



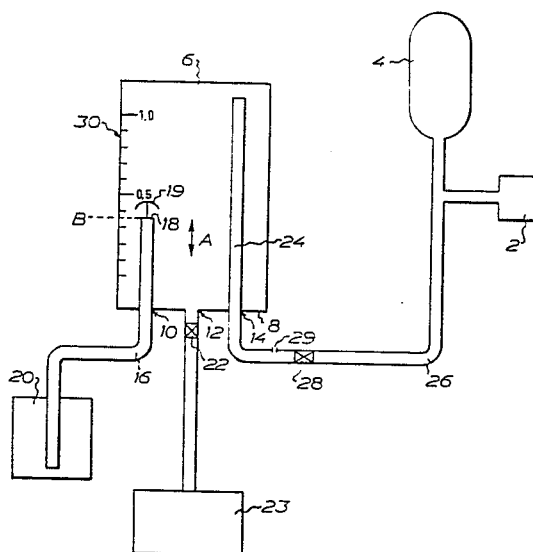
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(54) Title: METERING DEVICE

(57) Abstract

A dispensing device is used especially for dispensing a detergent in a pipeline milking plant. As known in the art, the milking plant (2) has a means (4) for producing a vacuum therein. According to the invention, the vacuum-producing means (4) is also connected, via a line (26), to a container (6) in the dispensing device, and a level-determining first pipe (16) is so adjustably arranged in the container (6) that detergent is drawn, by the vacuum produced, from a supply (20) into the container (6) where it adjusts to a level (B) corresponding to the vertical position of an opening (18) of the first pipe (16), when the vacuum is eliminated. The line (26) merges into a second pipe (24) which is extended in the container (6), passes into it from below and opens in the upper part thereof. Besides, a means (22) is provided for emptying the container (6) and for gas-tight closure thereof when no emptying is performed.



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METERING DEVICE

The present invention relates to a metering or dispensing device, especially for dispensing a detergent in
5 a pipeline milking plant comprising a vacuum-producing means.

A variety of dispensing devices based on the siphon principle or using different types of valves are previously known, e.g. from SE-C-107,028, SE-C-032,979, US-
10 A-2,652,222 and US-A-3,390,860. DK 94,063 and DK 102,155 define the state of the art of detergent-dispensing devices in pipeline milking plants.

In some pipeline milking plants, an electric pump is used for pumping detergent from a supply, either to a dispensing container or directly to an existing automatic
15 washing machine where the detergent is mixed with water. The operation of the pump is controlled in a suitable manner, e.g. by timing means. In other plants, use is made of a vacuum or negative pressure for passing detergent from
20 one container to another.

A large number of problems are linked with the use of prior art devices for dispensing exact amounts of detergent in automatic washing machines in pipeline milking plants. Only a few of these problems are touched on
25 here.

Thus, it cannot be positively ascertained that the exact amount of detergent has been pumped to the automatic washing machine. Deviations may occur, for example because the detergent supply container is empty or because the
30 pump does not operate properly.

Since usable detergents are alkaline or acid and also highly concentrated, the pump, the containers and the pipelines must be inspected frequently to ensure flawless operation, involving the risk of injuries to the attending
35 personnel because of frequent contacts with the highly concentrated detergent used.

In most cases, the milk producer, i.e. the farmer, is not authorised himself to carry out repairs on an electric pump, but must use special service personnel who, particularly on non-working days, may not be easily available,
5 which often means that the farmer will have to do the repairs himself with a consequent risk of physical injuries and/or damage to the plant.

Since the National Food Administration places severe hygienic demands on pipeline milking plants, these must be
10 cleaned at relatively short intervals. Naturally, it is of great importance that cleaning be effected in a reliable manner and with the exact amount of detergent required.

The present invention therefore aims at providing a simple, yet reliable dispensing device for detergents
15 which can be maintained/repared by the milk producer himself, without necessitating any special authorisation.

Another object of the invention is to provide a dispensing device which meters and supplies an almost constant, predeterminable amount of detergent to e.g. an
20 automatic washing machine.

Yet another object of the invention is to provide a closed system minimising the risk of physical injuries from contacts with the highly concentrated detergent.

These and other objects are achieved by means of a
25 dispensing device, especially for dispensing a detergent in a pipeline milking plant comprising means for producing a vacuum in said plant, characterised in that the vacuum-producing means is also connected, via a line, to a container, that a level-determining first pipe is so adjust-
30 ably arranged in the container that the detergent, by the vacuum produced, is drawn from a supply into the container where it adjusts to a level corresponding to the vertical position of an opening of the first pipe, when said vacuum is eliminated, that said line merges into a second pipe
35 which is extended in the container, passes into it from below and opens in the upper part thereof, and that means

is provided for emptying the container and for gas-tight closure thereof when no emptying is carried out.

The accompanying drawing illustrates an embodiment of a dispensing device according to the invention, especially
5 for dispensing a detergent in a pipeline milking plant. This embodiment will be described in more detail hereinbelow with reference to the sole Figure schematically showing the dispensing device of the invention.

The drawing shows a dispensing device, especially for
10 dispensing a detergent in a pipeline milking plant 2. The plant 2 has a means 4 for creating a vacuum in the plant 2 to allow automated milking of cows.

The dispensing device according to the invention comprises, in the embodiment illustrated in the drawing, a
15 container 6, preferably of a dimensionally stable material, in which a vacuum can be created. The bottom 8 of the container has three openings 10, 12, 14.

Through the first opening 10 extends a level-determining first pipe. The pipe 16 has an opening 18 whose
20 vertical position in the container 6 is adjustable, as indicated by a double arrow A in the drawing. The first pipe 16 is connected to a sealingly closable supply vessel or tank 20 for the detergent.

The second opening 12 is connected to a drain/valve
25 means 22 for emptying the contents of the container 6, e.g. into an automatic washing machine 23 for mixing with water, and for gas-tight closure of the container when no emptying is being effected. In this embodiment, this is achieved by means of a hose clip (not shown). The second
30 opening 12 suitably is at the lowermost level of the container bottom 8 to allow self-draining of the container by the force of gravity acting on the contents of the container.

Through the third opening 14 extends a second pipe
35 24 extended in the container 6 and opening at the upper part thereof. The second pipe 24 is connected by a line 26 to the vacuum-producing means 4.

The line 26 accommodates a valve 28 which should be closed when the pipeline milking plant is in operation.

In order to measure out a certain quantity of detergent, the first step suitably is to set the opening 18 of the level-determining first pipe at the desired vertical level. In the drawing, this level is designated B. To assist in accurately setting the vertical position of the pipe opening 18, use is made of a volume-indicating scale 30, e.g. graduated with figures.

10 When the vacuum-producing means 4 is activated and the valve 28 is moved to working position, the means 4 creates, via the line 26 and the second pipe 24, a vacuum in the container 6. The valve means 22 is closed and detergent is drawn from the tank 20 through the first pipe 15 16 and into the container 6. To prevent detergent from splashing into the second pipe 24, the opening of the first pipe 18 is equipped with an umbrella-like member 19 serving as a shield at the top of the pipe opening 18.

When the detergent in the container 6 has risen to a 20 level which is equal to or above level B, the valve 28 is closed. Thus, the vacuum in the container 6 is eliminated. Since the tank 20 and the container 6 act as communicating vessels, the level of detergent will adjust to the level B of the opening 18, if the level is above B when the valve 25 28 is closed. The container is thereafter emptied through the drain/valve means 22, either manually or automatically in conjunction with the filling of the automatic washing machine 23 with water. For instance, the water flowing into the washing machine 23 can actuate a simple lever 30 which, in resting position, is so spring-loaded as to shut off the outflow from the container 6. Pressure equalisation in the container 6 is then brought about by an opening 29 which may be closable and is arranged e.g. in the line 26 at a suitable location thereof.

35 In a second embodiment (not shown), the umbrella-like member 19 and the valve 28 are replaced by a float-actuated

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closure member for closing the opening of the second pipe in the upper part of the container 6.

The advantages of the present invention can be summarised as follows:

5 (1) The device need not be connected to the electric mains, and so the milk producer can himself maintain and repair the dispensing device without any special authorisation.

10 (2) The device is a closed system, minimising the risk of the operator being injured by contacting the highly concentrated detergent.

(3) The device allows presetting and varying the amount of detergent to be dispensed.

15 (4) Even if the supply tank should be emptied while filling the container, this will be immediately observed when the level of detergent is checked in connection with the closure of the valve in the pipe passing between the container and the vacuum-producing means.

20 It is readily understood by a person skilled in the art that modifications and alterations of constructional features of the inventive device are conceivable and that the accompanying claims should be considered to comprise all the modifications and alterations falling within the scope of the inventive concept.

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CLAIMS

1. Dispensing device, especially for dispensing a
5 detergent in a pipeline milking plant (2) comprising means
(4) for producing a vacuum in said plant, c h a r a c -
t e r i s e d i n

that the vacuum-producing means (4) is also con-
nected, via a line (26), to a container (6),

10 that a level-determining first pipe (16) is so
adjustably arranged in the container (6) that the deter-
gent, by the vacuum produced, is drawn from a supply (20)
into the container (6) where it adjusts to a level cor-
responding to the vertical position of an opening (18) of
15 the first pipe (16), when said vacuum is eliminated,

that said line (26) merges into a second pipe (24)
which is extended in the container (6), passes into it
from below and opens in the upper part thereof, and

20 that means (22) is provided for emptying the con-
tainer (6) and for gas-tight closure thereof when no emp-
tying is carried out.

2. Device as claimed in claim 1, c h a r a c -
t e r i s e d i n that a valve (28) is arranged in the
line (26) between the second pipe (24) and the vacuum-
25 producing means (4) for shutting off the dispensing
device, and

that the level-determining first pipe (16) also
passes into the container (6) from below.

3. Device as claimed in claim 1 or 2, c h a r a c -
30 t e r i s e d b y

means (19) for preventing detergent from entering
said second pipe (24) and thus said vacuum-producing
means (4).

4. Device as claimed in claim 3, c h a r a c t e r -
35 i s e d i n

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that said means (19) is so arranged at said level-determining first pipe (16) that the opening (18) thereof is screened from the opening of the second pipe (24) in the container (6).

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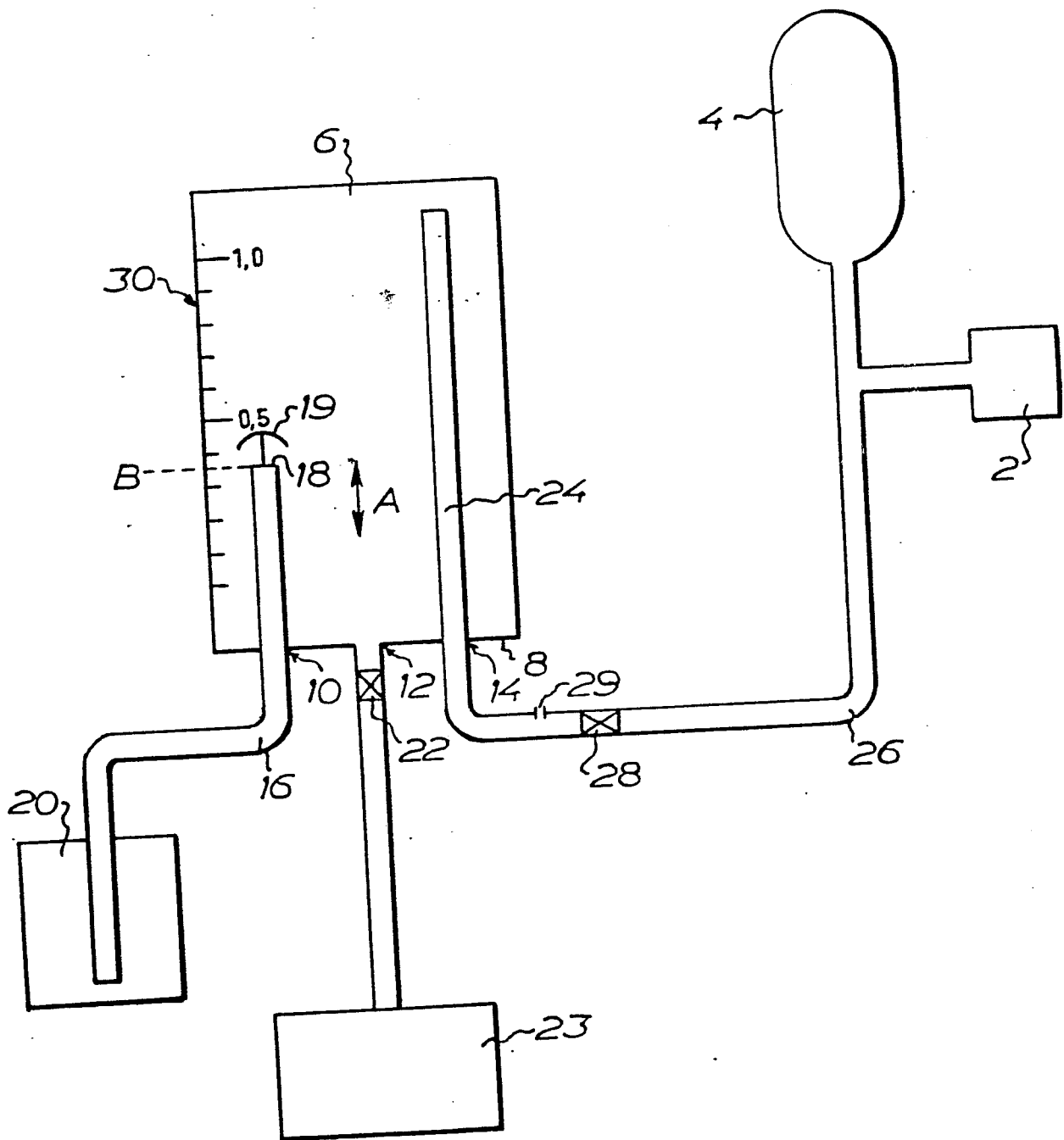
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INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 89/00653

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 01 J 7/00				
II. FIELDS SEARCHED				
Minimum Documentation Searched ⁷				
Classification System	Classification Symbols			
IPC5	A 01 J			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched ⁸				
SE,DK,FI,NO classes as above				
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹				
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³		
A	DK, C, 102155 (KRISTIAN SVENDSEN) 25 October 1965, see the whole document --	1-4		
A	DK, C, 94063 (A/S S.A. CHRISTENSEN & CO.) 29 October 1962, see the whole document -- -----	1-4		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; border: none;"> <p>* Special categories of cited documents:¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top; border: none;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents:¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>
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IV. CERTIFICATION				
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report			
30th May 1990	1990 -06- 13			
International Searching Authority	Signature of Authorized Officer			
SWEDISH PATENT OFFICE	Agneta Änggård <i>Agneta Änggård</i>			

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/SE 89/00653

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 90-05-07. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DK-C- 102155	65-10-25	NONE	
DK-C- 94063	62-10-29	NONE	