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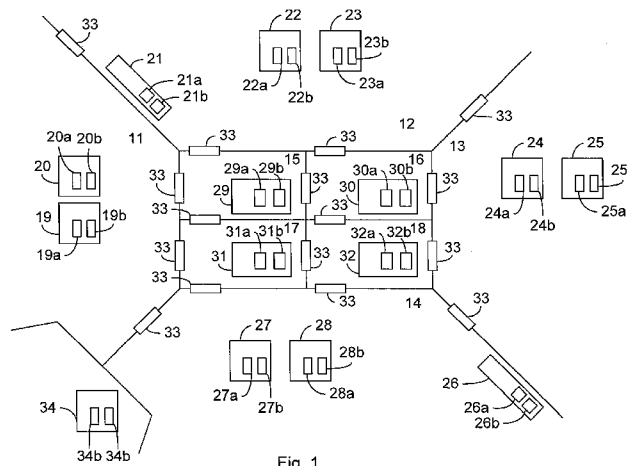


Fig. 1

(57) Abstract: A dairy farm system comprises specified zones (Z1-Z16; Z1-Z3), each of which being capable of housing one or more milking animals at a time; devices (19-32; 44-46, 48-51) for performing actions related to the milking animals in the zones; and a management system (34) having control means for controlling the operation of the dairy farm system and storage means for storing, for each of the milking animals, animal specific data including information of the at least one zone in which the milking animal is located at each instant. Each of the devices has control means for controlling the operation of the device and storage means and is associated with at least one of the zones in which the device operates; the management system is communicatively connected to each of the devices; and the management system is provided to send to each of the devices animal specific data of only the milking animals which enter, are about to enter, or have entered the at least one zone, with which the device is associated, whereupon the device is provided to store the animal specific data received from the management system in its storage means. The animal specific data contain control data used by the control means of the device in controlling the operation of the device.



DAIRY FARM SYSTEM AND METHOD THEREIN**TECHNICAL FIELD OF THE INVENTION**

The present invention relates generally to dairy farming, and more specifically to dairy farm systems and methods therein for
5 managing large number of milking animals.

DESCRIPTION OF RELATED ART AND BACKGROUND OF THE INVENTION

A dairy farm for housing large stocks of milking animals, e.g. hundreds or even thousands of milking animals, may comprise resting areas wherein milking animals are allowed to rest,
10 feeding areas wherein milking animals are fed, and milking areas wherein milking animals are milked. The feeding areas may comprise a large number of grazing areas or pastures. Typically, very large stocks of milking animals are managed manually or semi-automatically . When managing such large stocks
15 of milking animals a few problems may arise.

One problem encountered in automatic animal arrangements housing large stocks of milking animals is that it is more difficult to monitor and control various devices for performing actions related to the milking animals as well as the milking
20 animals themselves. The storing and/or processing capacity of the devices may limit the number of milking animals that can be handled and the time for finding a specified milking animal in the storage means and for retrieving data for the specified milking animal may be unacceptably long. Further, it may be
25 more difficult to find a specified milking animal, which for example has to be treated manually by the farmer.

Another problem encountered is difficulties in obtaining high milking machine utilization. This problem is particularly noticeable at very large dairy farms partitioned in different

sections, and which have a large number of milking robots for the milking.

SUMMARY OF THE INVENTION

5 It is an object of the present invention to provide a dairy farm system and a method in a dairy farm system, which address the above issues.

10 It is a particular object of the invention to provide such system and method, which provide a fast and accurate control of the devices of the dairy farm system as well as of the milking animals therein.

15 It is a further object of the invention to provide such system and method, which are scalable to be able to manage very large stocks of milking animals and which are flexible and can be dynamically changed in order to cope with changes with respect to the devices of the dairy farm system and/or with respect to the milking animals therein.

It is yet a further object of the invention to provide such system and method, which are simple, robust, reliable, and of low cost.

20 These objects among others are, according to the present invention, attained by systems and methods as claimed in the appended patent claims.

25 According to a first aspect of the invention there is provided a dairy farm system for managing milking animals comprising a management system having control means for controlling the overall operation of the dairy farm system and devices such as e.g. milking devices, feeding devices, treating devices, and gate devices, for performing actions related to the milking animals, wherein each of the devices has control means for
30 controlling the operation of the device and storage means, and

is communicatively connected to the management system. The control means of the management system comprises storage means for storing, for each of the milking animals, animal specific data e.g. containing control data used by the control means of the device in controlling the operation of the device

The dairy farm system is divided into specified zones, each of which being capable of housing one or more specified ones of the milking animals, and each of the devices is associated with at least one of the zones. The animal specific data stored in the storage means of the management system include information of the at least one zone in which each of the milking animals is located at each instant. The management system is arranged to send to each of the devices animal specific data of only the milking animals which enter, are about to enter, or have entered the at least one zone, with which the device is associated, in response to which the device is arranged to store the animal specific data received from the management system in its storage means. To this end, the dairy farm system comprises an animal identification system arranged to identify the milking animals which enter, are about to enter, or have entered the at least one zone, with which the device is associated, and communication means arranged to communicate the identification data from the animal identification system to the management system.

The animal specific data contain control data used by the control means of the device in controlling the operation of the device

In one embodiment, animal identification devices are located at appropriate locations for identifying milking animals which enter, are about to enter, or have entered each zone, and are operatively connected to the management system in order to transmit such identifications of animals to the management system.

Preferably, the management system is arranged to inform each of the devices if a milking animal present in the at least one zone, with which the device is associated, leaves, is about to leave, or has left that zone, whereupon the device is arranged to erase the animal specific data of that milking animal from its storage means. The animal identification devices have thus also to identify such milking animal that leaves, is about to leave, or has left a zone and to forward such identification to the management system.

10 In one embodiment, the dairy farm system comprises passages such as fences passageways, paths, or routes between the specified zones in order to allow the milking animals to move from one of the specified zones to another one of the specified zones, wherein each of the passages is equipped with an
15 identification device provided for identifying each of the milking animals which move from one of the specified zones to another one of the specified zones and communication means for communicating to the management system the identity of the milking animal such that the management system is capable of
20 updating the information of the zone in which the milking animal is located. Optionally, each of the passages is provided with a gate device, preferably a selection gate device.

The above embodiment may be implemented in an outland grazing arrangement wherein a milking system and different pastures
25 constitute different zones, and wherein passageways are leading from the pastures to the milking system. Also the various passageways may constitute different zones and may comprise devices for feeding the animals and or for giving them water and or treating them, wherein the devices are configured as
30 those devices disclosed above. The arrangement may be provided with identification devices and communication means of the above kind at both ends of the passages.

In another embodiment, the management system is provided for changing the specified zones, preferably according to a specified scheme or in response to a changed operation parameter of the dairy farm system. To this end the management system is arranged to (i) send to each of the devices, animal specific data of a milking animal if that milking animal was not present in the zone, with which the device is associated, before the change of the specified zones, but is after the change of the specified zones present in the zone, with which the device is associated, whereupon the device is provided to store the animal specific data of that milking animal in its storage means; and (ii) inform each of the devices if a milking animal that was present in the zone, with which the device is associated, before the change of the specified zones, but is after the change of the specified zones not present in the zone, with which the device is associated, whereupon the device is provided to erase the animal specific data of that milking animal from its storage means .

In yet another embodiment, the management system is, for at least one of the devices, provided for changing the at least one zone, with which the device is associated, preferably according to a specified scheme or in response to a changed operation parameter of the dairy farm system. To this end the management system is arranged to (i) send to the device animal specific data of a milking animal if the milking animal is not present in the zone, with which the device was associated before the change of the zone, but is present in the zone, with which the device is associated after the change of the zone, whereupon the device is provided to store the animal specific data of that milking animal in its storage means; and (ii) inform the device if a milking animal that is present in the zone, with which the device was associated before the change of the zone, but is not present in the zone, with which the device is associated after the change of the zone, whereupon the

device is provided to erase the animal specific data of that milking animal from its storage means.

According to a second aspect of the invention, a method is provided in a dairy farm system comprising a plurality of
5 devices for performing actions related to milking animals, and a management system having control means which controls the operation of the dairy farm system and storage means which stores, for each of the milking animals, animal specific data, wherein each of the devices has control means for controlling
10 the operation of the device and storage means. According to the method, zones of the dairy farm are specified, each of which being capable of housing one or several ones of the milking animals at a time. Each of the devices is associated with at least one of the zones. Information of the at least one zone in
15 which each of the milking animals is located at each instant is stored in the animal specific data. For each of the devices, animal specific data of only the milking animals which enter, are about to enter, or have entered the at least one zone, with which the device is associated, are sent from the management
20 system to the device, after which this animal specific data are stored in the storage means of the device. The animal specific data contain control data used by the control means of the device in controlling the operation of the device.

Preferably, each of the devices is informed by the management
25 system if a milking animal present in the at least one zone, with which the device is associated, leaves, is about to leave, or has left that zone, in response to which the animal specific data of that milking animal is erased from the storage means of the device. The management system will know when animals enter,
30 are about to enter, or have entered a zone, as well as when animals leave, are about to leave, or have left that zone by means of receiving such information from an animal

identification system, e.g. including a number of appropriately located animal identification devices.

According to a third aspect of the invention there is provided a dairy farm system for managing milking animals comprising a management system having control means arranged to control the overall operation of the dairy farm system and storage means arranged to store, for each of the milking animals, animal specific data, and devices for performing actions related to the milking animals, wherein each of the devices has control means for controlling the operation of the device and storage means, and is communicatively connected to the management system. The dairy farm system is divided into different specified zones, each of which being capable of housing one or several ones of the milking animals at a time, each of the devices is associated with at least one of the zones, and each of at least some of the milking animals is only allowed to visit a subset of the specified zones.

Different milking animals are mixed with one another in at least one of the plurality of zones and are separated from one another in at least two of the plurality of zones; and an identification and passage system is arranged to identify each of the milking animals which visits a passage (33) leading away from a zone and to allow the identified milking animal to pass through the passage only if the milking animal is allowed to visit the zone to which the passage leads.

Each of the devices holds animal specific data only of the milking animals which are allowed to visit the at least one zone, with which the device is associated, wherein the animal specific data contain control data used by the control means of the device in controlling the operation of the device.

According to a fourth aspect of the invention, a method is provided in a dairy farm system comprising a plurality of

devices for performing actions related to milking animals, and a management system having control means which controls the operation of the dairy farm system and storage means which stores, for each of the milking animals, animal specific data, wherein each of the devices has control means for controlling the operation of the device and storage means. According to the method, zones of the dairy farm system are defined, each of which being capable of housing one or several ones of the milking animals at a time.

Each of at least some of the animals is allowed to visit a subset only of the plurality of zones. Different milking animals are allowed to be mixed with one another in at least one of the plurality of zones and to be separated from one another in at least two of the plurality of zones; and each of the milking animals, which visits a passage leading away from a zone, is identified and the identified milking animal is allowed to pass through the passage only if the milking animal is allowed to visit the zone to which the passage leads.

Each of the devices is associated with at least one of the zones. For each of the devices, animal specific data of only the milking animals which are allowed to visit the at least one zone, with which the device is associated, are stored in the storage means of the device, wherein the animal specific data contain control data used by the control means of the device in controlling the operation of the device.

In the third and fourth aspects, the subset of the specified zones, which one of the animals is allowed to visit, may be reconfigured in response e.g. to an operator command and the animal specific data stored in the storage means of the device (s) associated with the changed subset of the specified zones may be updated with respect to the one of the animals.

This may, however, typically be made less than once a day, less than weekly, or less than monthly.

By the present invention it is rendered easier to monitor and control devices for performing actions related to the milking animals as well as the milking animals themselves. The storing and/or processing requirements of the devices can be relaxed and the time for finding a specified milking animal in the storage means and for retrieving data of the specified milking animal can be made fast and efficient.

The present invention is particularly well suited for managing very large number of milking animals such as e.g. at least several thousands of milking animals, but it is applicable also for managing smaller numbers of milking animals.

Further characteristics of the invention, and advantages thereof, will be evident from the following detailed description of preferred embodiments of the present invention given hereinafter and the accompanying Figs. 1 and 2, which are given by way of illustration only, and thus are not limitative of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1 and 2 illustrate schematically, in top views, dairy farm systems for managing a large number of milking animals according to different embodiments of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

In Fig. 1 is illustrated a dairy farm system for managing a plurality of milking animals according to one embodiment of the invention. The dairy farm system comprises here eight enclosed areas 11-18: two resting and/or treating areas 11, 13, two feeding areas 12, 14, and four milking areas 15-18. Each of the

areas 11-18 houses one or several devices 19-32 for performing actions related to the milking animals, wherein each of the devices 19-32 is provided with control means 19a-32a for controlling the operation of the device 19-32 and storage means
5 19b-32b. The control means 19a-32a may be a microcomputer or dedicated hardware and the storage means 19b-32b may be a memory .

The devices in Fig. 1 are distributed as follows. The area 11 houses two treating stations 19, 20, the area 12 houses one
10 feeding table 21 and two feeding stations 22, 23, the area 13 houses two treating stations 24, 25, the area 14 houses one feeding table 26 and two feeding stations 27, 28, and the areas 15-18 house each a milking station 29-32, e.g. a voluntary or automated milking system, AMS, or a rotary milking system e.g.
15 provided with robots for attaching teat cups to the teats of the milking animals to be milked.

A management system 34 is provided with control means 34a for controlling the overall operation of the dairy farm system and storage means 34b arranged to store, for each of the milking
20 animals, animal specific data. The control means 34a may be a microcomputer and the storage means 34b may be a hard drive or similar, wherein the animal specific data are stored in a database therein.

The management system 34 is communicatively connected to each of
25 the devices 19-32.

Further, a number of passages are provided which may allow milking animals to move from area to area. In the exemplary embodiment of Fig. 1, a passage having a gate device 33 is provided between each two adjacent ones of the areas 11-18. The
30 gate devices 33 are each equipped with an identification device arranged to identify each of the milking animals which presents itself at the gate device 33, after which the gate device 33

opens and allows the milking animal to pass, optionally after having checked that the milking animal is allowed to pass that gate device 33. Depending on the application, some of the passages/gate devices 33 may be dispensed with.

- 5 The gate device 33 may be arranged for one-way passages or two-way passages. In other dairy farm system designs, the gate devices 33 may be provided with one inlet and two outlets leading to different areas or zones or may be provided with two inlets from different areas or zones and one outlet.
- 10 The dairy farm system is divided into specified zones, each of which being capable of housing one or more specified ones of the milking animals. For example each of the areas 11-18 may be a different zone. Optionally, the treating stations 19, 20, 24, 25, the feeding stations 22, 23, 27, 28, and the milking
- 15 stations 29-32 are each a different zones.

Yet, optionally, two areas such as the milking areas 15, 16 may constitute one zone and the other two milking stations 17, 18 may constitute another zone.

- Generally, a zone as defined herein is one or several physical
- 20 areas. The zones may lie one within another, zones may overlap, and adjacent zones may be separated. As a consequence, a milking animal may be present in more than one zone at a time.

- Further the division of the dairy farm system may be changed preferably according to a specified scheme or in response to a
- 25 changed operation parameter of the dairy farm system. This will be exemplified later in this description.

- Each of the devices 19-32 is associated with at least one of the zones, that is, the zone(s) in which the device 19-32 operates. If the eight areas 11-18 constitute the specified zones, the
- 30 devices 19-32 are each associated with the zone which

corresponds to the area 11-18 in which the device 19-32 is located.

The animal specific data stored in the storage means 34b of the management system 34 include information of the at least one
5 zone in which each of the milking animals is located at each instant. To receive updated information regarding the location of the milking animals, the gate devices 33 are arranged to transmit information regarding the identifications of the milking animals that pass the gate devices 33. To this end the
10 gate devices 33 are provided with wired or wireless communication capabilities with the management system 34.

Similarly, if the devices 19-32 each comprises a zone, each of the stations has to be provided with an animal identification device for identifying milking animals entering, being about to
15 enter, or having entered that station, which is operatively connected to the management system 34 in order to supply the management system with the identifications.

Alternatively, or additionally, the dairy farm system comprises other kind of animal identification system arranged to identify
20 each of the milking animals which move from one of the specified zones to another one of the specified zones and communication means arranged to communicate the identification data to the management system.

Such animal identification system may comprise a camera system
25 including a plurality of cameras, a GPS system, or a radio based positioning system.

Typically, however, each zone comprises more than one of the devices 19-32.

The management system 34 is in turn arranged to send to each of
30 the devices 19-32 animal specific data of only the milking animals which enter, are about to enter, or have entered the at

least one zone, with which the device 19-32 is associated, whereupon the device 19-32 is arranged to store the animal specific data received from the management system 34 in its storage means 19b-32b.

5 The animal specific data contain typically control data used by the control means 19a-32a of each of the devices 19-32 in controlling the operation of the device 19-32 with respect to a given milking animal. If the device is a milking system, the animal specific data of a milking animal may comprise data
10 regarding how the milking animal should be treated and/OR milked, how the milking animal should be fed and/or enticed to a appropriate position, how the milk should be treated and/or collected, etc. If the device is a feeding station, the animal specific data of a milking animal may comprise data regarding
15 how the milking animal should be fed, how often the milking animal should be fed, what kind of feed the milking animal should be fed with, etc. If the device is a treating station, the animal specific data of a milking animal may comprise data regarding how the milking animal should treated, when the
20 milking animal should be treated, etc. If the device is a selection gate device, the animal specific data of a milking animal may comprise data regarding how the milking animal should traffic the dairy farm system, etc.

Also, each of the gate devices 33 may be associated with at
25 least one of the zones, preferably, the zone(s) to which the gate device 33 leads and optionally the zone(s) from which the gate device 33 is accessed. The management system sends to each of the gate devices 33 animal specific data of only the milking animals which enter, are about to enter, or have entered the at
30 least one zone, with which the gate device 33 is associated, in response to which the gate device 33 stores the animal specific data received from the management system 34.

Preferably, the management system 34 is arranged to inform each of the devices 19-32 if a milking animal present in the zone, with which the device 19-32 is associated, leaves, is about to leave, or has left, that zone, whereupon the device 19-32 is
5 arranged to erase the animal specific data of that milking animal from its storage means .

The management system 34 may be arranged to inform each of the devices 19-32 about milking animals entering and leaving the zone, with which the device 19-32 is associated, immediately for
10 each entering and/or each leaving repeatedly, preferably regularly.

By such provisions the devices for performing actions related to the milking animals as well as the milking animals themselves are easier to monitor and control. The storing
15 and/or processing requirements of the devices 19-32 are relaxed and the time for finding a specified milking animal in the storage means 19b-32b and for retrieving data of the specified milking animal can be made fast and efficient. In particular, devices having physical limitations with respect to storage
20 and/or processing capacity can be used since less data have to be handled by the devices. Response times from the management system 34 may be too long to rely on downloading data as they are needed. Further, some of the devices such as e.g. a feed device may not be operatively connected to the management
25 system 34 at all times as being described in WO2007/071406 , the contents of which being hereby incorporated by reference.

Further, if a manual input device as disclosed in EP 1936474, i.e. a manual input device, wherein on entry of an initial
30 piece of data, the device will suggest one or more possible animal identification numbers, is used in a zone of the present invention, it will faster suggest the correct animal identification number since the device will only contain animal specific data for a small subset of the milking animals managed

by the entire dairy farm system. The contents of EP 1936474 are hereby incorporated by reference. It shall be appreciated that any kind of search of the above mentioned kind can be made faster since the animal specific data which have to be searched
5 are heavily reduced.

In a further embodiment of the invention the management system 34 is arranged to change the specified zones, preferably according to a specified scheme or in response to a changed operation parameter of the dairy farm system. In response to
10 such change the management system 34 is arranged to send to each of the devices 19-32 animal specific data of a milking animal if that milking animal was not present in the zone, with which the device 19-32 is associated, before the change of the specified zones, but is after the change of the specified zones
15 present in the zone, with which the device 19-32 is associated, whereupon the device 19-32 is arranged to store the animal specific data of that milking animal in its storage means 19b-32b. Correspondingly, each of the devices 19-32 is informed by the management system 34 if a milking animal that was present
20 in the zone, with which the device 19-32 is associated, before the change of the specified zones, but is after the change of the specified zones not present in the zone, with which the device is associated, whereupon the device 19-32 is arranged to erase the animal specific data of that milking animal from its
25 storage means 19b-32b.

This embodiment will be exemplified with respect to Fig. 1. Assume the following scenario. The milking animals are divided up into two groups depending on some kind of criterion, e.g. milk production capacity. A first group of the milking animals
30 have access to areas 11, 12, 15, 16, which constitute a first zone, whereas a second group of the milking animals have access to areas 13, 14, 17, 18, which constitutes a second zone. All devices in areas 11, 12, 15, 16 are associated with the first

zone and all devices in areas 13, 14, 17, 18 are associated with the second zone. The group wise separation of the milking animals is terminated and all milking animals are allowed to visit all areas. New zones are specified: a first zone is specified as covering areas 11, 12, a second zone is specified as covering areas 13, 14, and a third zone is specified as covering areas 15-18. All milking animals located in areas 15, 16 are after the change of the zones present in the third zone instead of in the first zone and all milking animals located in areas 17, 18 are after the change of the zones present in the third zone instead of in the second zone.

The management system 34 is arranged to send to each of the devices 29, 30 located in areas 15, 16 animal specific data of the milking animals present in areas 17, 18 and to inform each of the devices 29, 30 located in areas 15, 16 of the milking animals present in areas 11, 12 which are no longer in the same zone as areas 15, 16. Each of the devices 29, 30 stores the received animal specific data and erases the animal specific data of the animals present in areas 11, 12. Present means here and below present at the time of the change of the specified zones .

Similarly, the management system 34 is arranged to send to each of the devices 31, 32 located in areas 17, 18 animal specific data of the milking animals present in areas 15, 16 and to inform each of the devices 31, 32 located in areas 17, 18 of the milking animals present in areas 13, 14 which are no longer in the same zone as areas 17, 18. Each of the devices 31, 32 stores the received animal specific data and erases the animal specific data of the animals present in areas 13, 14.

Finally, the management system 34 is arranged to inform each of the devices 19-23 located in areas 11, 12 of the milking animals present in areas 15, 16 which are no longer in the same zone as areas 11, 12, and to inform each of the devices 24-28

located in areas 13, 14 of the milking animals present in areas 17, 18 which are no longer in the same zone as areas 13, 14. Each of the devices 19-23 is arranged to erase the animal specific data of the animals present in areas 15, 16, and each
5 of the devices 24-28 is arranged to erase the animal specific data of the animals present in areas 17, 18.

In a yet further embodiment of the invention the storage means 19b-32b of each of the devices 19-32 is not dynamically storing animal specific data of only the milking animals *located* in the
10 zone, with which the devices 19-32 is associated, at each instant, but is storing animal specific data of the milking animals that are *allowed* to be in a zone, with which the devices 19-32 is associated. This embodiment requires that each of at least some of the milking animals is only allowed to
15 visit a subset of the zones. Typically, each of the milking animals is only allowed to visit a few, e.g. 2-10 zones, out of a large number of zones, e.g. more than 25, 100, 500, or even 1000. In this embodiment the management system 34 does not necessarily has to know, at each instant, in which zone each
20 milking animal is.

This embodiment may also be modified to cope with changes of the specified zones or changes of the zones that the at least some of the milking animals are allowed to visit. Special care has to be taken to avoid that a milking animal ends up being in
25 a non-allowed zone after the change.

In Fig. 2 is illustrated a dairy farm system for managing a plurality of milking animals according to a still further embodiment of the invention. The dairy farm system comprises three milking systems 41-43 of the parallel stall type, each
30 being provided with one or advantageously a plurality of animal identification devices. Each of the milking systems 41-43 may comprise a large number of milking stalls, each housing a

respective milking animal. The three milking systems constitute three different specified zones .

Further, the dairy farm system comprises various movable or portable devices 44-46, 48-51. For each of the milking systems
5 41-43 there is provided a milking device 44, 45, 46, and a PDA or operator communication device 49, 50, 51. Further, there is provided a feeding device 48 movable along a rail 47 or similar in a path passing each of the milking systems 41-43 . Each of
10 the devices 44-46, 48-51 includes control means 44a-46a, 48a-51a and storage means 44b-46b, 48b-51b. It shall be appreciated that there may be more than three milking systems and thus zones in the dairy farm system and more than one milking device for each of the milking systems.

Each of the devices 44-46, 48-51 is operatively connected to
15 the management system 34, which keeps track on the zone(s) in which milking animal is or is allowed to be. In the former case appropriately located animal identification devices are used to locate the milking animals.

Each of the devices 44-46, 48-51 is associated with at least
20 one of the specified zones, that is, devices 44 and 49 are associated with the zone corresponding to milking system 41, devices 45 and 50 are associated with the zone corresponding to milking system 42, devices 26 and 51 are associated with the zone corresponding to milking system 43, and the feeding device
25 48 is associated with a different one of the zones during different times, preferably according to a specified scheme or in response to a changed operation parameter of the dairy farm system.

Each of the devices 44-46, 48-51 is, at each time, arranged to
30 store animal specific data of only the milking animals located, or allowed to be, in the zone with which the device 44-46, 48-51 is associated at that time.

This means that if the feeding device 48 is scheduled to feed milking animals in the zone corresponding to milking system 41 during a first hour, to feed milking animals in the zone corresponding to milking system 42 during a second hour, and to
5 feed milking animals in the zone corresponding to milking system 43 during a third hour, the feeding device 48 is arranged to store in its storage means 48b animal specific data only for the milking animals present in the zone corresponding to milking system 41 at the start of the first hour and for
10 those who enter the zone corresponding to milking system 41 during the first hour, or only for the milking animals which are allowed to be in the zone corresponding to milking system 41. Then, the feeding device 48 is arranged to store in its storage means 48b animal specific data only for the milking
15 animals present in the zone corresponding to milking system 42 at the start of the second hour and for those who enter the zone corresponding to milking system 42 during the second hour, or only for the milking animals which are allowed to be in the zone corresponding to milking system 42. Finally, the feeding
20 device 48 is arranged to store in its storage means 48b animal specific data only for the milking animals present in the zone corresponding to milking system 43 at the start of the third hour and for those who enter the zone corresponding to milking system 43 during the third hour, or only for the milking
25 animals which are allowed to be in the zone corresponding to milking system 43. After three hours, and optionally after a short resting period, the feeding device 48 is arranged to repeat the three-hour feeding scheme. The animal specific data here may comprise an animal specific recipe or ration.

30 While the present invention has been described in a plurality of embodiments it shall be appreciated that it may be practiced in yet further embodiments falling within the scope of the appended patent claims. In particular, it shall be appreciated that the present invention is most useful in larger dairy farm

systems with many more areas, milking animals, milking systems, devices, and/or zones, than described above.

It shall further be appreciated that the inventive concept disclosed above may be implemented in any kind of dairy farm system, e.g. such as those based on parlor milking systems or rotary milking systems. Still further, the dairy farm system may be a stanchion barn.

CLAIMS

1. A dairy farm system comprising

- a plurality of specified zones, each of which being capable of housing one or several ones of a plurality of milking animals at a time;

- a plurality of devices (19-32; 44-46, 48-51) for performing actions related to the plurality of milking animals in the plurality of specified zones; and

- a management system (34) having control means (34a) provided for controlling the operation of the dairy farm system and storage means (34b) provided for storing, for each of the milking animals, animal specific data including information of the at least one zone in which each of the milking animals is located at each instant, wherein

- each of the devices has control means (19a-32a; 44a-46a, 48a-51a) for controlling the operation of the device and storage means (19b-32b; 44a-46b, 48a-51b) and is associated with at least one of the specified zones;

- the management system is communicatively connected to each of the devices; and

- the management system is provided to send to each of the devices animal specific data of only the milking animals which enter, are about to enter, or have entered the at least one zone, with which the device is associated, whereupon the device is provided to store the animal specific data received from the management system in its storage means, wherein

- the dairy farm system comprises (i) an animal identification system arranged to identify the milking animals which enter, are about to enter, or have entered the at least one zone, with

which the device is associated, and (ii) communication means arranged to communicate the identification data from the animal identification system to the management system; and

5 - the animal specific data contain control data used by the control means of the device in controlling the operation of the device .

2. The dairy farm system of claim 1 wherein the management system is provided for informing each of the devices if a milking animal present in the at least one zone, with which the
10 device is associated, leaves, is about to leave, or has left that zone, whereupon the device is provided to erase the animal specific data of that milking animal from its storage means.

3. The dairy farm system of claim 1 or 2 comprising passages (33) between the specified zones in order to allow the milking
15 animals to move from one of the specified zones to another one of the specified zones, wherein each of the passages is equipped with an identification device provided for identifying each of the milking animals which move from one of the specified zones to another one of the specified zones and
20 communication means for communicating to the management system the identity of the milking animal such that the management system is capable of updating the information of the zone in which the milking animal is located.

4. The dairy farm system of claim 3 wherein each of the
25 passages is provided with a gate device (33) , preferably a selection gate device.

5. The dairy farm system of any of claims 1-4 wherein the devices comprise feeding devices (21-23, 26-28; 48) and milking devices (29-32; 44-46).

30 6. The dairy farm system of any of claims 1-4 wherein said management system is provided for changing the specified zones,

preferably according to a specified scheme or in response to a changed operation parameter of the dairy farm system, wherein the management system is provided for

5 - sending to each of the devices animal specific data of a milking animal if that milking animal was not present in the zone, with which the device is associated, before the change of the specified zones, but is after the change of the specified zones present in the zone, with which the device is associated, whereupon the device is provided to store the animal specific
10 data of that milking animal in its storage means; and

- informing each of the devices if a milking animal that was present in the zone, with which the device is associated, before the change of the specified zones, but is after the change of the specified zones not present in the zone, with
15 which the device is associated, whereupon the device is provided to erase the animal specific data of that milking animal from its storage means.

7. The dairy farm of any of claims 1-6 wherein said management system is, for at least one of the devices, provided for
20 changing the at least one zone, with which the device is associated, preferably according to a specified scheme or in response to a changed operation parameter of the dairy farm system, wherein the management system is provided for

- sending to the device animal specific data of a milking
25 animal if the milking animal is not present in the zone, with which the device was associated before the change of the zone, but is present in the zone, with which the device is associated after the change of the zone, whereupon the device is provided to store the animal specific data of that milking animal in its
30 storage means; and

- informing the device if a milking animal that is present in the zone, with which the device was associated before the

change of the zone, but is not present in the zone, with which the device is associated after the change of the zone, whereupon the device is provided to erase the animal specific data of that milking animal from its storage means.

- 5 8. A method in a dairy farm system comprising a plurality of devices (19-32; 44-46, 48-51) for performing actions related to a plurality of milking animals; and a management system (34) having control means (34a) which controls the operation of the dairy farm system and storage means (34b) which stores, for
10 each of the milking animals, animal specific data, wherein each of the devices has control means (19a-32a; 44a-46a, 48a-51a) for controlling the operation of the device and storage means (19b-32b; 44a-46b, 48a-51b) , the method comprising the steps of:
- 15 - specifying a plurality of zones of the dairy farm system, each of which being capable of housing one or several ones of the milking animals at a time;
- associating each of the devices with at least one of the specified zones;
- 20 - storing information of the at least one zone in which the each of the milking animals is located at each instant in the animal specific data;
- sending from the management system to each of the devices animal specific data of only the milking animals which enter,
25 are about to enter, or have entered the at least one zone, with which the device is associated; and
- storing in the storage means of each of the devices the animal specific data received from the management system by that device, wherein

- the milking animals which enter, are about to enter, or have entered the at least one zone, with which the device is associated, are identified by an animal identification system and the identification data from the animal identification system are communicated to the management system; and

- the animal specific data contain control data used by the control means of the device in controlling the operation of the device .

9. The method of claim 8 wherein each of the devices is informed by the management system if a milking animal present in the at least one zone, with which the device is associated, leaves, is about to leave, or has left that zone, whereupon the animal specific data of that milking animal is erased from the storage means of the device.

10. The method of claim 8 or 9 wherein the animal information data sent to each of the devices contains control data; and the control data are used by the control means of the device in controlling the operation of the device.

11. A dairy farm system comprising

- a plurality of specified zones, each of which being capable of housing one or several ones of a plurality of milking animals at a time;

- a plurality of devices (19-32; 44-46, 48-51) for performing actions related to the plurality of milking animals in the plurality of specified zones; and

- a management system (34) having control means (34a) provided for controlling the operation of the dairy farm system and storage means (34b) provided for storing, for each of the milking animals, animal specific data, wherein

- each of at least some of the milking animals is only allowed to visit a subset of the plurality of specified zones;

- different milking animals are mixed with one another in at least one of the plurality of zones and are separated from one another in at least two of the plurality of zones;

- an identification and passage system is arranged to identify each of the milking animals which visits a passage (33) leading away from a zone and to allow the identified milking animal to pass through the passage only if the milking animal is allowed to visit the zone to which the passage leads;

- each of the devices has control means (19a-32a; 44a-46a, 48a-51a) provided for controlling the operation of the device and storage means (19b-32b; 44a-46b, 48a-51b), is associated with at least one of the specified zones, and holds animal specific data only of the milking animals which are allowed to visit the at least one zone, with which the device is associated, wherein said animal specific data contain control data used by the control means of the device in controlling the operation of the device .

12. The dairy farm system of claim 11 wherein said management system is arranged to reconfigure the subset of the plurality of specified zones, which one of the animals is allowed to visit, e.g. in response to an operator command, and to update the device (s) associated with the changed subset of the plurality of specified zones with respect to said one of the animals .

13. A method in a dairy farm system comprising a plurality of devices (19-32; 44-46, 48-51) for performing actions related to a plurality of milking animals; and a management system (34) having control means (34a) which controls the operation of the dairy farm system and storage means (34b) which stores, for each of the milking animals, animal specific data, wherein each

of the devices has control means (19a-32a; 44a-46a, 48a-51a) for controlling the operation of the device and storage means (19b-32b; 44a-46b, 48a-51b), the method comprising the steps of:

- 5 - specifying a plurality of zones of the dairy farm system, each of which being capable of housing one or several ones of a plurality of milking animals at a time;
- allowing each of at least some of the animals to visit a subset only of the specified zones;
- 10 - allowing different milking animals to be mixed with one another in at least one of the plurality of zones and to be separated from one another in at least two of the plurality of zones ;
- identifying each of the milking animals which visits a
15 passage (33) leading away from a zone and allowing the identified milking animal to pass through the passage only if the milking animal is allowed to visit the zone to which the passage leads;
- associating each of the devices with at least one of the
20 specified zones;
- storing in the storage means of each of the devices animal specific data of only the milking animals which are allowed to visit the at least one zone, with which the device is associated, wherein said animal specific data contain control
25 data used by the control means of the device in controlling the operation of the device.

14. The method of claim 13 wherein the subset of the specified zones, which one of the animals is allowed to visit, is reconfigured, e.g. in response to an operator command, and the
30 animal specific data stored in the storage means of the

device (s) associated with the changed subset of the specified zones is updated with respect to said one of the animals.

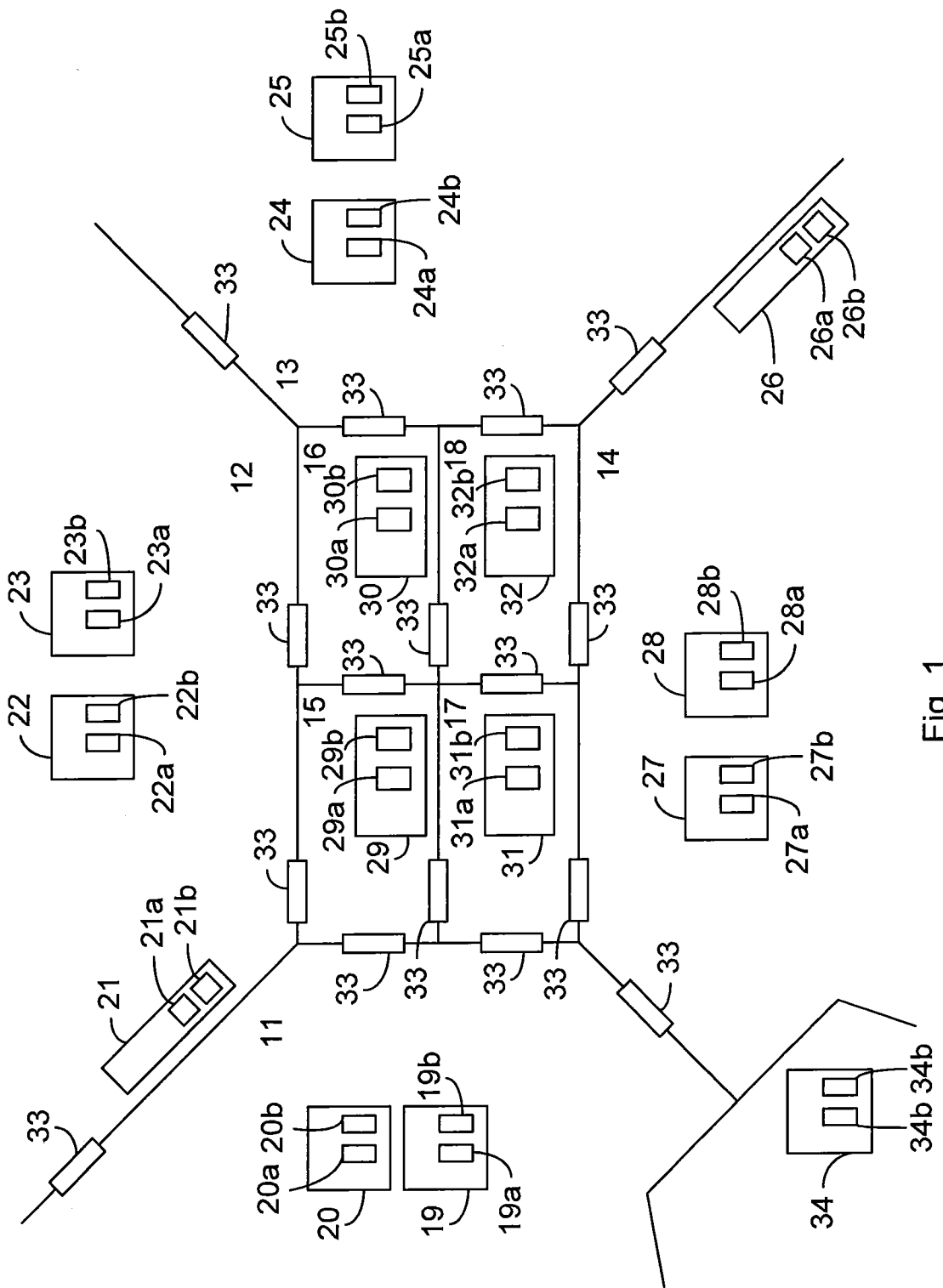


Fig. 1

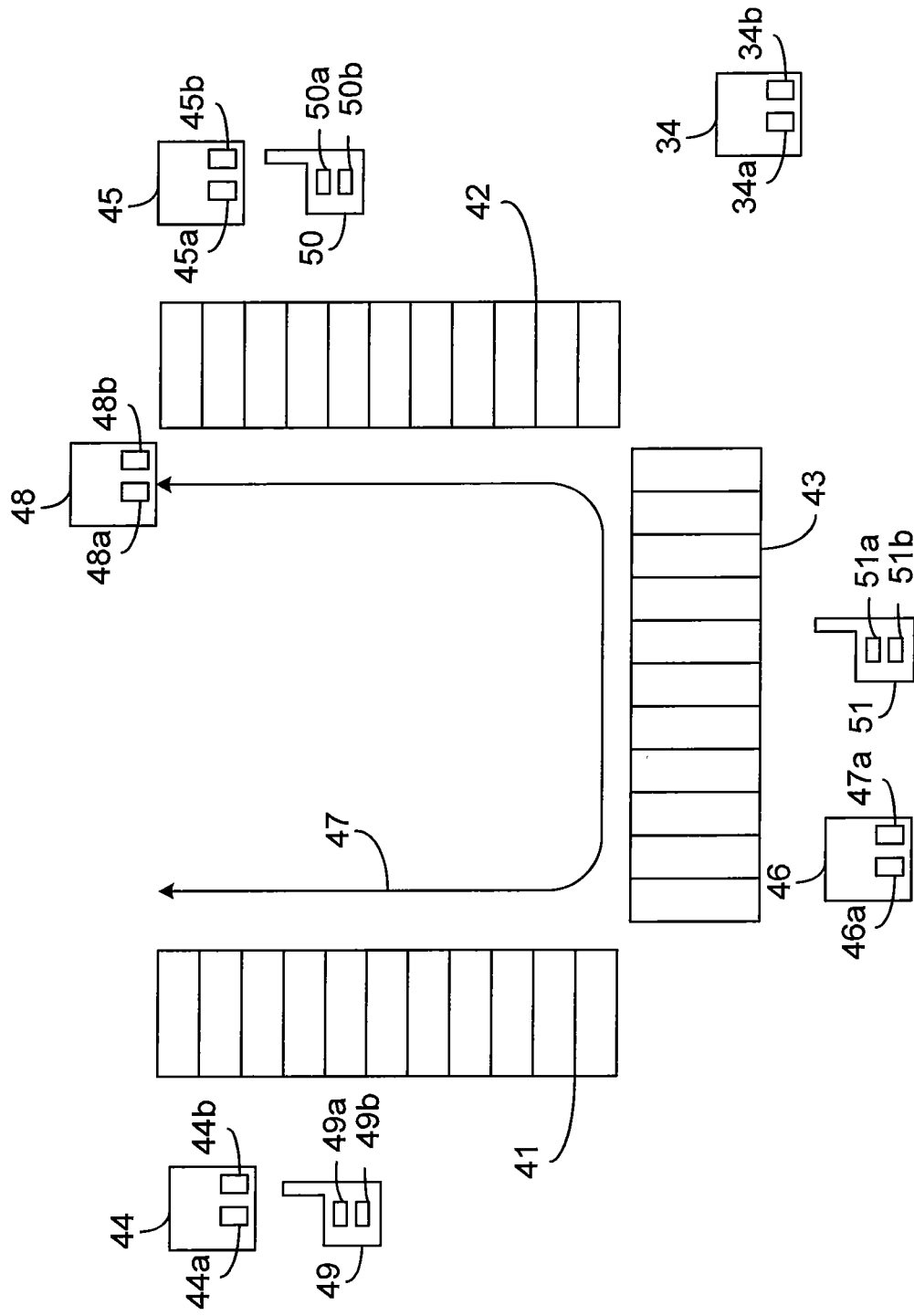


Fig. 2