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(54) Cleaning apparatus for plants of delivery of liquid or pasty foodstuff products

(57) An apparatus is described for cleaning a plant for the delivery of liquid or pasty products, which comprises an instant steam generator (6) and a pressure reducer (1) set along the supply pipe (3) of the water upstream of the instant steam generator (6).

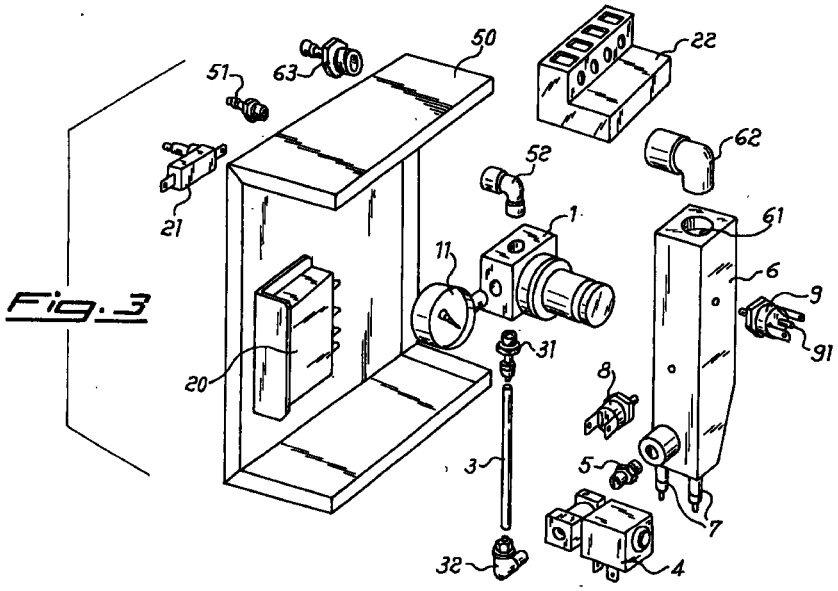

Fig. 3

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Description

[0001] The present invention relates to an apparatus for effecting the cleaning of plants for the delivery of liquid or pasty food products, products that may include drinks, ice creams, creams or the like that are delivered through a suitable delivery tap.

[0002] A similar device is already known from the European Patent n°. EP-B1-0245641, in which a machine intended for the delivery of food products is described, to which is associated an apparatus that allows the sterilisation and the washing of the delivery tap to be effected.

[0003] The apparatus described in the cited European Patent comprises a boiler for the production of hot water or steam which is then transferred to the delivery tap of the food products under the control of a timer, which controls the cycle of operation of the apparatus at pre-set times. There are particular safety devices used to control the correct operation of the apparatus that have the purpose of interrupting the operation of the boiler in case the labyrinth of tubes in the boiler is obstructed at any point, for instance by the formation of calcium deposits or other types of scalings.

[0004] One of the main drawbacks of a similar device is due to the particular complexity of the safety systems that must be provided in order to prevent breakdowns or, still worse, situations of danger due to the excess of pressure that could develop inside the boiler. The safety and control systems comprise in this case at least one flow rate regulator connected to the water supply pipe and at least one pressure switch arranged between the metering solenoid valve and the boiler. The pressure switch has the function of interrupting the operation of the boiler in case a particularly high pressure is reached between the metering solenoid valve, which closes after admitting a predetermined quantity of water, and the boiler.

[0005] Besides having a high cost, a similar system has also shown itself lacking the necessary reliability demanded by operators in the sector. For instance, since the cycle of cleaning and sterilisation is normally effected in the operator's absence during normal closing hours of premises, the occurrence of a slight obstruction in the tubes of the boiler doesn't cause any damage, thanks to the complex safety system, but effectively prevents efficient cleaning and sterilisation of the delivery tap. This fact may not be readily immediately noticed by the operator, who continues to enable the timed operation of the apparatus without becoming effectively aware that the cycle of cleaning and sterilisation has not been completed or hasn't been effected at all.

[0006] The object of the present invention is to produce an apparatus for cleaning plants for food product delivery that is particularly simple to construct, that has particularly limited costs and dimensions, and that could be easily integrated into new plants, as well as into existing plants.

[0007] Another object of the present invention is to produce an apparatus of the type described above that is particularly reliable and that requires limited maintenance.

[0008] These objects are achieved by the present invention which relates to an apparatus for cleaning a plant for the delivery of a liquid or a pasty product, the plant comprising at least one delivery tap for one or more products, the apparatus further comprising at least one water supply pipe for water drawn from a supply source, at least one steam generator device fed with water from the supply pipe, means for controlling the production of steam in the steam generator device, at least one conduit to convey the steam to at least one delivery tap of the plant and means for timing the operation of the apparatus, characterised in that the device for the generation of steam is an instantaneous generator of steam and that the means for controlling the generation of steam comprises a pressure reducer located along the supply pipe upstream of the steam generator.

[0009] The combination of a simple pressure reducer with an instant steam generator eliminates the need for all the safety devices used in the apparatuses of known type. In fact, an instant steam generator comprises in practice a single straight pipe having a particularly large section, in which entering water is brought quickly to such a temperature as to change it completely into steam before if reaches the other end of the generator. There can't, therefore, be any problem of obstruction in the single duct. Therefore, using a metering solenoid valve controlled in the way already known from the cited European Patent, it is sufficient to maintain constant the supply pressure of the water upstream of the boiler, using for that purpose an appropriately set pressure reducer, to obtain particularly reliable operation from the apparatus.

[0010] The pressure reducer upstream of the instant steam generator is set up to deliver water at a pressure between about 0.5 and 2 bar and, preferably, at a pressure of about 1.5 bar.

[0011] The apparatus is provided with a metering solenoid valve located along the supply pipe between the pressure reducer and the instant steam generator. In this way, knowing the pressure set at the pressure reducer, it is possible to set up the opening and closing cycles of the metering solenoid valve to establish the quantity of water arriving at the instant steam generator and therefore the quantity of steam necessary to achieve an effective cleaning and/or sterilisation of the delivery tap.

[0012] It is possible, if necessary, to insert on anti-calcium filter located along the supply pipe between the pressure reducer and the metering solenoid valve. This prevents possible formation of calcareous deposits in the circuit, above all in correspondence of the metering solenoid valve and in the connecting pipe to the instant steam generator in case the apparatus is used with par-

ticularly hard water.

[0013] The present invention will now be described, by way of example and without limiting purposes, with reference to an embodiment illustrated in the attached drawings, in which:

- Figure 1 illustrates the hydraulic circuit of the apparatus according to the present invention;
- Figure 2 illustrates the electrical circuit of the apparatus according to the present invention; and
- Figure 3 is an exploded perspective view of some elements of the apparatus according to the present invention.

[0014] With reference to the hydraulic circuit shown in Figure 1, it should be noticed that the apparatus according to the present invention comprises essentially a pressure regulator 1 to which water deriving from the water pipe network is delivered through a supply pipe 2.

[0015] The water leaving pressure reducer 1 is taken through a pipe 3 to a metering solenoid valve 4, if necessary interposing an anti-calcium filter 40 (here shown with broken line) that prevents the possible deposit of scalings, above all in pipe 3 and in solenoid valve 4.

[0016] The water leaving the solenoid valve 4 is taken by means of a pipe 5 to an instant steam generator 6, which delivers steam to an exit duct 10 that will carry it directly to one or more taps of the food product delivery plant (not shown).

[0017] Steam generator 6 is equipped in particular with a heating element 7 and a pair of temperature-sensitive devices 8 and 9 that will be described in more detail below.

[0018] The electric circuit of the apparatus shown in Figure 2 comprises a control circuit 20 that acts on the solenoid valve 4 to regulate the cycle of cleaning and sterilisation. In particular, circuit 20 comprises a timer which activates the solenoid valve 4 for a predetermined period with a series of opening and closing cycles (ON and OFF states). Maintaining the pressure upstream of solenoid valve 4 constant, it is thus possible to dose the quantity of water to be transformed into steam with high precision. Knowing that the period of the pulsating signal controlling the solenoid valve is pre-set generally to one second, it is possible to regulate the quantity of water fed to the steam generator on the basis of the number of ON states of the solenoid valve that occur for the whole duration of the cleaning cycle.

[0019] The supply to heating element 7 of steam generator 6, as well as being subject to control circuit 20, is also subjected to the control of temperature-sensitive devices 8 and 9. Device 8 consists preferably of a normally-open thermostat that closes the electric circuit to which if is connected when temperature exceeds a pre-set threshold, for instance between 120 °C and 130 °C. Device 9, on the other hand, consists preferably of a normally closed thermostat, provided with a reset switch, that opens the circuit to which it is connected when the temperature exceeds a pre-set threshold, for instance between 160 °C and 170 °C.

[0020] The activation of the apparatus can be effected manually by means of a button 21 each time it is deemed necessary, or can be regulated by a programmable timer 22 that daily activates the cycle of cleaning and sterilisation during the closing hours of the place in which the delivery plant is installed.

[0021] As it is evident from Figure 3, the apparatus is housed in a cabinet 50 that can be mounted on the delivery plant which is to be cleaned, or it can be an integral part of the same plant. The cabinet 50 comprises one or more detachable cover panels (not shown) to allow access to the inside.

[0022] Switch 21 is shown for clarity as located on the outside of chassis 50, but it is preferably located inside cabinet 50 with only the button itself accessible from the outside.

[0023] The water inlet consists of a suitable pipe (not shown) attached to a link for flexible pipes 51 that protrudes from cabinet 50. The water supply circuit continues via a union elbow 52 connected in turn to pressure reducer 1, the latter provided with a manometer 11 that indicates the pressure setting. Pressure reducer 1 allows the pressure to be maintained between about 0.5 and 2 bar, and is preferably maintained at about 1.5 bar.

[0024] The outlet of pressure reducer 1 is connected to the entry of metering solenoid valve 4 by means of a duct 3 and a pair of pipe fittings 31 and 32 respectively. The connection between the outlet of the metering solenoid valve 4 and the inlet of steam generator 6 is via linking pipe 5.

[0025] In the body of steam generator 6 are housed heating element 7 and two temperature-sensitive devices 8 and 9 already described above. Device 9 is preferably provided with a RESET button 91 that allows its re-activation in the case where the temperature inside steam generator 6 has exceeded a pre-set safety threshold.

[0026] Outlet aperture 61 of steam generator 6 receives a union elbow 62 that is connected to pipe fitting 63 for flexible pipes. To this pipe fitting 63, protruding outside cabinet 50, is connected a pipe (not shown) that carries the steam to one or more taps of the drinks delivery plant.

[0027] Inside cabinet 50 are further housed control circuit 20 and all the electric wiring (not shown) between the various components of the apparatus, as well as any timer 22 and any anti-calcium filter 40 (not shown in Figure 3). The filter could, for instance, be inserted directly in place of duct 3 or inserted along the same duct, or yet again between pipe fitting 32 and the metering solenoid valve.

Claims

1. Apparatus for cleaning a plant for the delivery of a liquid or a pasty product, said plant comprising at least one delivery tap for one or more of said products, the apparatus further comprising at least one water supply pipe for water drawn from a supply source, at least one steam generator device fed with water from said supply pipe, means for controlling the production of steam in said steam generator device, at least one conduit to convey said steam to said at least one delivery tap of said plant and means for timing the operation of the apparatus, characterised in that said device for the generation of steam is an instantaneous generator of steam and that said means for controlling the generation of steam comprises a pressure reducer located along said supply pipe upstream of said generator of steam.

2. Apparatus according to Claim 1, characterised in that said pressure reducer is set up to deliver water to said instant steam generator at a pressure between about 0.5 and 2 bar.

3. Apparatus according to Claim 2, characterised in that said pressure reducer is set up to deliver water to said instant steam generator at a pressure of about 1.5 bar.

4. Apparatus according to Claim 1, characterised in that said means for controlling the generation of steam comprises at least one metering solenoid valve located along said supply conduit between said pressure reducer and said instant steam generator.

5. Apparatus according to Claim 1, characterised in that it comprises at least one sensor for detecting the temperature in said instant steam generator.

6. Apparatus according to Claim 1, characterised in that it comprises at least one thermostat to interrupt the power supply to the heating element enclosed of said instant steam generator in case a pre-set temperature is exceeded.

7. Apparatus according to Claim 1, characterised in that it comprises at least one anti-calcium filter disposed along said supply conduit between said pressure reducer and said solenoid valve.

Fig.1

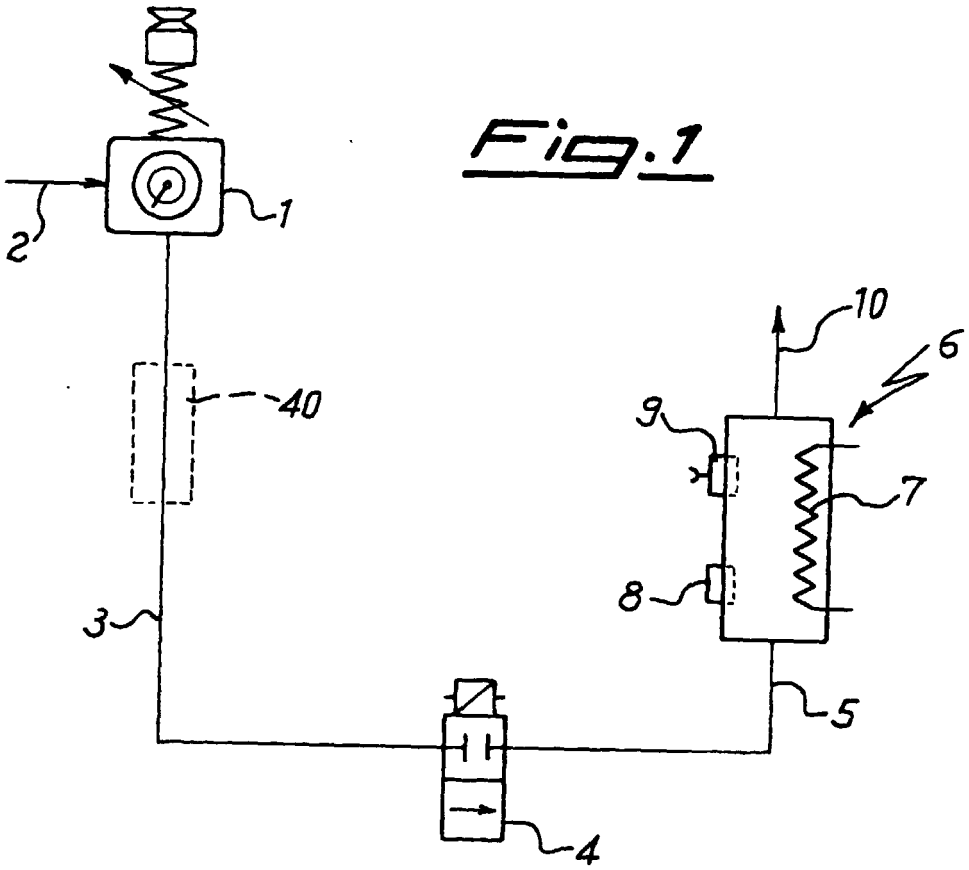
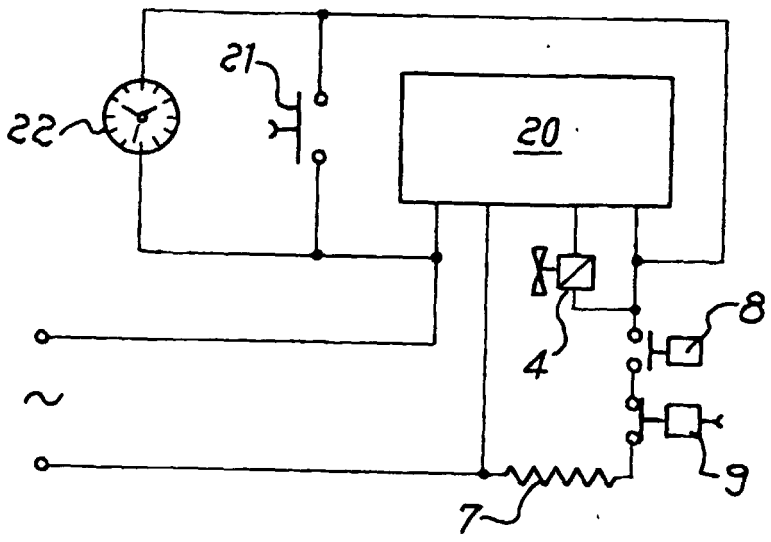


Fig.2



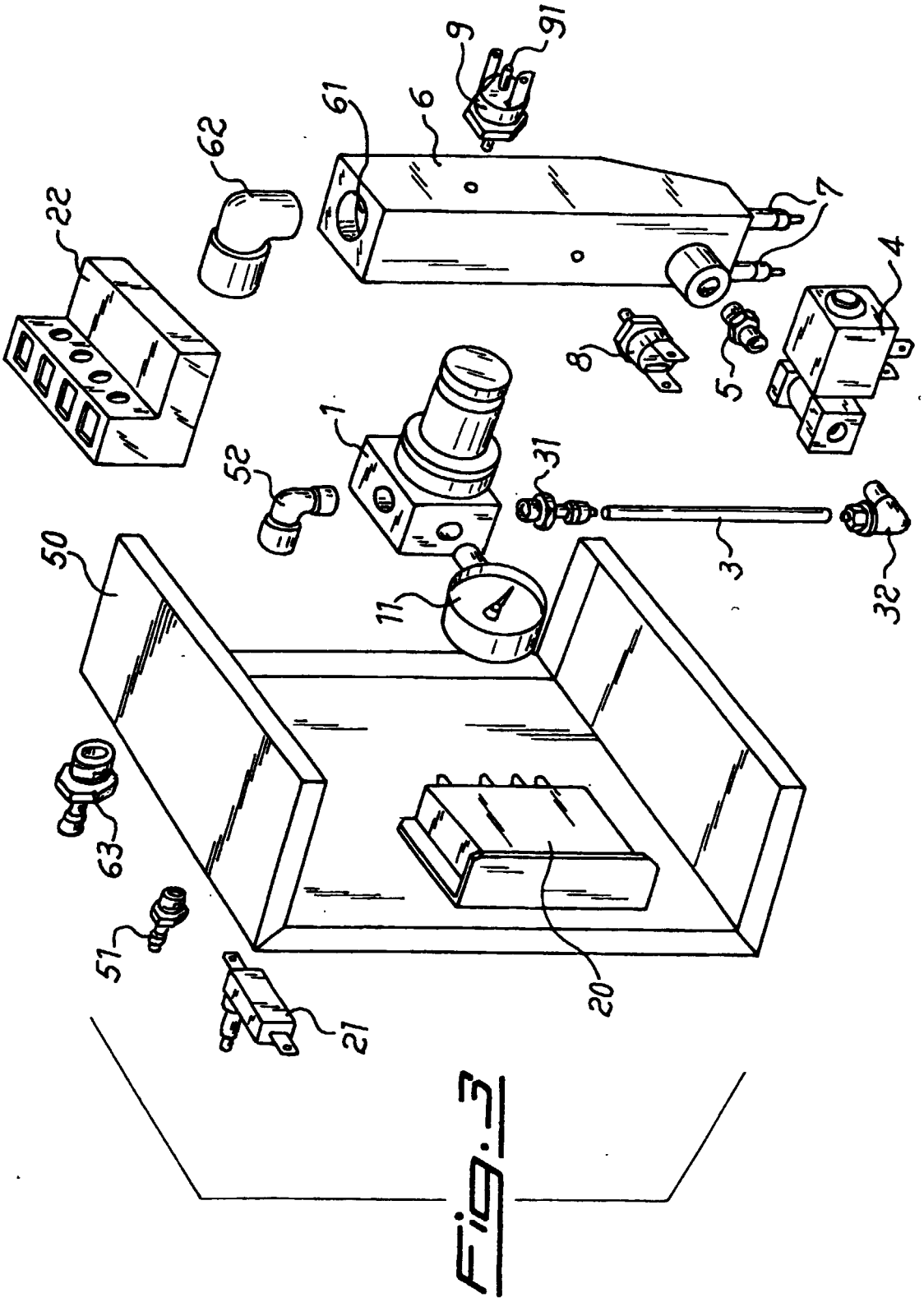


Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0388

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 November 1999	Van der Zee, W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 83 0388

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