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**Datasheet for the decision
of 7 November 2014**

Case Number: T 2046/12 - 3.2.07

Application Number: 06396009.0

Publication Number: 1712336

IPC: B27L7/00

Language of the proceedings: EN

Title of invention:

Splitting machine for wood pieces

Patent Proprietor:

Maaselän Kone Oy

Opponent:

Agromaster Oy

Headword:

Relevant legal provisions:

Keyword:

Inventive step - (no) partial problems

Decisions cited:

T 0389/86

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 2046/12 - 3.2.07

D E C I S I O N
of Technical Board of Appeal 3.2.07
of 7 November 2014

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 28 June 2012
rejecting the opposition filed against European
patent No. 1712336 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman H. Meinders
Members: V. Bevilacqua
C. Brandt

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the decision of the opposition division on the rejection of the opposition against the European patent 1 712 336. Opposition was filed against the patent as a whole and based on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC). The opposition division held that none of these grounds for opposition prejudiced the maintenance of the patent as granted.

The appealed decision took account of the following documents:

- D1: I. Fonselius, *Hydrauliikka II*, 1995, fig. 3.33
D2: R. Mäkinen, *Hydrauliikka 3*, 1981, fig. 2.31
D3: CH 617384 A
D4: WO 2004/022293 A

The following documents had also been filed in the opposition proceedings:

- D5: SU 421 504 A
D6: SU 115 1454 A
D7: FI 112617B
D8: US 2001/0008 153 A

- II. The appellant requested that the decision under appeal be set aside and the patent be revoked for lack of inventive step.
- III. The respondent requested that the appeal be dismissed and that the patent be maintained as granted.
- IV. The wording of claim 1 of the patent as granted reads as follows:

1) A machine for splitting wood pieces, comprising a splitting blade, a splitting space for the placement of a wood piece, a splitting head arranged to move back and forth in the splitting space and connected to two actuators in parallel, which are driven by pressurized medium and arranged to produce said movement,

the machine further comprising a pump arranged to pump pressurized medium from a tank via a pressure line as well as a return line for returning the pressurized medium to the tank, the splitting head being connected to two actuators in parallel, and the machine also comprising a directional control valve connected to the pressure line and the return line for selecting the direction of movement of the actuators,

the working pressure of the pressurized medium being arranged to be coupled selectively to the actuators so that in the first coupling position, the actuators provide a higher total thrust force and a lower speed than in the second coupling position by the fact that, in the first coupling position,

the working pressure is arranged to be directed to the actuators in such a way that it acts on a larger total piston working area, and, in the second coupling position, the working pressure is arranged to be directed to the actuators in such a way that it acts on a smaller total piston working area,

characterized in that the splitting blade is placed on the extension of the motion path of the splitting head for splitting the wood piece and that the pressurized medium system comprises a filling line separate from the return line and connected to the tank and arranged to be connected to the working chamber of that actuator

whose piston moves passively by the effect of the adjacent actuator, to which the working pressure is directed.

V. The appellant's arguments, in so far as they are relevant to the present decision, may be summarised as follows:

D3 discloses a wood splitting machine which should be regarded as a particularly suitable starting point for discussing inventive step.

Two differences are identified between the subject matter of claim 1 of the patent as granted and the content of the disclosure of this document:

-that the pressurized medium system comprises a filling line separate from the return line and connected to the tank and arranged to be connected to the working chamber of that actuator whose piston moves passively by the effect of the adjacent actuator, to which the working pressure is directed (first difference);

-that in D3 it is the splitting blade that is pressed against a piece of wood while in the opposed patent it is the splitting head that is pressing a piece of wood against the splitting blade (second difference).

Two separate effects are to be attributed to these two differences, and on this basis two separate partial problems can be formulated as follows:

-how to reduce the resistance to movement as generated by the idle cylinder of the machine of D3, in order to provide higher working speed;

-how to eliminate the need of removing the split wood from the machine, thereby simplifying the use of the machine by an operator.

Concerning this second problem the appellant argued that changing from a moving splitting blade that is pressed against a piece of wood to a moving splitting head which presses a piece of wood against a stationary splitting blade is an obvious modification especially because documents D4, D7 and D8 already show this type of configuration.

The appellant further argued that D2 and D1 both show hydraulic systems with pistons acting in parallel, which teach that a separate filling line connected to the tank and to the working chamber of the idle actuator is a way to solve the first problem.

The skilled person directly applying this teaching to D3 would solve the first partial problem in the same way claim 1 does it without the need of any inventive step.

VI. The respondent's arguments, in so far as they are relevant to the present decision, may be summarised as follows:

D3 is not a suitable starting point for the inventive step discussion. This is because the supply of hydraulic fluid to the upper chamber of the idle piston of D3 is always guaranteed by channel C. As a consequence, a person skilled in the art would not see, starting from this document, any need for an additional supply line connecting the idle actuator to the tank.

In addition to that, the partial problems approach used by the appellant was not correctly applied, because the two identified differences could not be treated separately when discussing inventive step.

This was because a common problem was solved by both these features in combination, namely increasing the working speed and efficiency of the known machine.

The effect linked only to the first difference, namely that the filling line can rapidly fill the space in the idle actuator, clearly contributes to solving this problem.

Also the technical effect linked to the second difference, namely that the split parts of the log are automatically pushed past the blade and therefore removed from the position in which the cutting step takes place, clearly contributes to an improvement to the working speed and efficiency of the known machine.

Moreover, a person skilled in the art of wood splitting machines would not take technical information made available by D1 and D2 into consideration when looking for a solution to the problem of increasing the working speed and efficiency of a wood splitting machine like the device of D3.

The hydraulic arrangements shown in D1 and D2 cannot be considered as belonging to the common general knowledge of this person because they clearly relate to a very specific field of application of hydraulic systems: industrial presses.

Industrial presses are intended for industrial production of products in big series and therefore for

continuously repeating the same working step on the same starting component and in the same working conditions. This situation is completely different from a wood splitting machine, which should be able to continuously adapt its operation to the continuously changing dimensions of the wood logs.

The line of argumentation of the appellant, according to which technical information coming from D1 and/or from D2 is enough, starting from D3, to cast doubt on the presence of inventive step in the subject matter of granted claim 1 is therefore not convincing.

This is because the content of the disclosure of D1 and D2 is not related to wood splitting in any way, and for this reason is not directly applicable to improve a wood splitting machine.

VII. Oral proceedings were held on 7 November 2014, at the end of which the decision was announced.

Reasons for the Decision

1. *D3*

1.1 The wood splitting machine disclosed in D3 is based on the same working principle as the machine claimed in claim 1: a hydraulic system using two cylinders acting in parallel. As claimed in claim 1 of the patent in suit, the cylinders are arranged in such a way that the smaller cylinder is activated by pressure only when a higher thrust force is needed.

For these reasons the Board finds that D3 is a suitable starting point to discuss inventive step.

1.2 Using the terminology of claim 1 of the patent in suit, D3 discloses (see fig. 1-3 and claim 1):

a machine for splitting wood pieces, comprising a splitting blade (16), a splitting space for the placement of a wood piece (between the blade 16 and the surface 15, in the lower portion of figure 1), a splitting head (connected to the blade, as visible in figure 2) arranged to move back and forth in the splitting space and connected to two actuators (11, 12, see figure 3) in parallel, which are driven by pressurized medium (pressurized oil, see page 2, column 2, line 21) and arranged to produce said movement,

the machine further comprising a pump (7) arranged to pump pressurized medium from a tank (see page 2, column 2, line 30) via a pressure line (this is the line on the left side of figure 3, where the pressure indicator is connected) as well as a return line (the other line, carrying the filter 4) for returning the pressurized medium to the tank, the splitting head being connected to two actuators acting in parallel (11, 12), and

the machine also comprising a directional control valve (10, called "Handsteuerventil") connected to the pressure line and the return line for selecting the direction of movement of the actuators (page 2, column 2, lines 23-25),

the working pressure of the pressurized medium being arranged to be coupled selectively to the actuators so that in the first coupling position (called "2. Stufe", see page 2 from line 30), the actuators provide a higher total thrust force and a lower speed than in the

second coupling position (called "1. Stufe", see from line 27)

by the fact that, in the first coupling position, the working pressure is arranged to be directed to the actuators in such a way that it acts on a larger total piston working area (i. e. on both pistons 11 and 12),

and, in the second coupling position, the working pressure is arranged to be directed to the actuators in such a way that it acts on a smaller total piston working area (only on piston 11).

2. *Differences*

2.1 D3 fails to disclose that the pressurised medium system comprises a filling line separate from the return line and connected to the tank and arranged to be connected to the working chamber of that actuator whose piston moves passively by the effect of the adjacent actuator, to which the working pressure is directed (**first difference**).

2.2 In D3 the splitting blade is connected to the moving splitting head. D3 therefore fails to disclose that the splitting blade is placed on the extension of the motion path of the splitting head for splitting the wood piece (**second difference**).

3. *Effects*

3.1 The effect linked to the **first difference** is explained at paragraphs [0017]-[0019] of the published patent specification as follows:

pressurised medium can fill the working chamber of the actuator which does not perform work.

In D3 the working chamber of the idle piston is filled through line C, because in position 1 of the valve (see figure 3) the lines B, C and D are connected to each other and to the return line and the tank.

- 3.2 The effect linked to the **second difference** is discussed at paragraphs [0006]-[0007] of the published patent (see in particular column 2, lines 22-38) and can be formulated as follows:

when the fixed blade penetrates the wood, the finished split parts are automatically removed from their original position because the action of the splitting head pushes them away.

4. *Problems to be solved*

- 4.1 The problem solved by the separate filling line (first difference) specifically relates to the improvement of the hydraulic arrangement of D3, is not directly related to wood splitting and can be formulated as follows:

how to find an easier and more efficient way (compared to D3) to fill the working chamber of a piston with hydraulic fluid in order to reduce the resistance generated by this piston when it is moved without being activated by pressure (idle piston).

- 4.2 The problem solved by arranging the blade to a fixed position (second difference) is clearly specific to the field of wood splitting, and can be formulated as follows:

how to automatically remove the split wood from the cutting position.

- 4.3 The respondent argued that these two differences could not be treated separately because, based on their effects, they both contributed to solving the more general problem of increasing working speed and capacity of the known wood splitting machine.

The Board disagrees with this line of argumentation, because the possibility of formulating a higher, more generic problem solved by both differences is not enough to conclude that they are so strictly interrelated that they could only be examined in combination for the purpose of discussing inventive step.

According to the jurisprudence of the Boards of Appeal (see in particular Case Law of the Boards of Appeal, 7th edition 2013, section I.D.9.2.2) the correct criterion to be used when deciding on this issue is rather whether a functional interaction between these two differences entails that a synergistic effect is achieved going beyond the sum of the the two individual effects (see also T 389/86, reasons, points 4.1, 4.2, 4.3).

- 4.4 The Board, in the present case, denies such an effect for the following reasons.

The filling of the working chamber of the idle cylinder with a separate filling line is clearly unaffected by the position of the blade (fixed on, or opposite to the splitting head).

The finished split wood logs are pushed away from the cutting position by the blade of the splitting head as an effect of the blade being placed on the extension of the motion path of the splitting head for splitting the wood piece.

This effect takes places independently from the presence of a separate filling line for the idle cylinder, because the presence of this additional line does not change the amplitude of the movement of the splitting head.

5. *Discussion of inventive step*

5.1.1 First partial problem

The Board finds that a person skilled in the art of wood splitting machines such as the one disclosed in D3, which is actioned by a hydraulic system, necessarily has a basic knowledge of hydraulics, see in this respect also D4.

Whether the hydraulic arrangements shown in D1 (figure 3.33) and/or in D2 (figure 2.31) should be considered as belonging to the basic knowledge (common general knowledge) of the person skilled in the art of wood splitting machines or not is not relevant for the purpose of taking the present decision and can therefore be left open by the Board.

The reason is that the Board is of the opinion that the content of these documents should in any case be regarded as belonging to the broader field of general hydraulics.

The Board notes that the first partial problem does not contain any reference to "wood splitting" but only

relates to an improvement of a known hydraulic arrangement.

The skilled person would, when faced with the task of improving the performance of the hydraulic system of D3, immediately realize that this a problem is not only encountered in the field of wood splitting but rather arises in many other technical fields using hydraulic cylinders acting in parallel, because also there the idle actuator generates forces which oppose the movement imposed by the active actuators.

The skilled person can therefore be expected to look for a solution also into literature relating to general hydraulics.

When doing that, he would gain knowledge of D1 and of D2, more in particular figure 3.33 of D1 and figure 2.31 of D2.

Both these figures show arrangements with three pistons acting in parallel, where the working chamber of the idle piston (the central piston, which is activated only when a sufficient pressure opens the respective sequence valves) is connected to the tank by a filling line which is separate from the return line.

The skilled person would see the advantages of this teaching and have no practical difficulties in applying it to the apparatus of D3, since it only requires adding a simple separate filling line, as shown in D1 and D2, between the working chamber of the idle piston 12 of D3 and the tank.

This measure is easily performed, and would not require any other modifications of the press of D3 in order to compensate for this change.

By performing this straightforward modification, which does not require any inventive skills, the skilled person would solve the first partial problem in the same way as the machine of claim 1 does.

The respondent argued that the skilled man would not take up any teaching coming from D1 or D2, because these presses were built to always repeat the same working cycle under the same working conditions by slowing down and increasing the force applied towards the end of the stroke, when the central piston is activated, whereas a wood splitting machine needs a high force immediately, and is subjected to changing working conditions due to the continuously changing size of the wood logs.

The Board disagrees, because this line of argumentation disregards the fact that the starting point of the present discussion, namely the machine of D3, already features an hydraulic system suitable for splitting wood.

The skilled person is therefore not looking, in the present case, for a complete hydraulic system suitable for splitting wood logs, but for the solution of a very specific hydraulic problem encountered when using this known machine, namely how to better compensate for the pressure reduction in the working chamber of the idle piston, which is moved without being activated by pressure being transmitted to its working chamber.

5.2 Second partial problem

It is clear to a skilled person that in order to split a wood log with a blade, the wood log and the blade must be moved relative to each other.

The Board finds that it cannot be seen as inventive to carry out a simple kinematic inversion in the machine of D3, performed by taking the blade 16 away from the splitting head (carried by the piston rods, see figure 1 of D3) and mounting it on the fixed end 15.

This is especially true because such an arrangement is widely used in this technical field (see e.g. D4, figures 1 and 2, D5, fig. 1, D7, fig 1, D8, fig. 1) as an alternative to the arrangement disclosed in D3.

The effects and advantages linked to this arrangement, namely that the wood log is pushed onto the blade, and therefore away from (see for example D8, paragraph [0022]) the cutting position are immediately apparent to a person skilled in the art.

5.3 Obviousness

As the skilled person is in a position to solve both partial problems independently without the need for inventive skills and in the same way as claimed in claim 1, the Board concludes that the subject matter of claim 1 lacks an inventive step (Art 52(1) and 56 EPC).

Order

For these reasons it is decided that:

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

The Registrar:

The Chairman:



G. Nachtigall

H. Meinders

Decision electronically authenticated