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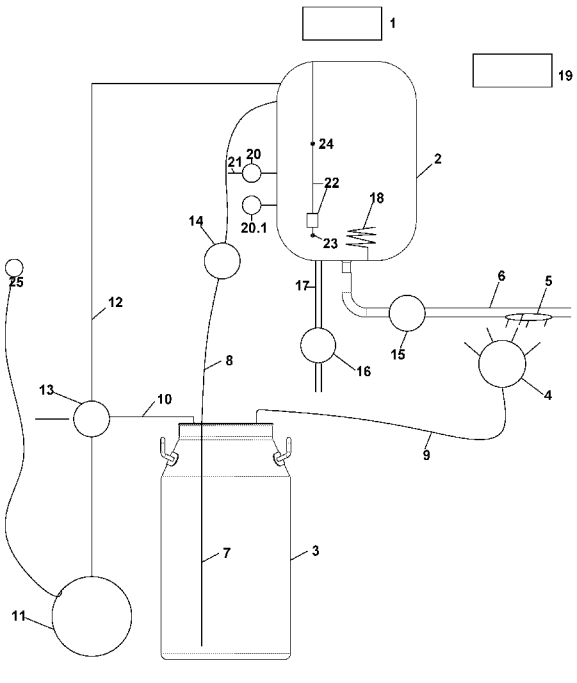

Figure- 1

(57) Abstract: The invention is particularly related to an automatic washing method which is used for washing the milking machine with milk bucket after milking automatically and also both increases the quality of the milk and prevents damage to the udder, comprises pre-rinsing, washing, final-rinsing process steps and to a milking machine with a milk bucket having an automatic washing system which comprises detergent dosing unit, washing boiler, milk can, milking cluster, washing jetter, washing line, liquid drafting line in the milk bucket, milk bucket vacuum connection, washing boiler vacuum connection, boiler-milk bucket vacuum orientation and vacuum discharge valve, boiler and milk bucket interim valve, washing line valve, drainage valve, drainage line, water heating resistance, cold water intake valve, hot water intake valve, float bottom level sensor, float upper level sensor.

WO 2020/046240 A2

AUTOMATIC WASHING SYSTEM FOR BUCKET MILKING MACHINE

TECHNICAL FIELD

This invention is related to the type of washing system for milking machines with milk bucket used for milk production of small-medium scaled dairy farms.

The invention is related to an automatic washing method which is used for automatically washing the bucket milking machine after milking. It is related to a milking machine with a milk bucket that has an automatic washing system which comprises pre-rinsing, washing, final-rinsing process steps and of detergent dosing unit, washing boiler, milk can, milking cluster(s), washing jetter, washing line, liquid drafting line in the milk can, milk can vacuum connection, washing boiler vacuum connection, boiler-milk can vacuum orientation and vacuum discharge valve, boiler and milk can interim valve, washing line valve, drainage valve, drainage line, water heating resistance, cold water intake valve, hot water intake valve, float bottom level sensor, float upper level sensor. This invention both increases the quality of the milk and prevents giving damage to the udder.

PREVIOUS TECHNIC

In the previous technic, the milk milked by the machines are collected in to a milk bucket. The milker empties the milk bucket by transferring the milk to another bigger container/bucket at the end of milking and thus the milker prepares the machine for the next animal to be milked. Said milking is very difficult and it is very tiring for the milker.

As it is known, the milking machines must be washed appropriately after each milking process without any delay. Delay in washing, not making a full wash or not making any wash causes proliferation of the bacteria in a very fast manner within the milking equipment. These bacteria cause infection on the udder of the animals at the next milking and also infecting the milk.

Due to the infection of the udders, besides the bacteria contaminating the milk via the milking equipment, the somatic cell in the milked milk also increases, increased somatic cell affects the milk production in a negative manner and the raw milk quality is impaired. As a result of the impaired milk quality, the milk is processed with extended duration and/or at high temperatures during pastorization, therefore energy consumption increases. The pH level of milk with high bacteria load increases, thus it substantially decreases the yield of milk products, excellence and product quality in the production of dairy products such as yoghurt, cheese etc.

The producers usually avoid washing the bucket milking machine or perform an insufficient washing because it requires an intensive labor. As a result of this, the udder diseases increase (Mastitis), the quality of the milk cannot reach to the required level. The raw milk quality targets specified in the declaration No 2000/6 of the Ministry of Agriculture (Number of total bacteria <100.000 number/ml, number of somatic cells <400.000 number/ml) can not be reached yet due to the fact that the milking systems of small-medium scaled enterprises are not washed properly, in contrast the current numbers of total bacteria and somatic cells are very far away from the targeted values as of the year 2018 in Turkiye and in many other developing countries.

As a result, due to insufficiency of the current solutions for solving the abovementioned problems within the current technics, it is necessary to make a development in the relevant technical field for a new washing system and equipment.

THE AIM OF THE INVENTION

The present invention solves all of the abovementioned problems at the same time. Said invention is in general related to a method which provides excellent automatic washing of all surfaces that contact with the milk in the bucket milking machine.

The most important aim of the present invention is to increase the milk production and raw milk quality by decreasing the somatic cells besides the bacteria contamination to the milk by the milking equipment by means of preventing the udders to be infected due to dirty milking equipment.

Another aim of the present invention is to provide appropriate washing of the milking machine in a standard and sufficient manner by bringing an easy solution to the milker who refrain from washing the milking machine because it eliminates the washing labor of the milker.

Another aim of the present invention is to enable washing of the milking machines appropriately without any delay after each milking process, due to its ease of use.

The most important aim of the present invention is to protect the health of other animals in the herd by means of preventing the infection of the udders.

Another aim of the present invention is to reduce the energy consumption by providing treatment of the milk within a shorter period of time and/or at low temperature during process at milk factories.

Another aim of the present invention is both to perform standard milking process by means of reducing the initiative of the milker on the milking machine and to improve the working conditions.

In the direction of said aims, the present invention which eliminates the current embodiments is an automatic washing method which is used for automatically washing the milking machine with milk bucket after milking and it also increases the quality of the milk and prevents damage to the udder, comprises pre-rinsing, hygiene provision, final rinsing process steps.

In the direction of said aims, the present invention is an automatic washing system for bucket milking machine which is used for automatically washing the bucket milking machine after milking, eliminates the disadvantages in the current situation, increases the quality of the milk and prevents damage to the udder, comprises of pre-rinsing, washing, final-rinsing process steps and includes detergent dosing unit, water heater, milking bucket, milking cluster(s), washing jetter, washing line, liquid drafting line in the milk can, milk can vacuum connection, washing tank vacuum connection, boiler-milk can vacuum orientation and vacuum discharge valve, boiler and milk can interim valve, washing line valve, drainage valve, drainage line, water heating resistance, cold water intake valve, hot water intake valve, float bottom level sensor, float upper level sensor.

Said invention will be a preferred product in the sector with its present condition and a simple system. Therefore it will provide a commercial success.

The structural and characteristic features of the present invention will be understood clearly by the following drawings and the detailed description made with reference to these drawings. For this reason the evaluation shall be made by taking these figures and the detailed description into consideration.

FIGURES CLARIFYING THE INVENTION

Figure – 1 is a drawing used for illustrating the washing system of the milking system subject to the present invention.

REFERENCE NUMBERS

1. Detergent dosing unit,
2. Washing tank and boiler,
3. Milk bucket,
4. Milking cluster,
5. Washing assembly,
6. Washing line,
7. Inter milk bucket liquid drafting pipe,
8. Inter milk bucket liquid drafting hose,
9. Milk hose,
10. Milk bucket vacuum connection,
11. Vacuum pump,
12. Washing tank/boiler vacuum connection,
13. Boiler-milk bucket vacuum orientation and vacuum discharge valve - 4 way valve,
14. Boiler and milk can interim valve,
15. Washing line valve,
16. Drainage valve,
17. Drainage line,
18. Water heating resistance,

19. Control circuit/panel,
20. Cold water intake valve,
    20.1 hot water intake valve
21. Water feeding line,
22. Float,
23. Float bottom level sensor,
24. Float upper level sensor,
25. Electrical plug

The present invention will be understood more clearly with the abovementioned reference numbers and description referring to the attached figures.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is shown in Figure-1 for illustrative purposes. In order to automatically wash the milking machine with milk bucket after milking process, first of all milking equipment comes near to the washing station for automatic washing, if it is a mobile milking machine, and the plug (25) of the vacuum pump is plugged into the socket on the control panel (19), inter milk bucket connection hose (8), inter milk bucket liquid drafting pipe (7) and milk bucket vacuum orientation and vacuum discharge valve hose (12) are plugged into the relevant sockets, the milking cluster (4) is fitted onto the washing jetter (5) and finally the start wash button is pressed on the control panel (19) and automatic washing is started. After this phase automatically, pre-rinsing, washing with the solution consisting of hot water and detergent and final rinsing process steps are applied respectively.

For pre-rinsing; cold water is taken into the boiler from the cold water intake valve (20); when the water amount taken into the boiler (2) reaches to the required level, it cuts water intake by triggering the upper level sensor (24) of the float (22), operates the vacuum pump (11). At this phase vacuum orientation valve (13) while transferring the vacuum to the milk bucket, interim valve between boiler-milk bucket (14) is in a closed position, washing line valve (15) is open; drainage valve (16) is closed. The vacuum pump (11) takes the rinsing water within the boiler (2) into the milk bucket (3) by passing through the washing jetter (5) and milking cluster (4). During this stage together with the reduction of the water in the boiler, the float of the boiler (22) triggers the lower level sensor (23); the washing line valve (15) is closed, the boiler

and milk bucket interim valve (14) is opened. Together with the opening of this valve, to the vacuumed environment within the milk bucket (3), a sudden atmospheric air inlet is provided by means of the inter milk bucket liquid drafting pipe (7) up to the bottom point of the milk bucket and after the water within the milk bucket (3) is provided to all points in the milk bucket in a pressurized manner thus rinsing is provided. After this process the boiler-milk bucket vacuum orientation valve (13) directs the vacuum to the washing boiler vacuum connection (12); it allows the atmospheric air way to the milk bucket vacuum connection (10). Due to the increased vacuum within the boiler (2), the dirty rinsing water within the milk bucket (3) is drafted into the boiler (2) through the inter milk bucket liquid drafting pipe (7) because the boiler-milk bucket interim valve (14) is open. When the whole dirty water is drafted into the boiler (2), the vacuum pump (11) is closed; the dirty rinsing water is drained by mean of opening the drainage valve (16). Therefore the pre rinsing process is completed.

After the pre-rinsing stage, the system passes to the washing stage with the solution consisting of the hot water and detergent. At this stage detergent dosing unit (1) gives a sufficient amount of detergent into the boiler (2). If there is any external hot water source in the enterprise, hot water is taken into the boiler (2) by means of the hot water valve (20.1); if there is no hot water source then water is taken from the cold water valve (20) and the heating resistance (18) starts to work until the washing solution is heated to the predetermined temperature. Water intake into the boiler (2) stops when the water level in the boiler (2) triggers the upper level sensor (24) of the float (22); the system waits for reaching the solution temperature up to the required level. The water within the boiler (2) is brought to the required temperature by means of the resistance (18) and is brought to the required level, then the float upper level sensor (24) is triggered and the vacuum pump (11) is operated. At this stage the vacuum orientation valve (13) transfers the vacuum into the milk bucket (3), the boiler-milk bucket interim valve (14) is closed, the washing line valve (15) is opened, and the drainage valve (16) is closed. The vacuum pump (11) drafts the solution within the boiler (2) into the milk bucket (3) through the washing jetter (5) and milking cluster (4). In this case, the solution amount within the boiler (2) is reduced and the lower level sensor (23) of the float (22) is triggered, then the washing line valve (15) is in a closed position, the boiler-milk bucket interim valve (14) is in an opened position. When the boiler-milk bucket interim valve (14) opens, the vacuum in the milk bucket (3) provides sudden atmospheric air inlet to the environment by means of the

inter milk bucket liquid drafting pipe (7) which reaches to the lowermost point of the milk bucket, then the washing process of the system is provided by reaching with the solution in the milk bucket (3) to all points within the milk bucket (3) in a pressurized manner. After this process the boiler-milk bucket vacuum orientation valve (13) directs the vacuum to the washing boiler vacuum connection (12); it allows the atmospheric air way to the milk bucket vacuum connection (10). Due to the increased vacuum within the boiler (2), the solution within the milk bucket (3) is drafted into the boiler (2) through the inter milk bucket liquid drafting pipe (7) because the boiler-milk bucket interim valve (14) is open. When the whole solution is drafted into the boiler (2), the vacuum orientation valve (13) transfers the vacuum into the milk bucket (3), the boiler-milk bucket interim valve (14) is in a closed position, the washing line valve (15) is in an opened position, and the drainage valve (16) is in a closed position. The vacuum pump (11) drafts the current solution within the boiler (2) by means of passing through the washing jetter (5) and milking cluster (4) and then redrafts it into the milk bucket (3) by means of the milk hose (9). This process is repeated several times and all surfaces in contact with the milk in the system are washed. After all of the surfaces are washed with the solution and hot water, the solution is drafted into the boiler (2) for the last time, then the vacuum pump (11) is closed, the drainage valve (16) is opened and the solution is drained.

The system passes to the final rinsing stage after the washing stage. At the final rinsing stage first of all cold water is taken into the boiler (2) by means of the water valve (20), when the water level which is filled into the boiler (2) reaches the required amount, water intake is stopped by means of triggering the upper level magnetic sensor (24) of the float (24). The control panel (19) actuates the vacuum pump (11). At this stage, the vacuum orientation valve (13) within the system transfers the vacuum to the milk bucket, the boiler-milk bucket interim valve (14) is in a closed position, the washing line valve (15) is in an opened position, and the drainage valve (16) is in a closed position. The vacuum pump (11) drafts the rinsing water within the boiler (2) into the milk bucket (3) through the washing jetter (5) and the milking cluster (4).

Together with the reduction of the water within the boiler (2), the lower level sensor (23) of the float (22) is triggered; it closes the washing line valve (15), opens the boiler-milk bucket interim valve (14). When this valve is opened, to the vacuumed environment in the milk bucket (3), a sudden atmospheric air inlet is provided by means of the inter milk bucket liquid drafting pipe (7) which reaches to the lowermost

point of the milk bucket, the final rinsing is provided by means of reaching to all points with the water in the milk bucket (3) in a pressurized manner.

After this process, the boiler-milk bucket vacuum orientation valve (13) directs the vacuum to the washing boiler vacuum connection (12); it allows the atmospheric air way to the milk bucket vacuum connection (10). Due to the increased vacuum within the boiler (2), the dirty rinsing water within the milk bucket (3) is drafted into the boiler (2) through the inter milk bucket liquid drafting pipe (7) because the boiler-milk bucket interim valve (14) is open. When the whole water is drafted into the boiler (2), the vacuum pump (11) is closed; the final rinsing water is drained by means of opening the drainage valve (16).

The boiler-milk bucket interim valve (14), the washing line valve (15) and the drainage valve (16) are valves operated by actuators which open and close the passages. The boiler-milk bucket vacuum orientation and vacuum discharge valve (13) are valves, that closes the free air passage of one side when vacuum is oriented to that side, and at the same time cuts the vacuum feeding of the other side, opens the free air passage of the side whose vacuum is cut previously.

The protection scope of this application is determined in the claims section; it certainly cannot be limited to the above descriptions given for the purpose of example/illustration, it is clear that a qualified person in the technic can present the novelty presented within the invention with similar embodiments and/or can apply this embodiment used in the relevant technical field to other fields of similar aim. Therefore it is clear that such embodiments will lack novelty and particularly the criteria to exceed the present state of the art.

CLAIMS

1. The invention relates to an automatic washing method of an automatic washing system of the milking machine with milk bucket which is used for washing the bucket milking machine after milking automatically, having pre-rinsing, washing and final rinsing stages and also both increases the quality of the milk and prevents damage to the udder due to contamination, **characterized in that** it comprises the following process step;

   . transferring the water or solution within the milk bucket (3) to all points in a pressurized manner by means of providing a sudden atmospheric air inlet into the vacuumed environment within the milk bucket (3).

2. An automatic washing system of a milking machine with milk bucket or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process steps; getting water or solution into the boiler (2); when the level of the water or solution filled within the boiler (2) reaches to the required amount, triggering the upper level sensor (24) of the float (22), cutting water or solution intake.

3. An automatic washing system of a milking machine with milk bucket or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; drafting the water or solution within the boiler (2) by means of vacuum through the washing jetter (5) and milking cluster (4) into the milk bucket (3) with vacuum.

4. An automatic washing system of a milking machine with milk bucket or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; triggering the lower level sensor (23) of the boiler float (22) with the reduction of the water or solution in the boiler, closing the washing line valve (15), opening the boiler-milk bucket interim valve (14).

5. An automatic washing system of a milking machine with milk can or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; vacuum is oriented to the washing boiler vacuum connection (12) by means of the boiler-milk bucket vacuum orientation valve (13) and opening the atmospheric air way to the milk bucket vacuum connection (10).

6. An automatic washing system of a milking machine with milk can or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the

following process step; due to the increased vacuum within the boiler (2), the water or the solution within the milk bucket (3) is redrafted into the boiler (2) by means of liquid drafting pipe (7) because the boiler-milk bucket interim valve (14) is open.

7. An automatic washing system of a milking machine with a milk can or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; closing the vacuum pump (11) after all water or solution is drafted into the boiler (2), opening the drainage valve (16), draining water or solution.

8. An automatic washing system of a milking machine with milk can or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; for washing with the solution; giving an appropriate amount of detergent into the boiler (2) by means of the detergent dosing unit (1).

9. An automatic washing system of a milking machine with a milk can or trolley bucket milking machine according to claim 1, **characterized in that**; if there is no hot water source in the enterprise, after taking water from the cold water valve (20), heating the washing solution up to the required temperature by means of the resistance (18).

10. An automatic washing system of a milking machine with milk can or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; waiting for the system washing solution temperature to reach to the required level.

11. An automatic washing system of a milking machine with a milk can or trolley bucket milking machine according to claim 1, **characterized in that**; it comprises the following process step; when the temperature of the water within the boiler (2) reaches to the required level by means of the resistance (18) and when the amount of the water reaches to the required level, actuating the vacuum pump (11) by means of triggering the float upper level sensor (24).

12. An automatic washing system of a milking machine with milk can or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; after all water or solution is drafted into the boiler (2), while the vacuum orientation valve (13) transfers the vacuum into the milk bucket (3), the boiler- milk bucket interim valve (14) is in a closed position, the washing line valve (15) is in an opened position, the drainage valve (16) is in a closed position.

13. An automatic washing system of a milking machine with milk can or trolley bucket milking machine according to claim 1, **characterized in that** it comprises the following process step; repeating the rinsing or washing process by drafting the redrafted water or solution into the boiler (2) through the washing head (5), milking cluster (4) again into the milk bucket (3) by means of the milk hose (9).

14. The present invention is a milking machine with the milk bucket or trolley bucket milking machine having an automatic washing system which is used for washing the milking machine with milk bucket after milking automatically and also both increases the quality of the milk and prevents damage to the udder, which comprises pre-rinsing, washing, final-rinsing process steps, **characterized in that**; it comprises at least one milk bucket vacuum connection (10), at least one washing boiler vacuum connection (12), at least one boiler-milk bucket vacuum orientation and vacuum discharge valve (13) , at least one boiler and milk bucket interim valve (14), at least one washing line valve (15), at least one drainage valve (16), at least one drainage line (17), at least one water heating resistance (18), at least one cold water intake valve (20), at least one hot water intake valve (20.1), at least one float bottom level sensor (23), at least one float upper level sensor (24).

15. A milking machine with milk bucket or trolley bucket milking machine having an automatic washing system according to claim 14, **characterized in that**; it comprises at least one inter milk bucket liquid drafting pipe (7), at least one inter milk bucket liquid drafting line (8).

16. A milking machine with milk bucket or trolley bucket milking machine having an automatic washing system according to claim 14, **characterized in that**; the boiler-milk bucket vacuum orientation and vacuum discharge valve (13), the boiler and milk bucket interim valve (14), the washing line valve (15), the drainage valve (16), the cold water intake valve (20) and the hot water intake valves (20.1) are valves with an actuator.

17. A milking machine with milk bucket or trolley bucket milking machine which has an automatic washing system according to claim 14, **characterized in that**; the boiler- milk bucket vacuum orientation and vacuum discharge valves (13) is a 4-way valve.

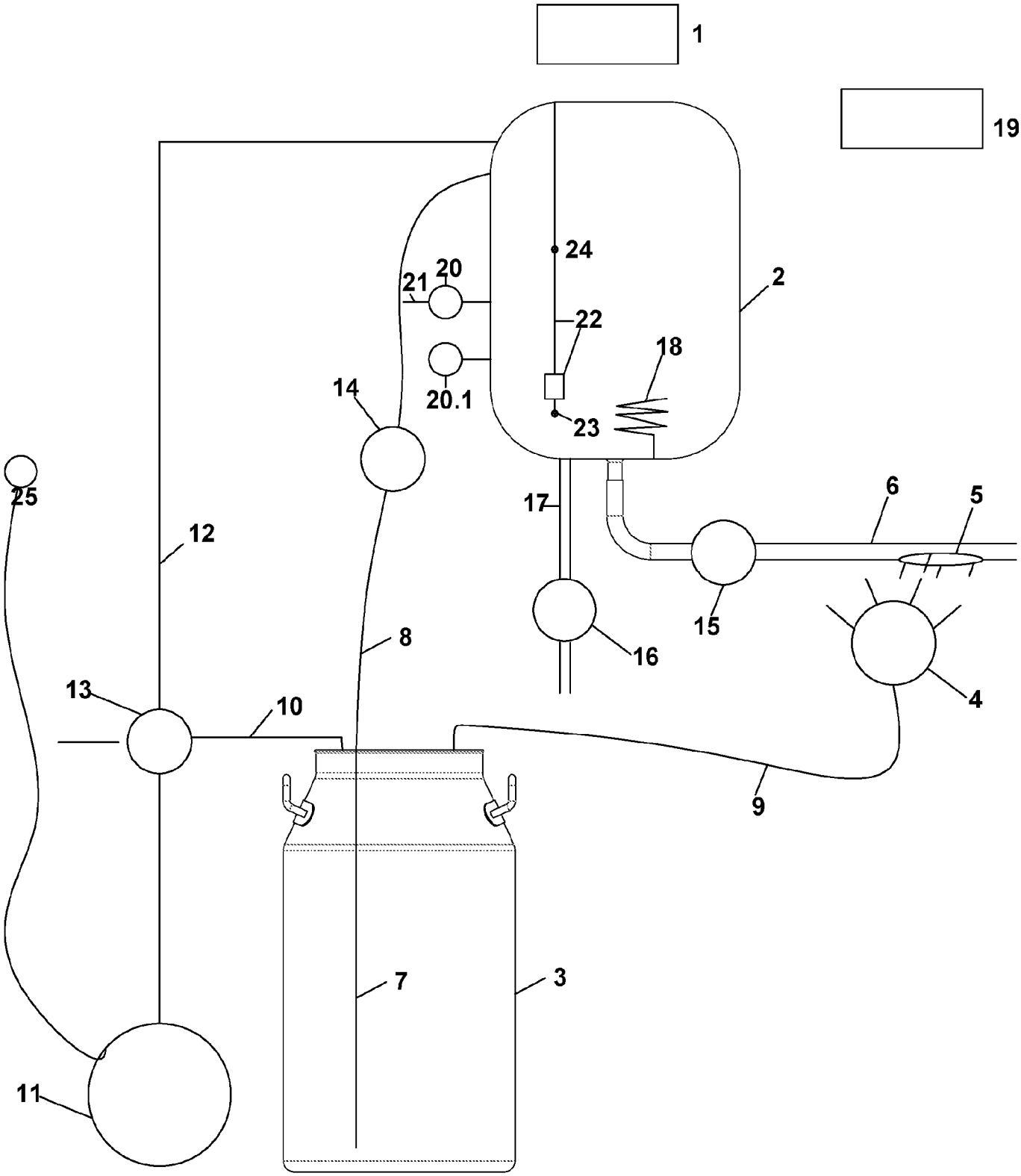

Figure- 1