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EUROPEAN PATENT APPLICATION

21 Application number: 85830306.8

51 Int. Cl.⁴: D 06 F 39/02

22 Date of filing: 17.12.85

30 Priority: 28.03.85 IT 2013385

43 Date of publication of application:
08.10.86 Bulletin 86/41

84 Designated Contracting States:
AT BE CH DE FR GB LI NL SE

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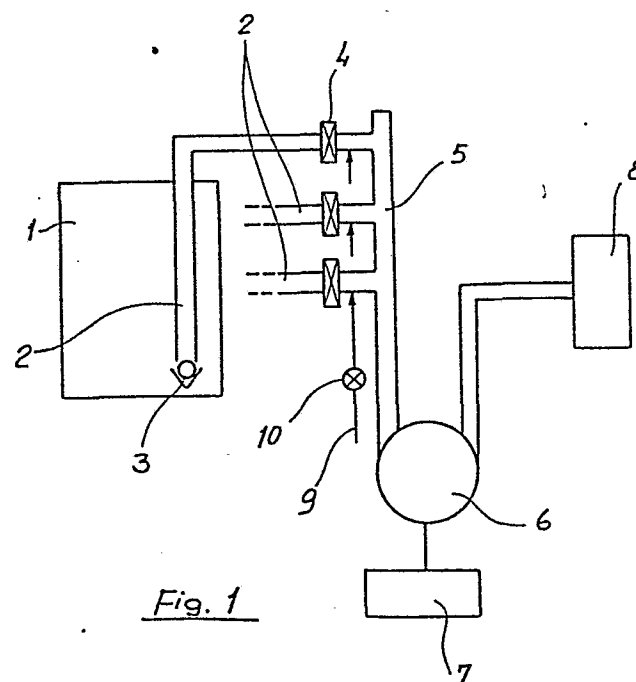
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54 A device for delivering metered quantities of liquid products to a utiliser.

57 A device for delivering metered quantities of liquid products to a utiliser (8) comprises a plunger-type pump (6) and a pump control means (7) including a programmable memory of any type, such as a memory card by means of which the number of strokes of the plunger of the pump (6) and consequently the quantity of liquid delivered thereby can be determined.

The pump (6) is connected at its suction side to a plurality of liquid containers (1) by a network of pipes (2) each having a controllable valve (4) the opening and closing of which can be controlled by the pump control means (7) in dependence on the programme stored in the programmable memory.

A typical utiliser (8) for such device is an industrial washing machine which can thus receive metered quantities of liquid detergents and other additives in place of powders used conventionally without recourse to liquid metering devices of other type and greater complexity.



- 1 -

"A device for delivering metered quantities of liquid products to a utiliser"

5 The present invention relates to a device for dispensing metered quantities of liquid products to a utiliser, such as an industrial washing machine, and particularly to a device having programmable memory means for metering the operation of the device via suitable control means.

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In industrial laundry the problem of correctly supplying detergent and specific additives to the various machines in operation is particularly important. Conventionally, such products are used in powder form because of the excessive complexity of liquid metering devices currently available on the market.

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The present invention seeks therefore to provide a device for metering liquid products, which can be preliminarily programmed.

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According to the present invention, therefore, there is provided a device for delivering metered quantities of liquid products to a utiliser, characterised by the fact that it comprises, a plurality of containers for the said liquid products, a single plunger-type pump of adjustable

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- 2 -

capacity and programmable memory means for controlling the operation of the pump whereby to determine the quantity of liquid dispensed by the pump by controlling the number of strokes performed by
5 the pump plunger in accordance with the programme stored in the memory means whereby to dispense a metered quantity of the liquid products.

10 A particular feature of the present invention is that it provides a device for metering liquid products, which can be made structurally simple and of great reliability. Another feature of the present invention is that it provides a device for metering liquid products, which is able to with-
15 draw, individually and in pre-arranged quantities, specific liquid products selected from a plurality of containers.

20 One embodiment of the present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, the single Figure of which is a schematic diagram illustrating the embodiment of the invention.

25 Referring now to the drawing, there is shown a device for metering liquid products from a plurality of containers 1, only one of which is shown in the drawings, each container holding a specific different liquid detergent or liquid additive.
30 A respective dip tube 2 enters each container 1 and each dip tube 1 is provided with a non-return valve 3 at its lowermost end.

The various dip tubes 2 are connected by means of

- 3 -

a corresponding number of pneumatic valves 4 to a manifold 5 which leads to a volumetric plunger pump 6, the operation of which is controlled by a computer 7. This pump, by performing a number of strokes
5 determined by a programme in the computer, meters the liquid product required and sends it to the washing machine 8.

Between the pneumatic valves 4 and the manifold 5
10 there is connected a respective pipe 9 flow through which is controlled by a solenoid valve 10 for the introduction of mains water for rinsing purposes.

The scheme of operation of the metering device of
15 the invention can be summarised by the following features:

- . For each laundry, the various different possible types of washing and associated metering programmes (quantity of various products and/or
20 liquid additives) are defined;
- . each metering programme is entered into a programme storage device, such as a programme card, by means of a computer;
- . the programme storage device is introduced
25 into the processor;
- . for each type of washing the associated metering programme that, is the said associated programme card, is selected by means of a selector.

30 When, as directed by the washing programme card, the washing machine requires the introduction of a certain product or liquid additive, the pump is controlled to draw in the quantity of the corresponding product memorised on the programme card

- 4 -

chosen by the selector, and this is then introduced into the machine. Then, when the metering of a product is completed the pump, the intake manifold and the delivery tube are all rinsed with mains
5 water according to a programme which is likewise memorised on the programme card. These operations ensure the introduction of the whole of the required quantity of the product into the washing machine, even if it is positioned at some distance
10 tance from the metering device, and furthermore ensures that mixing of products in the pump and the tubing is entirely avoided.

Particular operating arrangements, which can be
15 adopted during washing, without altering the programme cards further permit the operator to select from the following:-

- 20 . manually increasing the quantity of any product and/or additive in dependence on particular requirements;
- . automatically and proportionately increasing or reducing all the quantities held in the memory by acting on a mechanical volume regulator on the body of the pump;
- 25 . manually cancelling the introduction of one or more products or additives;
- . performing additional rinsing of the pump and tubes with mains water.

30 It is likewise envisaged that the apparatus of the present invention will include

- . low-level alarms for the product and additive containers;

- 5 -

- . controls for rapid manual priming of the pump to restart operation in the event that any of the induction tubes from the containers becomes empty;
- 5 . alarms indicating the lack of rinsing water in the tubes and the pumps;
- . pre-selected programme monitor;
- . a counter for counting the pumping strokes performed by the pump in metering each product and/or
- 10 liquid additive;
- . an illuminable indicator lamp for indicating which product and/or additive is being introduced into the machine at any one time and, therefore, the operating stage reached by the machine at that
- 15 time.

- 6 -

Claims:

1. A device for delivering metered quantities of liquid products to a utiliser (8), characterised by the fact that it comprises a plurality of containers (1) for the said liquid products, a single plunger-type pump (6) of adjustable capacity, and programmable memory means (1) for controlling the operation of the pump whereby to determine the quantity of liquid dispensed by the pump by controlling the number of strokes performed by the pump plunger in accordance with the programme stored in the memory means whereby to dispense a metered quantity of the liquid products.

2. A metering device according to Claim 1, characterised by the fact that each of the said plurality of containers (1) contains a respective liquid detergent or liquid additive, and into each container extends a dip tube (2) provided with a unidirectional valve (3) at its inlet end: the dip tubes (2) for all the containers (1) being connected via a corresponding number of pneumatic valves (4) to a manifold (5) which leads to the intake of the pump (6).

3. A metering device according to Claim 2, characterised by the fact that there are further provided means (9, 10) for the introduction of mains water to the manifold (5), the said means comprising a tube (9) controlled by a solenoid valve (10).

4. A metering device according to any preceding Claim, characterised by the fact that it further comprises means for manually increasing the quantity of each product and/or additive dis-

- 7 -

pensed to the utiliser in dependence on particular requirements without altering the memory means.

5. A metering device according to any preceding Claim, characterised in that it further comprises means for automatically and proportionally reducing the quantities delivered without changing the value of the quantities stored in the memory means, comprising a mechanical volume regulator on the body of the pump (6).

7. A metering device according to any preceding Claim, characterised in that it further comprises means for manually cancelling the dispensing of one or more products and/or additives.

8. A metering device according to any preceding Claim, characterised in that it further comprises means for performing additional rinsing of the pump (6) and the tubes (2,5) with mains water.

9. A metering device according to any preceding Claim, characterised by the fact that it includes an alarm device for indicating when the product and/or additive in the containers reaches a threshold low level.

10. A metering device according to any preceding Claim, characterised in that it further comprises means for rapid manual priming of the pump (6) in the event of possible emptying of the supply tubes (2,5) from the containers (1).

11. A metering device according to any pre-

- 8 -

ceding Claim, characterised in that it further comprises means for indicating the absence of rinsing water in the tubes (2,5) and/or the pump (6).

5 12. A metering device according to any preceding Claim, characterised in that it further comprises means for displaying the selected programme.

10 13. A metering device according to any preceding Claim, characterised in that it further comprises means for counting the number of strokes performed by the plunger of the pump (6) for each product and/or liquid additive.

15 14. A metering device according to any preceding Claim, characterised in that it further comprises means for indicating which product and/or additive is being introduced into the utiliser machine at any one time, and, therefore, the operating phase of
20 the utiliser machine at that time.

15. A metering device according to Claim 14, characterised in that the said indicating means are illuminable warning lamps.

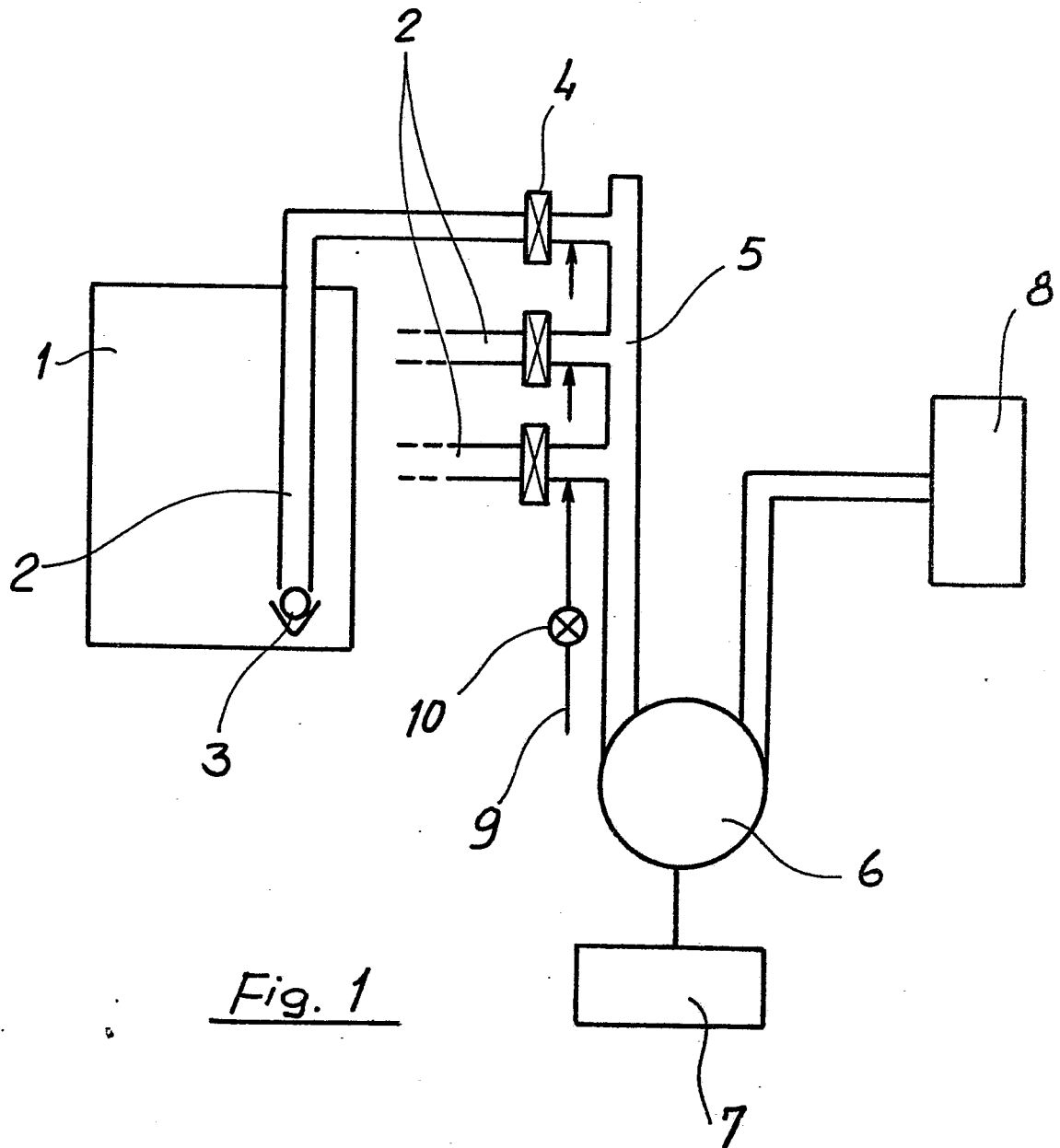


Fig. 1