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(54) Benævnelse: **INDRETNING TIL BEHANDLING AF EN VÆSKE, ISÆR MÆLK, MED INTEGRERET SKYLLESYSTEM OG FREMGANGSMÅDE TIL SKYLNING**

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DEVICE FOR TREATING A LIQUID, IN PARTICULAR MILK, WITH INTEGRATED RINSING SYSTEM AND METHOD FOR RINSING

Technical field of the invention

The present invention relates to a device for the preparation of a liquid, in particular milk, with an integrated rinsing system, as well as a method for rinsing and/or cleaning such a device. Preparation is defined as frothing up and/or heating, so that optionally warm or cold milk foam or warm or cold milk can be prepared by the device.

Background of the invention

So-called frothing devices are known for the preparation of liquids, in particular the liquid foodstuff milk, which are used for preparing hot beverages containing milk, such as e.g. cappuccino, latte macchiato, café latte, chocolate or chai, for heating and frothing milk. Basically milk is mixed with air and/or steam.

From EP 1 593 330 it is known to suction milk by means of a pump from a container via a milk suction line and convey it to an outlet. During suctioning the milk is conducted through a continuous-flow heater and is heated, and air or gas is mixed with either the cold or the heated milk in a controllable quantity via an air supply line. Then the mixture is conveyed via a constriction point to the outlet via an outlet line. For a metered supply of air, it is known to arrange an adjustable air volume controller or even a fixed nozzle in the air supply line. The line system comprises various check valves, which prevent a return flow of the milk or air or gas counter to a conveying direction. For rinsing and/or cleaning, rinsing and/or cleaning fluid is introduced from a source via a rinsing valve through a line into the milk suction line by means of the pump.

From EP 3 281 569 a modular foaming unit is known, whereby the latter, in addition to a pump, a line system with a milk suction line and a single line for connecting the pump to an outlet nozzle, an outlet line, and an air enrichment element, comprises a heating element designed as a continuous-flow heater, in the form of a thick film heater. This modular foaming unit can be integrated as a module in a compact way and can be arranged as such in a cooling unit. The module is cleaned by means of a connected rinsing system, which rinses the foaming unit between the outlet from a cooling unit up to a manifold valve in the outlet line, through which the rinsing water is discharged.

From JP 2018- 1228464 a beverage supply device is known, which in addition to producing cold milk or cold foamed milk and hot milk or hot foamed milk also rinses the

milk supply line, and in order to achieve this fills water into a predefined length of the line, which water can also be changed in a standby state. Furthermore, a system of air supply lines can be provided, wherein air for foaming milk can be supplied via a line and air for air flushing can be supplied via a different line by an air pump.

A problem with respect to the known foaming devices is that those line sections that are exposed to milk or foamed milk may become clogged over time with dried up milk. In addition to the functional disruption, these deposits can also have a negative sensory effect due to the curdling milk protein and a breakdown of casein. However, particularly for hygienic reasons, it is necessary to rinse or clean the milk-carrying parts of the device, preferably after each foaming or conveying operation. Hereby it is desirable to have a rinsing and/or cleaning process that is as automated as possible, which produces the desired reproducible cleaning result quickly, safely and independently of operating staff. A distinction is made between rinsing, i.e. rinsing out cyclically or after each dispensing, and cleaning, in particular rinsing with cleaning fluid, in particular at the end of a day.

Generally, for rinsing known foaming devices, including the lines, rinsing fluid is introduced via a rinsing valve into a section of the milk suction line, and via a further valve, after flowing through the elements belonging to the foaming device, but as a rule without the section to the outlet nozzle, is directed out into a collecting vessel or an outflow. The section to the outlet nozzle is often rinsed only periodically, for example every 10 minutes depending on the setting. This is problematic, particularly since the discharge of rinsing fluid into a drip pan after this rinsing phase can be seen by customers. A section of the milk suction line, which extends between the rinsing valve and the milk container and in particular projects into the milk container from above, is cleaned less frequently, generally in a separate rinsing or cleaning operation. This section is generally arranged in a cooled region and is thus less affected hygienically.

It also needs to be considered, in addition to the previously mentioned aspects of rinsing foaming devices, that as well as the temperature and characteristics of the milk, such as fat content, pasteurisation, pH value, protein content and storage period, the foaming of milk is also dependent on a precisely metered supply of air. A precise and metered supply of air is indispensable for high quality reproducible milk foam. However, in practice it has been shown that for uniform milk foam consistency it is also essential that no residue from milk or milk foam and/or rinsing fluid and/or cleaning fluid dries

inside the device including on any provided valves, in particular in sections of the air supply, and has a negative effect with respect to precise metering. In particular, a fully cleaned air supply line is necessary for exact air metering.

The importance of a precisely defined and pulsed air supply for producing foamed milk is described in DE 10 2015 117 650. A device is known for heating and foaming milk with a steam generator for generating steam and a pressurised gas source for generating pressure pulses of compressed gas, which when brought together form a steam-gas mixture, which is introduced into the liquid to be foamed. Thus the characteristics of the formed foam should be adjustable in a flexible way by a user in terms of consistency, creaminess, porosity, foam density and foam stability. This configuration for achieving a defined and/or pulsed injection of air is very expensive.

Summary of the invention

The underlying objective of the present invention is therefore to create a device for the preparation of liquid, in particular milk, a compact, robust and efficient device for the selective preparation of cold or hot milk foam or cold or hot milk, which is distinguished by having a reproducible and high quality milk foam. Furthermore, the device and the corresponding method should be optimised with respect to the rinsing and cleaning effects.

These objectives are achieved by a device according to claim 1 and a method according to claim 8. Further advantageous features are defined in the dependent claims, the following description and the drawing.

The device according to the invention for the preparation of a liquid, in particular milk, with integrated rinsing system, comprises at least one reservoir for storing the liquid, disposed in a cooling unit, a pump, a line system comprising a milk suction line, via which the at least one reservoir is connectible to the pump, an outlet line, via which the pump is connectable to at least one outlet, and a rinsing line, via which the milk suction line is loadable with a rinsing fluid, an air volume controller, by means of which air, via an air supply line, is able to be led in a metered way to an inlet point into the milk suction line, and a heating element designed as continuous-flow heater, which is disposed in the outlet line and is designed as thick film heater. Here between air volume controller and inlet point into the milk suction line a second check valve and a first check valve are arranged in the air supply line, wherein the first check valve and second check valve are configured

as directly closing check valves, and the air supply line is connectable between first check valve and second check valve to the rinsing line via a valve.

In the invention, the air volume controller for metering the air supply and the first and second check valve are provided in the air supply line, whereby the air volume controller can be designed as a proportional valve. The mentioned valve for connecting the air supply line to the rinsing system is disposed between first and second check valve. The first check valve opens or closes that section between the said valve and the air supply line in the direction of the introduction point and the second check valve opens or closes that section between the said valve and the air supply line in the direction of the air volume controller. First and second check valves are preferably switchable independently of one another.

It has been shown that a defined opening of two serially arranged check valves in a line system is hardly possible without pulsation occurring in the line system. Particularly during milk conveyance, this has a negative effect on the quality of milk foam to be achieved. Therefore, it is necessary to design first and second check valves in the air supply line in such a way that they are able to adopt an open or closed position in a coordinated way. A third check valve in the milk suction line is thereby also to be considered, which can prevent a back flow of suctioned milk counter to a conveying direction.

Check valves are often designed as spring-loaded check valves, which allow flow in one direction. The mechanism of spring-loaded check valves comprises a closing element, which is pressed tightly in a correspondingly shaped seat by means of the spring force of a return spring. If a counteracting force acting upon the closing element exceeds the spring force of the return spring, the passage is opened. The opening pressure is adjustable, for example via the spring force of the return spring. With the device according to the invention for the preparation of liquid with an integrated rinsing system, the opening pressure is determined in a definitive way by the negative pressure on the suction side of the pump. If the generated negative pressure on the suction side is not sufficient, the first and second check valves in the air supply line do not open or open only incompletely. If the negative pressure on the suction side is sufficiently high, in order to open the corresponding check valves in the air supply line, vibrations may occur on the check valves so that an exactly metered air supply is not possible. Furthermore, in particular the mode of operation of spring-loaded check valves is especially susceptible to contamination from incoming milk and/or milk foam.

According to the invention, the first check valve disposed in the air supply line of the device according to the invention and the second check valve are designed as directly closing check valves. The mechanism of such check valves comprises a closing element which is pressed into the seat by the force of gravity acting on the closing element and/or by a medium and thus closes tightly. In order that directly closing check valves can be disposed at least in the air supply line, the air supply line is arranged in the device according to the invention for the preparation of liquid in a vertical orientation. Accordingly, the air volume controller and second and first check valves included in the air supply system are arranged vertically from above downwards in the air supply line. With a supply of air, this vertical orientation relieves the corresponding check valves, so that the latter open completely and a precisely metered air supply is possible without fluctuations. In this configuration, at most only the first non-return valve is possibly in contact with milk or milk foam, but is also rinsed regularly at least from one side, in particular when the milk suction line is rinsed. The milk suction line can be arranged laterally, i.e. substantially horizontally, in the device so that milk is suctioned in horizontal direction via the milk suction line.

In another embodiment of the device according to the invention for the preparation of liquid with an integrated rinsing system, the air for foaming the milk is supplied in a metered way at a constant temperature via the air volume controller. Preferably, this is air of low temperature, which is especially suitable for producing a repeatable high milk foam quality. Preferably, the air is drawn from the cooling unit, in which the milk is kept cooled. It is also possible that the device according to the invention is largely fully accommodated in the cooling unit as a modular foaming unit. Supplied cooled air prevents temperature-related fluctuations in the quality of the milk foam. The milk foam quality is independent of seasonally fluctuating ambient temperatures and is thus consistently high.

Furthermore, a restrictor is arranged downstream of the pump in the outlet line, whereby in said restrictor a manifold valve is arranged, which connects the outlet line optionally to a nozzle for discharging rinsing fluid and via a line to the outlet at which the prepared liquid can be dispensed. In particular, the line between the manifold valve and outlet is dimensioned in such a way that it has only a small filling volume, preferably between 2 ml and 3 ml.

Moreover, the milk suction line is connectible to the integrated rinsing system outside the cooling unit by means of a rinsing valve. During a rinsing operation, preferably carried out between two actions of dispensing of prepared milk, the lines and elements directly exposed to milk or milk foam in those areas outside the cooling unit and also the air supply line are at least partially rinsed and cleaned. This is necessary mainly since during the frothing up of milk, especially at high temperatures, the milk foam can also expand in the direction of the air supply line, so that changed conditions arise in this air supply line which interfere with an exactly metered air supply. Furthermore, a check valve arranged in the air supply line and in contact with milk or respectively milk foam can be prevented in an advantageous way from being contaminated and adversely affected in its functional capacity.

The said valve, via which the air supply line can be connected to the rinsing system and charged with rinsing and/or cleaning fluid, is arranged a considerable distance from the introduction point of the air supply line into the milk suction line, so that it can be ensured that the section of the air supply line in which milk foam could penetrate is rinsed by the rinsing fluid. Preferably, the valve is disposed at a higher level with respect to the introduction point, so that the rinsing fluid also flows by gravity into the sections to be cleaned.

The integrated rinsing system can use as rinsing and/or cleaning fluid any medium in fluid form that is suitable for cleaning thoroughly the elements coming into contact with milk or milk foam, including the air supply line. Alternatively, cleaning or rinsing with a gaseous medium is also possible. Rinsing with cold or heated water or a solution with chemical additive and further rinsing is particular suitable. In addition to drying with an opened air inlet and activated pump, steam or compressed air can also be used in order to achieve complete drying of the elements and lines.

A method according to the invention for rinsing the device for the preparation of liquid, in particular milk, with an integrated rinsing system provides that for a rinsing operation a rinsing fluid can be supplied via a rinsing line, whereby the rinsing fluid is conveyed to the heating element designed as a continuous-flow heater, in particular as a thick film heater, at least partially via the milk suction line of the pump and to the outlet line, whereby rinsing fluid is also conducted to the air supply line via a valve and said air supply line is rinsed.

The cleaning or rinsing operation can be triggered by a time control, whereby after each dispensing of prepared milk to the outlet or after a predetermined number of dispensing actions rinsing is activated automatically. The rinsing operation can be controlled by means of a control system, whereby sensors are arranged which capture data with respect to filling the system and with respect to the type of filling and transmit them to the control system. Assigned to the rinsing system is the rinsing valve in the milk suction line and the said valve in the air supply line, which can be optionally switched, on the one hand in order to conduct the rinsing fluid via the milk suction line from a cooling unit and on the other hand the rinsing fluid via the air supply line. Simultaneous rinsing is also possible. The rinsing is also possible in reverse direction. With rinsing after each dispensing of prepared milk, rinsing fluid is located in the device according to the invention at the start of the milk foam preparation. The device according to the invention is thereby filled with rinsing fluid, preferably water, from the outlet, i.e. in a section between the manifold valve and outlet or outlet nozzle for milk or milk foam up to the border to the cooled region. With a closed manifold valve, the water remains in the section between this valve and the outlet and blocks this for the subsequent running of e.g. milk or milk foam. For discharging the rinsing fluid, the manifold valve provided in the outlet line opens and the water or rinsing fluid can be led out into a container or a nozzle. At the same time the pump is started and the air volume controller is opened. At the time point when the suctioned milk or milk foam reaches the manifold valve, this can be detected via correspondingly placed sensors, or with a time delay, this valve is switched in such a way that prepared milk or milk foam is conducted to the outlet. Water which was present in the section between manifold valve and outlet is likewise pressed in the direction of the outlet. However, this quantity is so minimal that the water does not adversely affect the milk or milk foam for the beverage to be produced. If the end of the dispensing of prepared milk is detected, the said valve opens, via which the air supply line can be connected to the rinsing system and rinsing fluid is supplied. Due to the pressure of the supplied rinsing fluid, the first check valve opens and the second check valve closes the section in the direction of the air volume controller and the third check valve closes the milk suction line, whereby the suction pressure of the pump is compensated. Preferably, the rinsing fluid, has a pressure of at least 1, preferably 2 bar. With a time delay, preferably in the range of about 0.5 sec, the air volume controller is brought into a closing position. If the rinsing fluid reaches the manifold valve, this valve opens, in order

to discharge the rinsing fluid. With the rinsing or cleaning operation, the components of the device according to the invention between the manifold valve on the outlet side and the said valve are rinsed. Alternatively, the section between the manifold valve and outlet can be rinsed cyclically.

In the device according to the invention with integrated rinsing system the heating element designed as a thick film heater can be used advantageously. Since between two milk or milk foam dispensing actions the thick film heater conceived as continuous-flow heater is filled with rinsing fluid, e.g. water, the latter can be heated with high energy without the subsequently flowing milk foam being affected. The result is thus short heating up periods.

Brief description of the drawings

An exemplary embodiment of the invention is explained in more detail in the following with reference to the drawing. In the latter:

Figure 1 shows schematically a device according to the invention for the preparation of a liquid foodstuff, in particular milk, with an integrated rinsing system.

Detailed description of preferred embodiments

The device 1 according to the invention shown in Figure 1 for the preparation of a liquid, in particular milk, comprises milk of one type stored in a first reservoir 12 and milk of another type or respectively milk substitute in a second reservoir 14. The first and second reservoirs 12, 14 are connected in the exemplary embodiment shown to a milk suction line 16 with a suction side of a pump 18 via a 3/2 directional control valve 15, so that milk or milk substitute can be taken from the first and/or second reservoir 12, 14. Disposed in the milk suction line 16 is a check valve, designated as third check valve 20, which opens in direction of the pump 18. The pump 18 is connected on its pressure side via a single outlet line 22 to an outlet 24, at which prepared milk or milk foam can be delivered. Disposed in the outlet line 22 before the outlet 24 is a manifold valve 23, so that optionally flow is opened in direction of outlet 24 via a line 27 or flow is opened in direction of a nozzle 25.

On the suction side of the pump 18 an air supply line 26, in which an air volume controller 28 is provided, opens into the milk suction line 16. The air volume controller 28 can be designed as a proportional valve, so that air is supplied in a precisely

metered way from the environment. In particular, the air can be obtained from a cooling unit 10 and thus has a constant temperature independent of the ambient temperature. The milk can be mixed with a metered amount of air via the air supply line 26, whereby a milk/air mixture is formed which is suctioned by the pump 18. In the air supply line 26 first and second check valves 30, 32 are arranged, which will be described in more detail.

On the pressure side of the pump 18 on the outlet line 22 a heating element 34 designed as continuous-flow heater is arranged. The heating element 34 is designed as thick film heater, an electrical heating resistor being installed on the heating element 34 on a support, on which a flow pathway is provided. When flowing along the flow pathway, with activated heating element 34, the liquid, i.e. milk or a milk/air mixture, is brought to a predetermined temperature, which can be controlled by means of a temperature sensor (not shown). With a switched-on heating element 34, warm or hot milk and/or milk foam can be produced; with a switched-off heating element 34 cold milk or milk foam can be conducted to the outlet 24. This is possible in particular by means of the thick film heater with its fast reaction time and minimal waste heat.

Furthermore, in Figure 1 in the outlet line 22 downstream of the heating element 34 a restrictor 36 is arranged, which produces from the already present, possibly heated, milk/air mixture a stable and homogeneous milk foam. The restrictor 36 can be designed as a nozzle, baffle, fixed or adjustable nozzle, whereby a narrowing of the through flow cross-sectional area is provided at a restriction point. In particular, the restrictor 36 can be designed as a throttle adjustable by a control unit (not shown) or another device. The restrictor 36 produces a counter pressure, which also makes itself noticeable in the flow pathway in the heating element 34. Expansion, tending to increase with higher temperature, and thus air bubbles growing larger in the milk foam are counteracted accordingly. Smaller air bubbles in a milk/air mixture facilitate the heating of this mixture, which otherwise is negatively influenced by air as a poor thermal conductor.

An adjustable restrictor 36, in addition to a precisely metered air quantity and the adjustable temperature, enables an optimal mixing of air and milk into a milk/air mixture and a dispersion of small air bubbles in the mixture which means a high foam quality.

The device 1 for the preparation of liquid can be integrated into a housing as a module, which is able to be incorporated in the cooing unit 10. Virtually all components of the device 1 according to the invention can be incorporated in the cooling unit 10,

whereby the cooling unit 10 can be designed as an add-on device for a coffee machine or also as an integrated component of a coffee machine.

Furthermore, the device 1 according to the invention comprises an integrated rinsing system for rinsing or cleaning the elements included in the device 1 according to the invention. By means of a rinsing valve 40, the milk suction line 16 can be connected to the rinsing system, in particular connected to a rinsing line 42. Thus the milk-conducting elements, for example the milk suction line 16, the pump 18, the heating element 34, the restrictor 36 and the outlet line 22 including the line 27 all the way to the outlet 24 and the outlet 24 itself can be charged with the rinsing fluid, whereby on opening the rinsing valve 40 the third check valve 20 unblocks the milk suction line 16. The third check valve 20 can thereby open at a pressure of rinsing fluid of at least 1 bar. In contrast to known cleaning or rinsing systems for devices for producing milk foam, the integrated rinsing system according to the invention ensures that the cooled regions are also sufficiently rinsed in which the formation of lactic acid and casein is only minimal due to the low temperatures.

Now it is essential that the air supply line 26 is also rinsed with the integrated rinsing system according to the invention. For this purpose, this line can be connected via a valve 44 to the rinsing line 42 and thus to a source for rinsing fluid. Accordingly it is possible at any time to rinse or clean not only the line sections exposed to milk but also the air supply line 26. The rinsing line 42 has a section in which the valve 44 is arranged, and which opens in the air supply line 26 between the first check valve 30 and the second check valve 32. During the charging of the rinsing line 42 with rinsing fluid, the second check valve 32 is in a closed position, while the first check valve 30 is opened.

As shown in Figure 1, it is of particular significance that the air supply line 26 with the air volume controller 28, the second check valve 32 and the first check valve 30 are oriented in a vertical configuration. It is thus possible to design the first and the second check valves 30, 32 as directly closing check valves, which due to the vertical alignment with respect to the air supply are relieved by the force of gravity acting on a closing element. Accordingly rinsing or cleaning of the air supply line 26 is then also possible when the negative pressure generated by the pump 18 in the air supply line 26 alone would not be sufficient to open the first check valve 30.

In summary, the device 1 according to the invention for the preparation of liquid, in particular milk, with integrated rinsing system has the advantage that an improvement

in the hygienic and sensory conditions can be achieved by rinsing or cleaning the air supply line 26 and by the vertical configuration of directly closing check valves 30, 32 in the air supply line 26 and the air supply can be supplied in a precisely metered way. In particular, this is achieved without additional effort since the air supply line 26 can be rinsed and cleaned in the same rinsing cycle as the elements charged with milk.

Patentkrav

1. Indretning (1) til behandling af en væske, især mælk, med integreret skyllesystem, omfattende

- mindst et reservoir (12, 14) til opbevaring af væsken, indrettet i en køleanordning (10);
- en pumpe (18);
- et ledningssystem, omfattende
  - -- en mælkesugeledning (16), via hvilken det mindst ene reservoir (12, 14) er forbundet med pumpen (18),
  - -- en udløbsledning (22), via hvilken pumpen (18) kan forbindes med mindst et udløb (24), og
  - -- en skylleledning (42), via hvilken der kan tilføres en skyllevæske til mælkesugeledningen (16),
- en luftvolumenregulator (28), ved hjælp af hvilken luft via en lufttilførselsledning (26) på en afmålt måde kan ledes til et indløbspunkt i mælkesugeledningen (16), og
- et varmeelement (34) udformet som en gennemstrømningsvandvarmer, som er anbragt i udløbsledningen (22) og udformet som en tykfilmvarmer

kendetegnet ved, at

der i lufttilførselsledningen (26) mellem luftvolumenregulatoren (28) og indløbspunktet i mælkesugeledningen (16) er anbragt en anden kontraventil (32) og en første kontraventil (30), hvor den første kontraventil (30) og den anden kontraventil (32) er udformet som direkte lukkende kontraventiler, og lufttilførselsledningen (26) kan forbindes mellem den første kontraventil (30) og den anden kontraventil (32) til skylleledningen (42) via en ventil (44).

2. Indretning (1) ifølge krav 1, **kendetegnet ved, at** luftvolumenregulatoren (28) omfattet i lufttilførselsledningen (26), den anden kontraventil (32) og den første kontraventil (30) er placeret over hinanden i en lodret konfiguration.

3. Indretning (1) ifølge et af de foregående krav, **kendetegnet ved, at** luftvolumenregulatoren (28) er indstillet til at tilføre luft fra køleanordningen (10) på en afmålt måde.

4. Indretning (1) ifølge et af de foregående krav, **kendetegnet ved, at** skylleledningen (42) kan forbindes med mælkesugeledningen (16) uden for køleanordningen (10) via en skylleventil (40).

5. Indretning (1) ifølge et af de foregående krav, **kendetegnet ved, at** en drosselanordning (36) er anbragt i udløbsledningen (22) nedstrøms for pumpen (18).

6. Indretning (1) ifølge et af de foregående krav, **kendetegnet ved, at** der i udløbsledningen (22) er anbragt en flervejsventil (23), som selektivt forbinder udløbsledningen (22) med et afløb (25) til udledning af skyllevæske og udløbet (24), ved hvilken en behandlet væske kan udleveres.

7. Indretning (1) ifølge et af de foregående krav, **kendetegnet ved, at** en ledning (27) mellem flervejsventilen (23) og udløbet (24) har et påfyldningsvolumen på 2 ml til 3 ml.

8. Fremgangsmåde til skylning af en indretning (1) til behandling af en væske, især mælk, med et integreret skyllesystem ifølge et af kravene 1 til 7, **kendetegnet ved, at** der kan tilføres en skyllevæske til en skylleproces via en skylleledning (42), hvor skyllevæsken mindst delvist tilføres via mælkesugeledningen (16), pumpen (18), varmeelementet (34) udformet som en gennemstrømningsvandvarmer og udløbsledningen (22), hvor lufttilførselsledningen (26) også forsynes med skyllevæske via en ventil (44) og skylles.

9. Fremgangsmåde ifølge krav 8, **kendetegnet ved, at** en skylleproces finder sted efter hver udlevering af behandlet væske til og med udløbet (24).

10. Fremgangsmåde ifølge krav 8 eller 9, **kendetegnet ved, at** under en skylleproces skylles mælkesugeledningen (16), lufttilførselsledningen (26) og udløbsledningen (22) i det mindste delvist på samme tid.

11. Fremgangsmåde ifølge et af kravene 8 til 10, **kendetegnet ved, at** under en skylleproces åbnes flervejsventilen (23) i udløbsledningen (22) mindst

midlertidigt, således at udløbsledningen og ledningen (27) er fyldt med skyllevæske til udløbet (24).

12. Fremgangsmåde ifølge et af kravene 8 til 11, **kendetegnet ved, at** før hver udlevering af behandlet væske ved udløbet (24) er indretningen (1) fra skylleventilen (40) og ventilen (44) til udløbet (24) fyldt med skyllevæske, hvor ved starten af en udlevering åbnes flervejsventilen (23) for at lede skyllevæsken ud af indretningen (1) via afløbet (25) og lukkes derefter, når den behandlede væske når flervejsventilen (23).

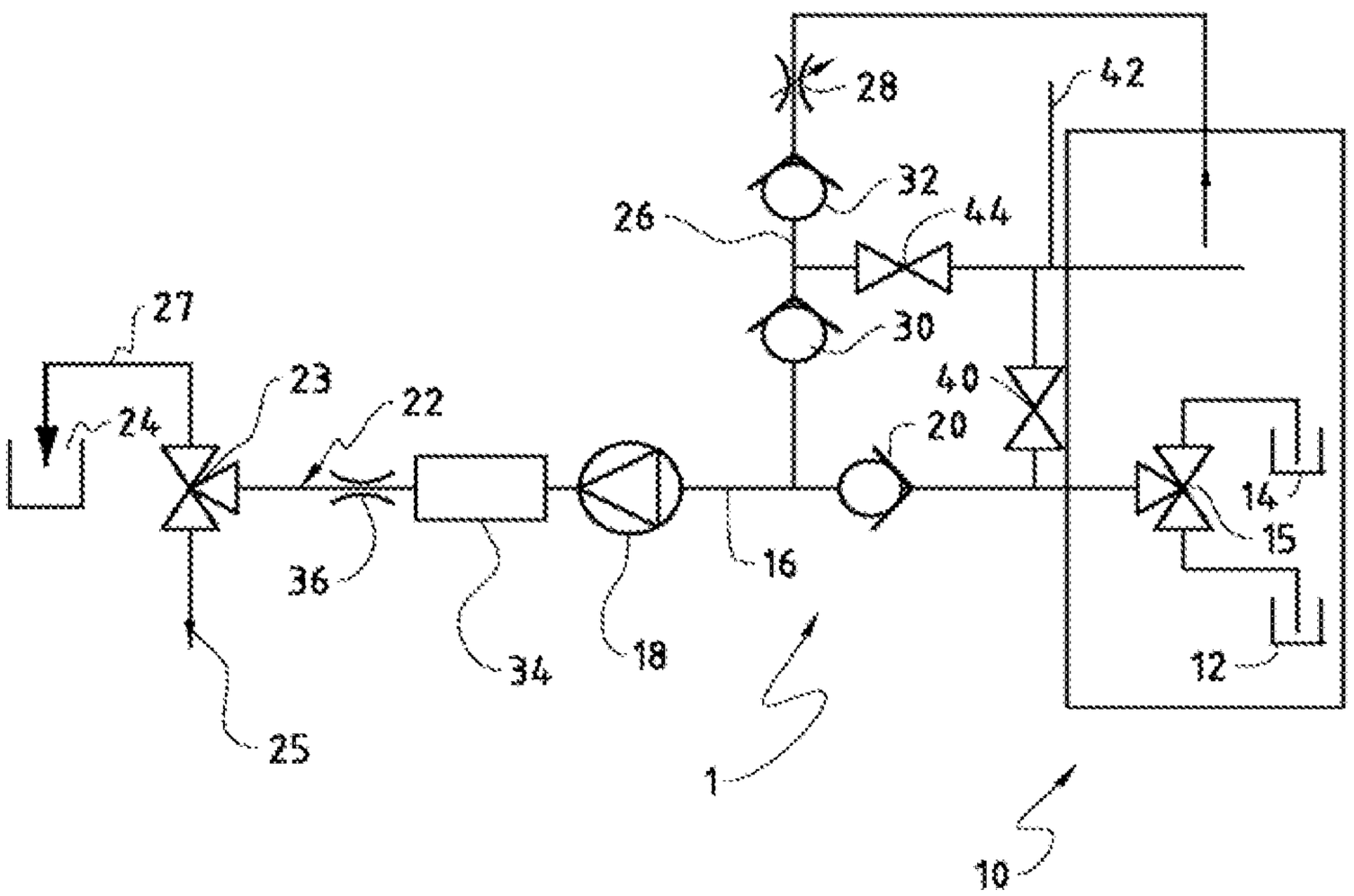

FIG. 1