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**Datasheet for the decision
of 12 January 2007**

Case Number: T 0660/04 - 3.2.04

Application Number: 96202599.5

Publication Number: 0764402

IPC: A01J 5/01

Language of the proceedings: EN

Title of invention:

A method of determining the quantity of milk collected during a milking turn

Patentee:

MAASLAND N.V.

Opponent:

DeLaval International AB

Headword:

Milk meter/MAASLAND

Relevant legal provisions:

EPC Art. 100(a), 100(b)

Keyword:

"Inventive step (yes)"
"Sufficiency of disclosure (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0660/04 - 3.2.04

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 12 January 2007

Appellant: DeLaval International AB
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 24 March 2004
rejecting the opposition filed against European
patent No. 0764402 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: M. Ceyte
Members: P. Petti
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. The opposition filed against the European patent No. 764 402 and based upon Articles 100 a) and b) EPC was rejected by a decision of the opposition division posted 24 March 2004. The opponent (hereinafter appellant) on 17 May 2004 lodged an appeal against this decision and simultaneously paid the appeal fee.

Independent claims 1 and 4 of the granted patent read as follows:

"1. A method of determining the quantity of milk M collected during a milking turn, whereby, by means of a computer and a milkmeter, the quantity of milk M can be established at various points of time, **characterized in that** the method comprises the following steps:

- 1) the milk is discharged from the milkmeter, when a prefixed quantity of milk A has been collected therein;
- 2) the discharge of milk from the milkmeter is stopped after a fixed time (t₂-t₁) has elapsed and the quantity of milk C in the milkmeter is then measured;
- 3) after it has been ascertained that the milk flow to the milkmeter has ended, the quantity of milk D in the milkmeter is measured;
- 4) in the computer the milk yield M is calculated according to:

$$M = A + B - C + D,$$

in which B is determined as (slope). (t_2-t_1) , wherein (slope) is determined on the basis of at least two quantity measurements in the milkmeter prior to the discharge of the milk from the milkmeter or thereafter and outside the open interval (t_2-t_1) and the points of time at which these quantity measurements have been carried out."

"4. An implement for applying a method as claimed in any one of claims 1 to 3, **characterized in that** the implement comprises a milk container, such as a milkmeter or a milk glass, (2) including a supply line (3) and a discharge line (5) for the milk, and that a computer-controlled valve (6) is included in the discharge line (5) and a quantity meter (11, 16) is included in the milk container (2), the implement further being provided with a flow sensor for ascertaining that the milk flow to the milkmeter (2) has ended and with a computer (8)."

II. In the opposition proceedings, the appellant referred *inter alia* to GB-A-2 113 856 (hereinafter document D1) as well as to the prior use of the "Flomaster Pro" milk meter manufactured by Alfa Laval Agri for which a pamphlet (hereinafter document E1) describing the operation mode of this milk meter and a written statement (dated 24 June 2003) by Mr Jianning Li, relating to the construction and operation of "Flomaster Pro" milk meter (hereinafter document E5) was submitted.

III. With the statement setting out the grounds of appeal, which was received on 29 July 2004, the appellant filed document US-A-4 548 161 (hereinafter D8) and a further written statement (dated 3 August 2004) by Mr Jianning Li (hereinafter document E6).

IV. Oral proceedings before the board were held on 12 January 2007.

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

The Patent proprietor (hereinafter respondent) requested that the appeal be dismissed. Auxiliarily, he requested that the decision under appeal be set aside and the patent be maintained only on the basis of the method claims 1 to 3.

VI. The appellant essentially argued that

- the patent does not disclose the invention as defined in dependent claim 3 in a manner sufficiently clear and complete to enable it to be carried out by a skilled person,
- the subject-matter of claim 1 and that of claim 4 lack novelty with regard to the milk meter described in document D1 as well as to the prior use of the "*Flomaster Pro*" milk meter,
- the subject-matter of claim 4 also lacks novelty with regard to document D8,

- the subject-matter of claim 1 does not involve an inventive step with regard to either document D1 or the above mentioned prior use in combination with the general knowledge of the skilled person as well as with regard to document D8 in combination with either document D1 or the above mentioned prior use,

- the subject-matter of claim 4 does not involve any inventive step with regard to the above mentioned prior use in combination with the general knowledge of the skilled person.

Reasons for the Decision

1. The appeal is admissible.

2. *The claimed subject-matter (claims 1 and 4)*
 - 2.1 According to granted claim 1, the quantity milk M collected during a milking turn is calculated according to $M = A + B - C + D$, wherein the quantities A, C and D are determined according to steps 1), 2) and 3), while in a further step the quantity B is calculated according to the formula $(\text{slope}) \cdot (t_2 - t_1)$.

The algebraical formula $M = A + B - C + D$ clearly and unambiguously indicates that each of quantities A, B, C and D is determined **only once** during a milking turn (during oral proceedings the respondent agreed with this interpretation of claim 1).

2.1.1 In this respect, the appellant argued that claim 1 does not preclude the possibility of repeating some of the above mentioned steps by a plurality of alternating filling and emptying phases, so as to include within its scope a method in which one or more of the values A, B, C and D may be determined by summing a plurality of sub-values.

The board cannot accept this argument because it is based upon an interpretation of claim 1 which is not supported by the claim itself and has no basis in the description of the patent specification which consistently refers to a method in which the above mentioned quantities are determined only once during the milking turn.

2.2 Independent claim 4 is directed to an implement "for applying a method as claimed in any one of claims 1 to 3" which is provided *inter alia* with a computer. Thus, claim 4 implies that the computer of the implement is provided with an appropriate program so as to apply the method defined in claim 1.

2.2.1 The implement according to claim 4 comprises a quantity meter (11, 16) and is "further" provided with a flow sensor for ascertaining that the milk flow to the milkmeter (2) has ended. Thus, the flow sensor is a structural element which is independent from the quantity meter.

3. *Article 100 (b) EPC*

3.1 According to dependent claim 3 the measurements necessary for the determination of the milk quantity B

take place after the discharge of milk from the milk meter is stopped, i.e. after the fixed time ($t_2 - t_1$) has elapsed.

- 3.2 In this respect, the appellant essentially argued that the patent specification does not sufficiently disclose the invention so as to solve the problem indicated in the patent specification in column 1, lines 22 to 29, in so far as the method of claim 3 would result in an inaccurate measurement of the quantity B and thus of the total quantity of milk.

The board cannot accept this argument because the general aim of the invention is to provide a method for determining the total quantity of milk yield from an animal during the milking turn and the patent specification describes in a clear and sufficient manner the method steps for determining this quantity regardless of whether the result is accurate.

Moreover, the problem to be solved is not to provide an accurate measurement. It has to be noted that the patent specification refers in a first passage (paragraph 0003; column 1, lines 8 to 21) to a known method using a conventional milk meter, in which disadvantages may occur if the quantity of milk yield from a high productive animal is greater than the capacity of the milk meter. Only in a successive passage (paragraph 0004; column 1, lines 22 to 29) is the milk quantity measuring device known from EP-A-81 049 referred to as not being very accurate. Thus, the problem to be solved does not exclusively concern the measurement with respect to accuracy.

3.3 Therefore, the ground of opposition according to Article 100 (b) EPC does not prejudice the maintenance of the patent as granted.

4. *Novelty (claims 1 and 4)*

4.1 With respect to document D1:

4.1.1 This document discloses an implement comprising a computer, a milk container (1) including a supply line (3) and a discharge line (11, 4') for the milk, a computer-controlled valve (12) included in the discharge line, and a milk quantity meter (23, 24). When a quantity of milk has been collected in the milk container during a filling period (a), the computer-controlled valve (12) is opened and is held open for an emptying period (b) so that the collected quantity is discharged from the milk container, whereafter the computer-controlled valve (12) is periodically kept closed for further filling periods (a) and open for further emptying periods (b).

The milk quantity meter is capable of measuring the instantaneous mass (kg) of the milk present in the milk container when the computer-controlled valve (12) is closed.

According to a first operating mode (see particularly page 3, lines 99 to 110), there is a regular, periodic time control of the computer-controlled valve (12).

According to a second operating mode (see particularly page 3, lines 111 to 124), the computer-controlled valve is controlled as a function of the quantity of

milk present in the milk meter. Namely, the valve is held closed to collect during each weighting period (a) always the same prefixed quantity (A) of milk, is opened to discharge this quantity (A) of milk until the quantity meter indicates that the milk container is empty, such that the length of each emptying period (b_i) is a function of the milk flow during the immediately preceding weighting period (a).

Thus, during each weighting period (a) the instantaneous mass (kg) of milk in the milk container is measured and recorded in the computer in which the specific mass flow (kg/min) for each filling period (a) is calculated. For each emptying period (b), the computer, on the basis of the measurements made during the immediately preceding filling period (a), calculates by extrapolation the milk flow during the emptying period (b), such that a curve representing the instantaneous milk flow (kg/min) during the whole milking turn is generated. By integration of this curve the total amount (M) of milk during the whole milking turn is determined.

If at the end of the milking the residual amount is not sufficient to fill up the milk container such that the weight of the milk in the milk container remains constant for a certain period the computer-controlled valve is opened to discharge the residual quantity of milk (see particularly page 4, lines 76 to 81). This implies that the computer also calculates the milk flow during the last filling period. This also implies that the end of the milk flow is determined by the milk meter itself.

4.1.2 The appellant argued that the passage on page 3, lines 111 to 114 of document D1 also discloses a third operating mode according to which the computer-controlled valve is opened when a maximum level is achieved in the container of the milk meter and is kept open for a certain period of time.

The board cannot accept this argument, because document D1 does not clearly and unequivocally describe a third operating mode. In this respect, it has to be noted that the passages describing the operation modes of the computer-controlled valve (page 4, lines 99 to 124) are preceded by the sentence "The control can be undertaken mainly in two days [*sic*]", in which the word "days" has to be unambiguously read as "ways".

Thus, document D1 does not disclose the step according to which the discharge of milk is stopped after a fixed time has elapsed in combination with the step of collecting a prefixed quantity of milk in the milk meter.

4.1.3 It cannot be derived from document D1 that after each emptying period the quantity of milk present in the milk container is measured, because at the beginning of the next filling period the milk container is empty (see page 3, lines 118 to 120).

In this respect, the appellant argued that the measurement of the above mentioned quantity of milk is implicitly disclosed in document D1.

The board cannot accept this argument, because document D1 also indicates that it is unimportant to measure

this quantity since measurements are made of the increase in weight, and not of the accumulated weight (see page 4, line 80 to 84).

4.1.4 Therefore, the method according to claim 1 differs from the operating mode of the implement known from document D1 in that

(a) the milk yield M is calculated according to the formula $M = A + B - C + D$ (i.e. by algebraically summing a single quantity A and a single quantity B to the quantities C and D), and

(b) the quantity of milk C is measured when the discharge of milk from the milk meter is stopped after the fixed time $(t_2 - t_1)$,

and the implement according to claim 4 differs from this known implement at least in that

(c) it is further provided with a flow sensor for ascertaining that the milk flow to the milk meter has ended.

4.2 With respect to the "*FloMaster Pro*" milk meter:

4.2.1 Document E1 describes how the control system of the De Laval "*FloMaster Pro*" milk meter operates. The written statements E5 and E6 of Mr Jianning Li refer to this milk meter.

The "*FloMaster Pro*" milk meter operates according to the following steps:

- a first quantity A_1 of milk is collected in the milk meter in a first filling phase,
- during the first filling phase the computer calculates the flow rate Q_1 ,
- when the prefixed quantity A_1 of milk has been collected in the milk meter, the milk is discharged from the milk meter for a first fixed period of time (emptying phase T_1),
- the quantity B_1 of milk which has entered the milk meter during the emptying phase T_1 is calculated in the computer by multiplying the delay time T_1 (plus a short delay) by the average value of the milk flow rate Q_1 ,
- these steps are repeated a number of times,
- at the end of the milking turn, the quantity D of milk collected in the milk meter during the last filling phase is determined (see particularly document E6).

According to document E5, if the flow rate Q_{i+1} is greater than Q_i the emptying time is set to a new value T_{i+1} which is greater than T_i . That means that the emptying time changes in function of the flow rate.

None of documents E1, E5 and E6 refers to the measurement of quantity of milk present in the milk meter after each emptying phase.

It is clear from document E1 (page 4) that the end of the milk flow is determined by the milk meter itself.

4.2.2 Thus, the method according to claim 1 differs from the "FloMaster Pro" milk meter also by the above mentioned (section 4.1.4) features (a) and (b), and the implement according to claim 4 differs from this known implement at least by the above mentioned feature (c).

4.3 With respect to Document D8:

4.3.1 Document D8 discloses an implement capable of determining the quantity of milk M collected during a milking turn, the implement comprising a milk container (14), including a supply line (32) and a discharge line (33) for the milk, an automatically operable valve (34) being included in the discharge line, a quantity meter (15) being associated with the milk container (14), the implement further being provided with a detacher (11) capable of sensing that the milk flow from the cow has ended and with a computer, wherein the quantity M of milk obtained during a milking turn is collected in the milk container (14) and is measured at the end of the milking (when milk is no longer flowing into the milk container).

In particular, the automatically operable valve (34) is controlled by the detacher (11) to open, so that milk is discharged from the milk container (14) only when the detacher determines that milking is completed, and to close again after sufficient time has been provided for the milk to completely drain off the milk container (14).

4.3.2 Therefore, the implement according to claim 4 differs from this known implement in that

(d) it is suitable for applying the method of claim 1, i.e. for carrying out the steps specified in the characterising portion of claim 1, and

(e) the valve included in the discharge line is controlled by the computer.

4.4 Therefore, the subject-matter of claim 1 as well as that of claim 4 are novel with respect to the prior art referred to by the appellant.

5. *Inventive step*

5.1 Claim 1 (starting either from document D1 or from the "*FloMaster Pro*" milk meter):

5.1.1 Having regard to the above considerations with respect to novelty, the subject-matter of claim 1 differs from the operating mode of either the implement according to document D1 or the "*FloMaster Pro*" milk meter at least by feature (a), which relates to the formula $M = A + B - C + D$.

Thus, the claimed subject-matter solves the problem of simplifying the method of determining the total quantity of milk, in so far as the number of measurements made during the milking turn is reduced.

The skilled person starting from a method as referred to in D1 or in the evidence concerning the "*FloMaster Pro*" milk meter would not arrive at the idea of reducing the number of measurements so as to have only one single filling and one single emptying of the milk meter, firstly because in each of these known methods

the cyclical repetition of the filling and emptying phases is an essential feature which is necessary to define the various portions of the curve representing the specific mass flow of milk during the milking turn, which curve is the basis for the calculation (by integration) of milk yield and, secondly, because a larger milk container would be necessary.

5.1.2 In this respect, the appellant essentially argued as follows:

- The only technical result achieved by the claimed invention is to avoid the repetition of the measurements which implies the use of a larger measuring container and less accuracy in the measurement of the milk yield M . This represents a regressive step in terms of technology.
- The method according to claim 1 does not result in a simplification because it does achieve the same result of the known methods in so far as it is less accurate.

However, the European Patent Convention does not require an invention to show a technical superiority and, as already stated in section 3.2 above, the problem to be solved is not directed to the accuracy of the measurement. Moreover, in view of the significant technical advantages achieved by the invention defined in claim 1, this solution cannot be considered as self-evident or falling within the normal competence of the skilled person: compared with the method disclosed in document D1 or in the documents concerning the "*Flomaster Pro*" milk meter, which suffers from the

drawback of requiring a great number of filling and emptying phases, the claimed invention needs only one emptying and filling cycle. In order to hold the milk of a high productive animal the traditional method illustrated by document D8 requires a bigger milk glass. The claimed invention which allows a relatively small milk glass even in the case of high productive animals eliminates this drawback.

5.1.3 Therefore, the skilled person starting either from the measuring method used in either the implement according to document D1 or the "*FloMaster Pro*" milk meter would not arrive at the method according to claim 1 without exercising an inventive skill.

5.2 Claim 1 (starting from document D8):

5.2.1 The implement according to document D8 is provided with a conventional milk meter in which the collected quantity of milk is measured at the end of the milking turn.

Thus, the claimed method differs from this prior art by the steps defined in the characterising portion of claim 1.

The problem to be solved with respect to document D8 corresponds to that indicated in the description of the patent, column 1, lines 9 to 21, namely to allow the use of a milk meter for milking high productive animals which in a milking turn may give a quantity of milk greater than the capacity of the milk meter.

If the skilled person were to consider document D1 or the "*FloMaster Pro*" milk meter in order to solve this problem, he would not arrive at the claimed subject-matter which is based on the idea of having only one emptying and filling cycle, since these citations teach to carry out a plurality of filling and emptying phases that are cyclically repeated.

5.2.2 Therefore, in the board's judgement, the claimed solution to the above defined technical problem is not obvious in the light of the combination of document D8 with the teaching of document D1 or of the "*FloMaster Pro*" milk meter.

5.3 Independent claim 4 (starting from document D8):

5.3.1 The implement according to independent claim 4 differs from that disclosed in document D8 in that it is suitable for applying the method defined in claim 1, so that the computer of the claimed implement is appropriately programmed to carry out the claimed method and in that the valve included in the discharge line is a computer-controlled valve.

5.3.2 In this respect, the appellant submitted that by suitably programming the computer of the implement known from document D8 that implement would be able to carry out the method defined in claim 1.

The board cannot accept this argument for the following reasons:

- In document D8 the automatically operable valve (34) in the milk line is controlled by the

detacher (11) and not by the computer. Moreover, the detacher (11), after sensing the cessation of the milk flow, shuts off the milking vacuum and after a predetermined period of time opens the valve (34) to discharge milk. Thus, document D8 does not disclose the detacher (11) as being capable of opening the valve (34) without shutting off the milking vacuum.

- The quantity meter (15) of the implement known from D8 is constituted by a load cell weight metering unit connected by an outlet line (16) to a pressure transducer (17) which determines the weight of the milk in the milk container in proportion to the difference between the pressure measured at the start and end of milking, when the system is stabilized so as to improve the accuracy of the measurement (see column 6, line 55 to column 7, line 43). Thus, it cannot be clearly and unequivocally derived from this document that the quantity meter is capable of metering a prefixed quantity of milk collected in the milk container when the milk is still flowing into the milk container.

- In order to arrive at the claimed implement, the skilled person confronted with the problem indicated in section 5.2.1 above (3rd paragraph), not only has to appropriately program the computer but also needs to carry out functional and structural modifications which concern the metering unit and the control of the valve included in the discharge line.

5.3.3 Furthermore, as has been already stated, document D1 and the "*FloMaster Pro*" milk meter teach away from an apparatus in which only one single emptying and filling cycle is required for determining the quantity of milk collected during a milking turn.

5.3.4 Therefore, starting from the implement of document D8, the skilled person would not arrive with the aid of document D1 or the "*FloMaster Pro*" milk meter at the subject-matter of claim 4.

5.4 Independent claim 4 (starting from document D1 or from the "*FloMaster Pro*" milk meter):

The implement according to claim 4 differs from this prior art in that it is suitable for applying the method defined in claim 1, so that the computer of the claimed implement is also appropriately programmed to carry out the claimed method and in that a flow sensor is provided in addition to the milk meter.

5.4.1 In this respect, the appellant essentially argued that

- both the implement according to document D1 and the "*FloMaster Pro*" milk meter are able to perform the measurement and calculation steps defined in claim 1,
- neither the patent specification nor any of the submissions of the respondent alleged that an additional flow sensor secured any advantage,
- and, in view of document D8, it would be obvious to provide these known implements with an

additional flow sensor, in so far as this document discloses an apparatus in which in addition to the milk meter there is a separate detacher capable of ascertaining that the milk flow has ended.

The board cannot accept these arguments for the following reasons:

- The implement according to document D1 and the "*FloMaster Pro*" milk meter are not designed for applying the method of claim 1, since they are not capable of determining the quantity of milk yield during a milking turn simply by algebraically summing a single quantity A and a single quantity B to the quantities C and D. Moreover, the structural elements of these known implements are not suitable for carrying out the steps defined in claim 1. In this respect, it has to be noted that the milk container of each of these known implements is not described as being big enough for only one cycle of filling and emptying.
- Finally, the skilled person, confronted with the problem of simplifying the method of determining the quantity of milk yield during a milking turn, would have no reason to arrange an additional flow sensor in a system in which the milk meter itself is capable of ascertaining that the milk flow has ended.

5.4.2 Thus, starting either from the implement according to document D1 or from the "*FloMaster Pro*" milk meter, it would not be obvious to arrive at the subject-matter of independent claim 4.

5.5 Therefore, the subject-matter of claim 1 as well as that of independent claim 4 involve an inventive step (Article 56 EPC).

6. Accordingly, the ground of opposition under Article 100 (a) EPC does not prejudice the maintenance of the patent as granted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Magouliotis

M. Ceyte