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Case Number: T 0550/12 - 3.2.04

Application Number: 04725413.1

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Title of invention:
CROP SPRAYING APPARATUS

Patent Proprietor:
Knight, Brian George

Opponent:
Amazonen-Werke
H. Dreyer GmbH & Co. KG

Headword:

Relevant legal provisions:
EPC Art. 100(a), 56

Keyword:
Inventive step - main request (yes)

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Catchword:

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Case Number: T 0550/12 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 21 June 2016

Appellant: (Opponent)	Amazonen-Werke H. Dreyer GmbH & Co. KG Am Amazonenwerk 9-13 49205 Hasbergen (DE)
Representative:	Grünecker Patent- und Rechtsanwälte PartG mbB Leopoldstraße 4 80802 München (DE)
Respondent: (Patent Proprietor)	Knight, Brian George Wireless Hill South Luffenham Oakham Rutland LE15 8NF (GB)
Representative:	Gwilt, Julia Louise Marks & Clerk LLP 62-68 Hills Road Cambridge Cambridgeshire CB2 1LA (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 27 December 2011 rejecting the opposition filed against European patent No. 1615496 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	A. de Vries
Members:	E. Frank
	C. Heath

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division dated 7 December 2011 and posted on 27 December 2011, to reject the opposition against the European patent No. 1 615 496 pursuant to Article 101(2) EPC. The appellant (opponent) filed a notice of appeal on 24 February 2012, paying the appeal fee on the same day. The statement of grounds of appeal was submitted on 4 April 2012.

II. The opposition was filed against the patent as a whole and based on Article 100(a) in conjunction with Articles 54 and 56 EPC. The opposition division held that none of these grounds prejudice the maintenance of the patent as granted. In its decision the division considered the following prior art, amongst others:

D1 = DE 2 318 739 A
D3 = US 6,053,419

III. A communication pursuant Article 15(1) RPBA was issued after a summons to attend oral proceedings, which were duly held on 21 June 2016.

IV. The appellant requests that the decision under appeal be set aside and the patent revoked, and that the appeal fee be reimbursed by virtue of a substantial procedural violation.

The respondent (proprietor) requests that the appeal be dismissed and the patent maintained as granted, or, alternatively, on the basis of one of the auxiliary requests 1 to 3, all filed with letter dated 7 November 2011.

V. The wording of claim 1 as granted (main request) reads as follows:

"Agricultural crop spraying apparatus comprising a spray boom (1) consisting of a plurality of boom sections (2,3,4) which are hinged together to be foldable and extendable, double-acting hydraulic rams (8,9) controlling the folding and extension of the boom sections, latch means further controlling folding of the boom sections, and sensing means (12) disposed along at least an outboard portion of the front edge of the boom to sense contact with an obstacle, characterised by the sensing means (12) being coupled to the latch means to allow folding of the boom sections when an obstacle is sensed, a hydraulic valve (13) in a circuit controlling the hydraulic rams and a trip switch controlling the operation of the valve, the arrangement being such that the trip switch is operated when the sensing means (12) senses an obstacle to cause the hydraulic valve to allow the boom sections to fold."

VI. As to the main request, the appellant argued as follows:

The term "to allow" in claim 1 also encompasses active folding. A "trip switch" as in claim 1 can be any sensing switch, but need not be an electric circuit breaker. Starting from D3, the strong interaction between boom and obstruction before the boom protection system is able to passively fold away the boom sections should be avoided, as well as unintended folding due to the pre-set relief valve pressure differential. To this end, D1 teaches to provide a sensor in front of the boom (wire or optical) by means of a control valve. It would be within the common general knowledge of the

skilled person to change the relief valves of D3 into controllable valves of D1's sensor mechanism, thus to arrive at the subject-matter of claim 1. As to this, it does not matter whether the boom sections are actively folded vertically (see D1) or passively folded horizontally (see D3). Moreover, the subject-matter of claim 1 would also be obvious starting from D1 in the light of D3. Therefore, claim 1 as granted does not involve an inventive step.

VII. As to the main request, the respondent argued as follows:

"To allow" in claim 1 suggests permitting an action to take place, in this case thus passive folding, as is understood from e.g. patent, para 0020, where the break-away valve allows the ram to float. Moreover, the "trip switch" of claim 1 which is operated by a sensor triggers the hydraulic valve, thus to release the pressure in the circuit. Turning to D3, to replace the relief valves of D3 by means of a controllable valve of D1 would require changing the hydraulic circuit completely to allow the boom to freely float. This would not be a straightforward modification and, thus, beyond the common general knowledge of the skilled person. Moreover, D1 leads away from the passive horizontal boom displacement of D3, since it teaches active folding to bring the boom sections in an upright position. Starting from the spreader of D1 is less relevant, since claim 1 is directed to a sprayer. Thus, claim 1 as granted involves an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. Interpretation of claim 1 as granted

2.1 The crop spraying apparatus of claim 1 comprises a spray boom with boom sections, which are folded and extended by means of double-acting hydraulic rams. The hydraulic rams are controlled in the hydraulic circuit by a hydraulic valve. Moreover, claim 1 stipulates that the hydraulic valve is operated by means of a trip switch, such that the hydraulic valve is caused to allow the boom sections to fold (in case of a boom obstacle is sensed).

2.2 The Board concurs with the respondent that the skilled person would understand from a normal contextual reading of claim 1 that the hydraulic valve of the spraying apparatus of claim 1 is operated to "allow", i.e. to permit, the boom sections to fold passively - as opposed to "cause" the boom sections to fold actively under power, that is by means of active hydraulic pressure supply to the hydraulic rams. This is also in line with the skilled reader's common understanding of controlling the operation of a hydraulic valve by means of a "trip switch": a trip switch is a safety switch which cuts (trips) supply when an abnormal situation occurs. That is, a circuit is broken, whether electric or hydraulic. In the Board's view, therefore, a trip switch of claim 1 does not control any operation of the hydraulic rams as advanced by the appellant, but rather, causes the pressure in the hydraulic circuit to be cut-off, if an obstacle is sensed.

2.3 Likewise, this interpretation of claim 1 is supported by the description, where a sensing means (sensing rail) operates a trip switch. As a result, the trip switch operates the hydraulic valve such that the pressure is released in the double acting hydraulic cylinders or rams, which allows the rams to float and thus to fold when an obstacle is encountered. See patent, para 0018 and 0020, and break-away valve 13 shown in fig.4.

3. Inventive step

3.1 Novelty of granted claim 1 is not in dispute. It is common ground that document D3 forms a suitable starting point for the assessment of inventive step of claim 1, since it concerns an agricultural crop spraying apparatus having a foldable spray boom. In particular, D3, see, col. 1, line 64 to col. 2, line 9, and figures 1 and 10 describes moving each of booms 28 (right hand boom) and 30 (left hand boom) between an extended condition 56 for spraying and a retracted condition 32 (shown in fig. 1 in phantom) for transport by means of boom actuators 58 and 59, which may be double-acting hydraulic cylinders.

3.2 Moreover, the spraying apparatus of D3 provides a response to boom deflections, be it as a result of rapid turning (boom inertia) or encountering an obstruction. To this end, a self-centering boom system is suggested. A pair of pressure relief valves (valve blocks 174, 176; figure 9) responds to differential pressure rising above threshold level caused by the pressure rise in the double-acting cylinder of the boom actuator, when a boom section associated with that actuator is deflected. In so doing, the boom section is

passively permitted, i.e. "allowed", to move horizontally away from its predetermined center position. Moreover, when it is indicated that the boom is deflected (see fig. 8: movable magnet 96), hydraulic fluid will be delivered to the self-centering relief valve blocks and, unless the boom is in contact with an obstruction, the boom will automatically move back to the predetermined center position, cf. D3, col.5, line 61, to col.6, line 59; col.8, lines 9-46, and figures 8 and 9.

3.3 However, no additional sensor to sense contact with an obstacle prior to the boom structure itself being touched is disclosed or hinted at in D3. Rather, obstacles are sensed by the mechanical boom movement caused by the actual interaction of the boom with the obstruction. Furthermore, D3 allows a boom section to horizontally fold away only if (or always when) a pre-set pressure level exerted on the boom is exceeded due to boom deflection. In other words, the hydraulic pressure of D3's double-acting cylinders is not invariably shut-off just in case an obstacle is sensed.

3.4 Thus, in the judgment of the Board, the subject-matter of claim 1 (see interpretation of claim 1 above) differs from D3's disclosure by sensing means being disposed along at least an outboard portion of the front edge of the boom to sense contact with an obstacle, and a trip switch controlling the operation of the hydraulic valve in a circuit controlling the (double-acting) hydraulic rams, the arrangement being such that the trip switch is operated when the sensing means senses an obstacle to cause the hydraulic valve to allow the boom sections to fold.

3.5 These different features allow for less interaction between boom and obstacle (no direct contact between boom and obstacle) and less unintentional folding (no pre-set folding threshold), cf. patent, para 0003. Following the well-established problem-solution approach, the broadest underlying problem of these distinguishing features with respect to the above cited prior art disclosure can therefore be seen as how to improve the damage avoidance system of the spray boom.

3.6 Document D1 concerns an agricultural spreader, suitably adapted to spread granulates onto the soil. Thus the embodiment disclosed in D1, see figures 1 to 3, comprises a feed hopper 1, a granulate distribution system 6, and a plurality of bulky tubes 21, 21´ (see plan view in fig.3: "Rohrleitungen"). These installations are carried by inner ("Ausleger" 8, 8') and outer ("äußerer Ausleger" 9, 9') boom sections, which are supported by wheels 44 to enable the boom sections to be constantly distanced from the ground, see D1, page 8, 2nd para.

As argued by the respondent, the fact that D1 concerns a spreader stands in contrast with the subject-matter of claim 1 of the patent, which is explicitly directed to an agricultural crop sprayer, as is also the subject of D3 (see above). The crop sprayer of D3 sprays liquid pesticides or fertilizers onto the crops and, therefore, dimensioning as well as designing of its freely suspended boom sections and their folding mechanisms, see D3 fig. 1, are believed to be adapted accordingly, i.e. significantly different from a spreader concept such as in D1.

3.7 However, the spreader embodiment of figures 1 to 3 of D1 also discloses a boom protection system. In

particular, a sensing means is arranged in the form of wires or a photoelectric sensor in front of (and behind) the boom sections to sense contact with an obstacle, cf. D1, page 7, last para, to page 8, 1st para. The outer parts 14, 14' of the outer boom sections 9, 9' are not protected by sensing wires, cf. D1, page 13, 2nd para.

In case of striking an obstacle (cf. figures 1 and 3, left-hand boom sections), the wires 35, 36 of D1 are directly connected to a control lever 30 (located on the tractor, see D1, fig. 2) to move the lever into an operative position 30, thus to cause immediate vertical lifting of both the inner and outer boom sections 8 and 9 (together with the outer part 14) to an upright position under active power from the hydraulic ram 29, see D1, figures 1 and 3, on the left, page13, 2nd para to page 14, 1st para.

3.8 Since D1 concerns the concept of a spreader boom design, see above, starting from a sprayer of D3, it is firstly questionable whether or not the skilled person would consider D1 at all in order to improve the boom protection system of D3. However, even if he did so as advanced by the appellant, D1 nowhere teaches or hints that the control valve of the single actively acting ram 29 of D1 should replace (or be used) in the passively acting relief valve block of D3. Nor is it apparent how the vertical lifting concept of all boom sections of D1 should be incorporated into the horizontal response system to boom deflections (boom inertia, obstacle) of D3, together with the subsequent automatic boom centering. The Board concurs with the respondent that this would imply considerable adaptation of D3, employing skills beyond the common technical knowledge of the skilled person.

3.9 Rather, if the skilled person were to consider D1 to improve boom protection of D3, the embodiment of figures 1 to 3 of D1 might suggest to him a supplementary active vertical lifting system by means of an additional actively acting hydraulic cylinder, which folds all the boom sections of D3 in an upright position, when an obstacle is sensed by sensing wires (or a photoelectric sensor), i.e. different from the passive response mechanism claimed. Last but not least, even if the Board followed the appellant's argument that the skilled person would adopt only the sensing control from D1 as part of a modified valve block of D3 to control passive hydraulic pressure release, he would also not arrive at the valve control required by claim 1 of the patent: neither D1 nor D3 suggest how the sensor (wire, photoelectric sensor) to sense contact with an obstacle should convey its signal to the hydraulic control valve, much less that the sensor operates a trip switch, that is, a circuit breaker which shuts off the valve to allow the boom sections to fold, see interpretation of claim 1 above.

3.10 Finally, starting from D1's spreader appears to be of limited relevance, as it does not concern or address a crop spraying apparatus claimed in claim 1. Moreover, the boom sections of the spreader do not fold passively when an obstacle is sensed as also required by claim 1, but actively under power, see above. Either the skilled person does not choose this prior art as a suitable starting point because too dissimilar, or, if he did, he would then be bound by his choice and, in particular would not as a matter of obviousness venture beyond its ambit, i.e. the field of spreaders.

3.11 In summary, the Board holds that the subject-matter of claim 1 is inventive in the light of D1, D3, and common general knowledge. Therefore, claim 1 complies with the requirements of Articles 100(a) and 56 EPC.

4. The Board concludes that the ground of inventive step raised in first instance and pursued in appeal does not prejudice maintenance of the patent as granted (main request). As this is the only of its findings contested it confirms the appealed decision. The appeal therefore fails. Hence the auxiliary requests 1 to 3 need not be considered by the Board.

5. Reimbursement of the appeal fee

A precondition for reimbursement of the appeal fee under Rule 103(1)(a) EPC is that the Board finds the appeal to be allowable. That not being the case, see above, the issue is moot.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Magouliotis A. de Vries

Decision electronically authenticated