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D E C I S I O N
of 7 May 2002

Case Number: T 0853/99 - 3.2.3

Application Number: 91118697.1

Publication Number: 0484839

IPC: E21B 4/14

Language of the proceedings: EN

Title of invention:

Reversible impact-operated boring tool

Patentee:

THE CHARLES MACHINE WORKS INC

Opponent:

Tracto-Technik, Paul Schmidt, Spezialmaschinen KG

Headword:

-

Relevant legal provisions:

EPC Art. 56, 57

Keyword:

"Inventive step - confirmed"

Decisions cited:

-

Catchword:

-



Case Number: T 0853/99 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 7 May 2002

Appellant: Tracto-Technik, Paul Schmidt
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Respondent: THE CHARLES MACHINE WORKS INC
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Representative: UEXKÜLL & STOLBERG
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 24 June 1999
rejecting the opposition filed against European
patent No. 0 484 839 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: C. T. Wilson
Members: J. B. F. Kollar
H. Preglau

Summary of Facts and Submissions

- I. European patent No. 0 484 839 was granted on 29 January 1997 on the basis of application No 91 118 697.1 filed on 2 November 1991.

Granted independent claims 1 and 6 read as follows:

- "1. A reversible impact operated boring tool (10) operable in a forward mode and in a reverse mode from a source of high pressure operating fluid including a housing assembly (14) having a hollow interior, said housing assembly defining a forward striker surface (92) and a rearward striker surface (49) at opposite ends of the hollow interior, a striker (70) reciprocal within the hollow interior of the housing assembly between the forward and rearward striker surfaces, the striker having an interior cavity defining an inner surface and at least one port (74) formed therethrough to connect the interior cavity to the hollow interior of the housing assembly, an operating fluid supply tube (60) extending proximate the interior cavity of the striker to supply operating fluid to the interior cavity, and a control sleeve (100) in sliding contact with the inner surface of the striker, the striker reciprocating between the forward striker surface and a position intermediate said striker surfaces with the control sleeve in a forward position, the striker reciprocating between the rearward striker surface and a point intermediate said striker surfaces with the control sleeve in a rearward position, wherein the improvement is characterized in the boring tool having a control fluid supply

tube (58) concentric with said operating fluid supply tube (60) defining an annular control fluid passage therebetween, said control sleeve further mounted in slidable sealed contact at a forward end thereof to the operating fluid supply tube (60) and in slidable sealed contact at a rearward end thereof to the control fluid supply tube (58) to define a control chamber (102) connected to the control fluid passage, said control sleeve slidable between the first, forward position and the second, rearward position and means to selectively provide a control fluid through the control fluid passage to the control chamber to maintain the control sleeve in the first position, the operating fluid pressure in the interior cavity acting on the control sleeve to move the control sleeve to the rearward position in the absence of control fluid pressure in the control chamber to selectively operate the impact operated boring tool in the forward or reverse modes."

- "6. A method for alternating the operation of a reversible impact operated boring tool (10) between the forward mode and the reverse mode including the steps of pressurizing the interior chamber (102) of a control sleeve (100) with high pressure fluid with the control sleeve maintained in a first position to operate the tool in the forward mode and pressurizing the interior cavity of a striker (70) with high pressure fluid from an operating fluid supply line (22) and maintaining the supply of high pressure fluid to the interior of the striker for facilitating reciprocal motion of the striker to operate the tool in the forward

mode, the improvement characterized in supplying the high pressure fluid to the interior chamber of the control sleeve from a control fluid supply line (30) separate from the operating fluid supply line and further depressurizing the interior chamber of the control sleeve by exhausting the high pressure fluid from the interior chamber while maintaining the supply of high pressure fluid to the interior of the striker, whereby the force of the high pressure fluid within the interior cavity of the striker upon the control sleeve moves the control sleeve to a second position to operate the tool in the reverse mode."

- II. An opposition was filed requesting the revocation of the patent in accordance with Article 100(a) EPC in connection with Articles 56 and 57 EPC.

In the course of the opposition proceedings the following documents were cited:

D1: US-A-4 708 211

D2: DE-A-2 820 786.

The patent proprietor requested the rejection of the opposition.

- III. By a decision dispatched on 24 June 1999 the Opposition Division rejected the opposition. The Opposition Division held that a boring tool according to the patent can be used in the drilling industry and the requirement of Article 57 EPC was met, and that the independent claims 1 and 6 met the requirements of Article 56 EPC.

IV. On 28 August 1999, the appellant (opponent) filed an appeal against the rejection of the opposition and paid the appropriate fee on the same day.

The statement of grounds of appeal was received on 3 November 1999.

V. In the Annex to the summons to attend oral proceedings dispatched on 21 November 2001, the Board set out its provisional opinion that the patent specification taken as a whole would seem to comply with the requirements of Articles 52 to 57 EPC.

VI. During the oral proceedings held on 7 May 2002, after the discussion of the questions whether the patent as granted met the requirements of Articles 52 to 57 EPC, the parties formulated their requests as follows:

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

The respondent (patentee) requested that the appeal be dismissed.

VII. In support of his request the appellant argued substantially as follows:

The subject-matter of the patent in suit is not patentable under Article 57 EPC because the invention claimed in claims 1 and 6 is not susceptible of industrial application since it cannot be used without the spring 104 which is an essential feature and is missing from said claims.

Document D2 shows a reversible impact operated boring

tool comprising, similarly to the present invention, a spring-pneumatically controlled valving member for the switching of the operating fluid flow. At this tool the operating fluid and the control fluid are supplied by two concentric tubes independently of each other into the operating chamber and the control chamber, respectively. One skilled in the art starting from the state of the art according to document D1 on which the preamble of the independent claims of the patent in suit is based, would be led by the teaching of D2 to switch the operating fluid flow of D1 by means of the inlet of the control fluid flow supplied through the annular channel between the inner air inlet tube and the control fluid supply tube. Following the teaching of D1 and D2 the person skilled in the art would arrive at the invention as claimed in claims 1 and 6 without exercising an inventive skill. Therefore, the subject-matter of claims 1 and 6 does not meet the requirements of Articles 52(1) and 56 EPC.

VIII. The counterarguments presented by the respondent can be summarised as follows:

The patent specification taken as a whole teaches that the essential features of the invention in suit consist of the constructional arrangement of the directional control means in form of the control sleeve and the fluid pressure acting on it in order to selectively operate the boring tool in the forward or reverse mode. Reference is made to column 4, lines 15ff of the patent specification according to which the spring contained within the directional valve helps to keep the valve in its required position. Said spring is claimed in dependent claim 2 of the patent in suit as an optional feature among other alternatives known to the skilled

person, like eg increased pressure of the control fluid, electropneumatic or electromagnetic force etc, assisting the pressurized control fluid in withstanding that the directional sleeve is forced in a rearward direction due to the fluid pressure prevailing in the operating chamber of the tool. Since the spring does not form an essential feature of the invention claim 1 of the patent in suit does not conflict with the requirements of Article 57 EPC.

Document D1 forms the closest prior art. Document D2 shows a reversible boring tool in which the pressurized control fluid, in the forward position of strike, is supplied to the directional valve via a plurality of means (valves and openings) only if the supply tube for the control fluid and the directional valve are separated (cf. Figure 2 of D2), whereas in the invention in suit the control fluid flows directly into the control chamber independently from the position of the striker sleeve. It was not obvious for the skilled person to combine the different concepts of D1 and D2. The requirements of Articles 52(1) and 56 EPC are thus satisfied.

Reasons for the Decision

1. The appeal is admissible.

2. The subject-matter of the contested patent relates to a reversible impact operated boring tool according to the independent claim 1 and to a method for alternating the operation of a reversible impact operated boring tool according to claim 6.

It is explained in the introductory part of the patent specification (see columns 1 to 3) that numerous attempts have been made before the date of filing to improve the means for switching from the forward to the reverse mode of operation, the attempts however often resulted in uncertainty about which direction the machine was travelling in the hole. The prior art discloses various means for accomplishing reverse motion. Some required interrupting the pressurized fluid supply. Others require manipulation of the hose supplying the pressurized fluid to the tool, either by rotating the hose or by pulling it back. Still others require both the interruption of the pressurized fluid supply and the manipulation of the hose - each of these means having its disadvantages

3. *Industrial application*

The patent specification taken as a whole unambiguously teaches that the tool according to the patent in suit employs a directional valve by means of which the tool can be switched from the forward to the backward mode and describes the constructional features and process steps enabling the required mode of operation.

The tool comprises a primary supply tube for the operating pressurized fluid and a secondary supply tube for the controlling fluid, the tool being arranged for the sliding motion of the directional valve along both the primary and secondary fluid inlets tubes. The primary pressurized fluid enables reciprocal movement

of the tool and it is one of the advantages of the invention in suit that the supply of the primary fluid does not have to be interrupted on switching the operating mode.

The Board agrees with the argument of the respondent alleging that the essential features of the present invention consist of the constructional arrangement of the directional control valve within the tool and of the supply of the fluid flow acting on it in order to selectively operate the boring tool in the forward and reverse mode. When pressurized control fluid is supplied to this directional valve, the tool operates in the forward mode to burrow holes in the soil. When pressurized fluid is exhausted from this directional valve, the tool operates in the reverse mode for retrieval. This means that the condition for the forward mode of the tool requires that the kinetic pressure prevailing in the valving member chamber must be higher than the pressure in the rear operating chamber.

Contrary to the opinion of the appellant stressing that without the spring arranged within the directional valve the invention in suit would not be susceptible of industrial application and undue burden would be required from the person skilled in the art in order to provide for the aforementioned condition and that said spring thus being the essential feature of the invention, the Board takes the view that the spring which is mentioned in column 4, lines 15ff as an optional feature and is claimed in claim 2 of the patent in suit as a preferred embodiment is not an essential feature of the invention in suit but represents one of suitable structural and functional

alternatives, like e.g. increased pressure of the control fluid, arrangement of electropneumatic or electromagnetic elements etc. The selection of the available alternatives as well as the balancing of their dimensions against the required conditions belongs to the normal choice of an average engineer in the field of control technology following general laws of pneumatics.

In view of the above, the Board concludes that the patent meets the requirements of Article 57 EPC.

4. *Novelty*

It has been agreed throughout the proceedings that document D1 relating to a reversible air-operated percussive action machine for driving holes in the ground forms the nearest prior art.

The subject-matter of claim 1 and 6 differs from D1 by the characterising features. Since the appellant has not provided any document which would anticipate all the features of the independent claims the requirements of Article 54 EPC are satisfied.

5. *Inventive step*

D1 discloses that reverse operation is achieved by shutting off the air supply.

- 5.1 The problem to be solved by the present invention is according to lines 29 to 36 of the patent specification seen in finding an alternative means for reversing operation quickly and safely.

5.2 The problem is solved by the present invention as claimed in claims 1 and 6, according to which the primary pressurized operating fluid supply which enables reciprocal movement of the tool does not have to be terminated, nor does the supply hose have to be manipulated in any manner. The claimed invention provides for rapidly and safely changing from the forward mode of operation to the reverse mode of operation of the boring tool.

5.3 According to claim 1 of the patent in suit the control sleeve (100) is mounted in slidable sealed contact at a forward end thereof to the operating fluid supply tube (60) and in slidable sealed contact at the rearward end thereof to the control fluid supply tube (58), while in document D2 a valve sleeve (42) has one end in sliding contact with an outer tube (26) whereas the outer end (44) has no sliding contact with the tube (26). Thus the aforementioned feature of claim 1 cannot be derived from document D2.

Furthermore, whereas in D2 the control fluid is supplied through the annulus (27) via the valve (30) to the opening (28) and in the forward position of the striker (6) through the opening (18) into the annular chamber formed by sleeve (42) only if the sleeves (42) and (26) are separated as shown in Figure 2, in the invention the control fluid flows directly into the control chamber (102) independently of the position of the striker sleeve.

5.4 These two aforementioned concepts are so remote that the person skilled in the art would have no incentive for modifying the design of the prior art boring tool according to D1 in a way which could make the invention obvious.

5.5 Accordingly, the Board has reached the conclusion that the subject-matter of claim 1 as granted involves an inventive step as required by Article 56 EPC and the claim is therefore patentable. The same applies also to method claim 6.

5.6 As claim 1 is allowable the same goes for dependent claims 2 to 5, which are directed to preferred embodiments of the tool according to claim 1.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

A. Counillon

C. T. Wilson