claims relate to particular embodiments of the invention and are fully dependent on the main claim.

Order

For these reasons it is decided that:

1. The decision of the Examining Division of 2 August 1994 is set aside.

2. The case is remitted to the Examining Division with the order to grant a European patent on the basis of Claims 1 to 11 submitted on 19 August 1996 and a description to be adapted.

The Registrar: The Chairman:

N. Maslin C. T. Wilson