

(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. AU 199882466 B2
(10) Patent No. 742392

(54) Title
A construction including an implement for automatically milking animals

(51)⁷ International Patent Classification(s)
A01J 005/017 A01J 007/04
A01J 007/02

(21) Application No: **199882466** (22) Application Date: **1998.07.09**

(87) WIPO No: **WO99/03331**

(30) Priority Data

(31) Number	(32) Date	(33) Country
1006607	1997.07.17	NL

(43) Publication Date : **1999.02.10**

(43) Publication Journal Date : **1999.04.01**

(44) Accepted Journal Date : **2002.01.03**

(71) Applicant(s)
Maasland N.V.

(72) Inventor(s)
Cornelis Van Der Lely; Olaf Van Der Lely

(74) Agent/Attorney
PHILLIPS ORMONDE and FITZPATRICK,367 Collins Street,MELBOURNE VIC 3000

(56) Related Art
EP 728412
EP 630558
WO 96/13151

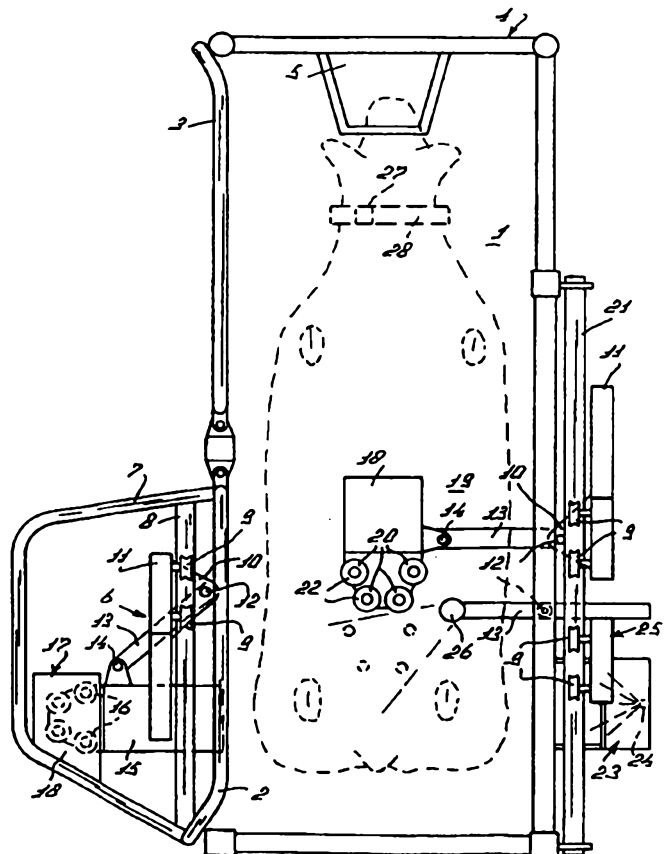


<p>(51) International Patent Classification ⁶ : A01J 5/017, 7/04, 7/02</p>	<p>A1</p>	<p>(11) International Publication Number: WO 99/03331 (43) International Publication Date: 28 January 1999 (28.01.99)</p>
<p>(21) International Application Number: PCT/NL98/00398 (22) International Filing Date: 9 July 1998 (09.07.98) (30) Priority Data: 1006607 17 July 1997 (17.07.97) NL (71) Applicant (for all designated States except US): MAASLAND N.V. [NL/NL]; Weverskade 10, NL-3155 PD Maasland (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): VAN DER LELY, Cornelis [NL/CH]; Brüschenrain 7, CH-6300 Zug (CH). VAN DER LELY, Olaf [NL/CH]; Weinbergstrasse 11, CH-6300 Zug (CH). (74) Agent: MULDER, Herman; 10 Weverskade, NL-3155 PD Maasland (NL).</p>		<p>(81) Designated States: AU, CA, JP, NZ, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report. In English translation (filed in Dutch).</p>

(54) Title: A CONSTRUCTION INCLUDING AN IMPLEMENT FOR AUTOMATICALLY MILKING ANIMALS

(57) Abstract

The invention relates to a construction including an implement for automatically milking animals, such as cows, which implement comprises teat cups (16) which are capable of being connected to the teats of an animal to be milked. The implement comprises separate cups (20) which are capable of being connected to the teats of an animal and by means of which these teats can be cleaned or disinfected and/or foremilked. The implement is further provided with switch means for switching the separate cups (20) from the cleaning position into a foremilking position and/or a stimulating position, in the latter position the animal being stimulated to give the milk faster and/or earlier.



A CONSTRUCTION INCLUDING AN IMPLEMENT FOR AUTOMATICALLY
MILKING ANIMALS

The invention relates to an automatic milking machine for automatically milking animals such as cows that includes teat cups that are capable of being
5 connected to the teats of an animal to be milked.

A milking machine must operate hygienically so that high quality milk may be obtained. Ideally the teats of the animal to be milked should be cleaned prior to milking. With known milking machines, cleaning of the teats is carried out by means of the teat cups themselves. The disadvantage thereof is that cleaning fluid
10 and/or contamination may remain behind in the teat cup and be mixed with the milk during milking. It is obvious that this is undesirable.

As such, the invention aims at obviating the above-mentioned drawback or at least minimising the same.

Accordingly, the invention provides an automatic milking machine for milking
15 animals such as cows, including: a milk box for maintaining an animal to be milked in a milking position; first teat cups operative for milking the teats of an animal; second teat cups operative for cleaning and/or disinfecting and/or foremilk and/or stimulating the teats of an animal; and a cleaning system operative to clean the first and second teat cups, wherein the cleaning system is operative to clean
20 the second teat cups during operation of the first teat cups.

Preferably, the automatic milking machine has second teat cups that have a diameter that is larger than the first teat cups, and more preferably approximately one and a half times the diameter of the first teat cups. For the purpose of ensuring a proper connection between the second teat cups and the teats, each
25 second teat cup may be provided with an enlarged upper contact face that contacts with the udder of an animal when the second teat cups are connected to the teats.

In order to prevent the cleaning and/or disinfecting fluid of the second teat cups from being mixed with milk, the second cups preferably include a separate supply and/or discharge line for supplying and/or discharging cleaning fluid or
30 disinfecting fluid or foremilk or hot water.



For the purpose of further automation of the automatic milking machine, it preferably includes a first milking robot for the first teat cups and a second milking

5

10



robot for the second teat cups. With the aid of such robots the first and second teat cups can be automatically connected to the teats of an animal. In order to determine the position of the teats the automatic milking machine preferably includes a further robot with a detector disposed thereon. Preferably the detector
5 includes a laser and/or an ultrasonic sensor and/or a camera.

Preferably, the cleaning system includes a first cleaning device operative to clean the first teat cups and a second cleaning device operative to clean the second teat cups. Preferably the cleaning system is operative to clean the first teat cups during operation of the second teat cups and is operative to clean the second
10 teat cups during operation of the first teat cups. Within the first and second cleaning devices, cleaning of the first and second teat cups is facilitated by the application of fluid under pressure. The first and second cleaning devices may include housings that define spaces in which the first and second teat cups respectively can be cleaned. Preferably, both the first and second teat cups are
15 operative to be stored in the first and second cleaning device spaces respectively. In another preferred form, either or both the first and second teat cups are attached to transport cables, by means of which they may be moved to their respective spaces to be stored.

Preferably, the first cleaning device is located on one longitudinal side of the milk box, while the second cleaning device is located on the opposite longitudinal
20 side of the milk box.

In a preferred form, the automatic milking machine includes an animal identification system. The animal identification system includes a computer. The animal identification system can record for a particular animal or group of animals
25 whether the teats are stimulated and/or cleaned and/or disinfected by means of the first teat cups or the second teat cups and by means of which teat cups foremilk takes place.

The invention will now be explained in further detail with reference to the accompanying drawings. However, it should be understood that the following
30 description is illustrative only and should not be taken to limit the generality of the invention as described above.



Figure 1 shows schematically a plan view of a milk box, a robot arm with teat cups and a robot arm with separate cups being disposed therein.

Figure 1 shows a plan view of a milk box 1 provided with an entrance door 2 and an exit door 3. Near the front side of the milk box 1, a feed trough 5 is fitted to the frame 4, in which feed trough 5 fodder, such as concentrate, can be fed to an animal present in the milk box 1.

To the entrance door 2 there is fitted a milking robot 6. The milking robot 6 is surrounded by a U-shaped protective bracket 7 which is disposed on the entrance door 2. Between the two legs of the U-shaped protective bracket 7 there is disposed a longitudinal guide means 8 extending in the longitudinal direction of the milk box 1 and along which the milking robot 6 can be moved via a pair of rollers 9 by a (non-shown) motor, preferably a stepper motor. The milking robot 6 comprises a first robot arm 10 which is fastened to a support beam 11 to which the rollers 9 are attached. The first robot arm 10 is hingeably connected to a second robot arm 13 via a vertical axis 12. The second robot arm 13 itself is hingeably connected about a vertical axis 14 to a third robot arm 15 carrying four teat cups 16 at one of its ends. In the position shown in Figure 1 the teat cups 16 are inoperative. The first, second and third robot arms 10; 13;

20



15 can be rotated relative to each other by (non-shown) motors, such as stepper motors and/or pneumatic or hydraulic, possibly servo-controlled cylinders. The milking robot 6 can further be moved in height by a (non-shown) hingeable arm construction.

To the U-shaped protective bracket 7 there is further fitted a first cleaning device 17 for cleaning of the teat cups. The first cleaning device 17 comprises a box-shaped housing 18 in which the teat cups 16 can be cleaned by means of fluid and/or air.

Near the other longitudinal side of the milk box 1 there is arranged a robot 19 with separate cups 20 which are capable of being connected to the animal's teats which can thus be cleaned and/or disinfected and/or foremilked and/or stimulated to give milk. Like the previous milking robot 6, the robot 19 is movable via a longitudinal guide means 21 which is fastened to the frame 4 of the milk box 1 and extends in the longitudinal direction of the milk box 1. Apart from the cups 20, the robot 19 is designed in the same manner and therefore indicated in Figure 1 by the same reference numerals. The separate cups 20 have a larger diameter, preferably one and a half times as large as the teat cups 16. Each of the separate cups 20 is further provided with a relatively large contact face 22 with which the cup, when it is connected to a teat, is situated against the udder of the animal. The large contact face 22 ensures that the interior space of the separate cup 20 is properly shut off from the environmental atmosphere.

Near the same longitudinal side as where the robot 19 is arranged, near the rear side of the milk box 1 there is disposed a second cleaning device 23 for cleaning and/or disinfecting the separate cups 20. Like the first cleaning device 17, the second cleaning device 23 is provided with a box-shaped housing 18 with a cleaning member 24 disposed therein by means of which cleaning member 24 water, air or disinfecting fluid can be spouted both into and against the separate cups 20.

To the longitudinal guide means 21 there is fitted a further robot 25 in a similar manner as the robot 19.



Therefore, corresponding parts are indicated by the same reference numerals. At the end of the arm 13 of the further robot 25 there is fitted a detector 26 with the aid of which the position of the teats of an animal can be determined. The detector 26 comprises a (non-shown) laser.

For the purpose of identifying the animal present in the milk box 1, the implement comprises a (non-shown) animal identification system and a computer which are capable of cooperating with a data carrier 27 which is disposed around the neck of the animal via a collar 28.

The above described implement functions as follows:

The animal can enter the milk box 1 via the entrance door 2, whereafter the animal is identified by means of the (non-shown) animal identification system. If there has been established that the animal is to be milked and/or to be foremilked and/or the animal's teats are to be cleaned, there is fed to the animal a dosaged quantity of concentrate in the feed trough 5 via a (non-shown) concentrate dosage system. Then, by means of the further robot 25, the position of the teats of the animal is determined. Thereafter the robot 19 is activated and the separate cups 20 are connected to the teats of the animal. Depending on how the computer is preprogrammed the animal can subsequently be cleaned and/or disinfected and/or stimulated and/or foremilked by means of the separate cups 20. Thereafter the separate cups 20 are moved to the second cleaning device 23 and (non-shown) switch means are operated by the computer, in such a manner that the separate cups 20 are cleaned and/or disinfected by means of the second cleaning device 23. During cleaning of the separate cups 20 the milking robot 6 is activated and the teat cups 16 are connected to the teats of the animal to be milked, whereafter the animal is milked. When there has been established by the computer that the animal has been milked, the teat cups 16 are moved to the first cleaning device 17 with the aid of the milking robot 6. Subsequently the switch means are activated again by the computer, in such a manner that the teat cups 16 are cleaned and/or disinfected. It is also possible to adjust the switch means in such a manner that both the teat cups 16 and the separate cups 20 are cleaned by air and/or blown dry.



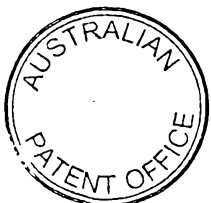
Cleaning and/or disinfecting or blowing dry or blowing clean of the teat cups 16 can go on, even when the entrance door 2 is opened for a next animal.

9
2
16
2



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An automatic milking machine for milking animals such as cows including:
a milk box for maintaining an animal to be milked in a milking position;
first teat cups operative for milking the teats of an animal;
- 5 second teat cups operative for cleaning and/or disinfecting and/or foremilk
and/or stimulating the teats of an animal;
a cleaning system operative to clean the first and second teat cups, wherein the
cleaning system is operative to clean the second teat cups during operation of the
first teat cups.
- 10 2. An automatic milking machine according to claim 1, wherein the cleaning
system is operative to clean the first teat cups during operation of the second teat
cups.
3. An automatic milking machine according to any preceding claim wherein the
cleaning system includes a first cleaning device operative to clean the first teat
15 cups and a second cleaning device operative to clean the second teat cups.
4. An automatic milking machine according to any preceding claim wherein the
cleaning system cleans by the application of fluid under pressure.
5. An automatic milking machine according to either claim 3 or claim 4,
wherein the first and second cleaning devices include housings which define
20 spaces in which the first and second teat cups respectively can be cleaned.
6. An automatic milking machine according to claim 5, wherein the first and
second teat cups respectively are operative to be stored in the spaces.
7. An automatic milking machine according to claim 6, wherein either or both of
the first or second teat cups are attached to transport cables and by means of
25 which they may be moved to their respective spaces.
8. An automatic milking machine according to any of claims 3 to 7, wherein the
first and second cleaning devices are located at opposite longitudinal sides of the
milk box.
9. An automatic milking machine according to any preceding claim wherein the
30 second teat cups have a larger diameter than the first teat cups.



10. An automatic milking machine according to claim 9 wherein the diameter of the second teat cups is approximately one and a half times that of the first teat cups.

5 11. An automatic milking machine according to any preceding claim wherein each second teat cup is provided with an enlarged upper contact face which contacts the udder of an animal when the second teat cups are connected to the teats.

10 12. An automatic milking machine according to any preceding claim wherein the first teat cups are mounted upon a first milking robot and the second teat cups are mounted upon a second milking robot.

13. An automatic milking machine according to any preceding claim further including a detection robot with a detector disposed thereon for determining the position of the teats.

15 14. An automatic milking machine according to claim 13 wherein the detector includes a laser and/or an ultrasonic sensor and/or camera.

15. An automatic milking machine according to any preceding claim further including an animal identification system.

16. An automatic milking machine according to claim 15 wherein the animal identification system includes a computer.

20 17. An automatic milking machine according to either claim 15 or claim 16 wherein the animal identification system can record for a particular animal or group of animals whether the teats are stimulated and/or cleaned and/or disinfected by means of the first teat cups or the second teat cups and by means of which cups foremilk takes place.

25 18. An automatic milking machine substantially as described herein with reference to the accompanying drawings.

30 DATED: 2 November 2001
PHILLIPS ORMONDE & FITZPATRICK
Attorneys for **MAASLAND N.V.**

