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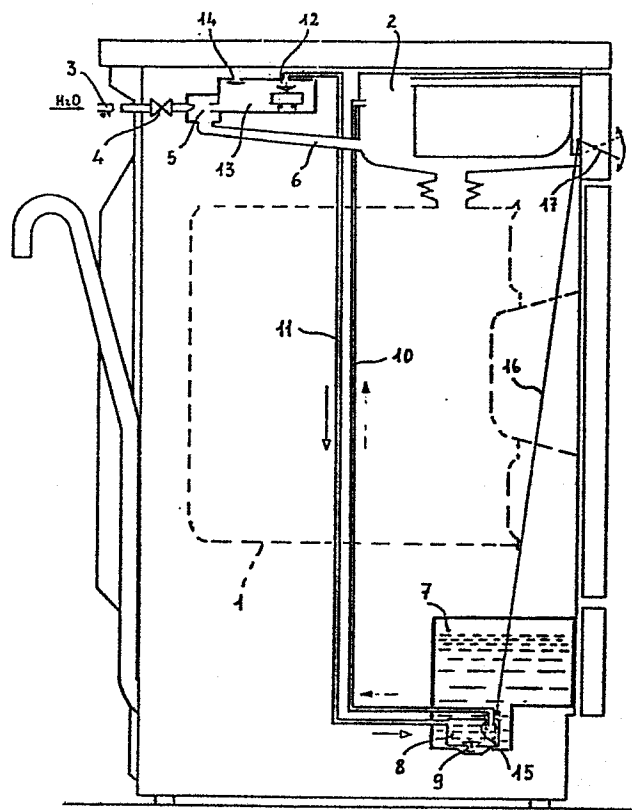
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⑥④ **Liquids metering and distributing device for a washing machine.**

⑥⑦ A liquid detergent and additive metering and distributing device for a washing machine, particularly for a laundry washing machine for domestic use, comprises a liquids reservoir (7) disposed in the lower portion of the machine and associated to at least one metering chamber (8) located therebelow, the connection between said reservoir and said chamber being adapted to be closed by automatic valve means (9) said chamber being connected to the washing tub of the machine.

The metering chamber (8) is connected to an air chamber (13) provided with automatic valve means (12, 14) and associated to a free jet section (5) connected to the water supply circuit (3).

Means may optionally be provided for varying the metered amount of the liquids dispensed via the metering chamber.



1 Liquids Metering and Distributing Device
 for a Washing Machine

5 Description

10 This invention relates to a liquid detergent and additive
metering and distributing device for a washing machine,
particularly for a laundry washing machine for domestic
use.

15 Already known are laundry washing machines provided with
a liquid detergent and additive distributor, comprising
a reservoir for containing said liquids disposed in the
lower portion of the machine and associated with at least
one metering chamber located therebelow and connected
thereto through automatic valve means adapted to permit
or to interrupt the gravity flow of said liquids from
the reservoir to the metering chamber. The latter is sub-
20 divided into two hermetically separated compartments by
means of a flexible diaphragm. One compartment is con-
nected to the tub of the washing machine, whilst the
other is connected to the tub and to the water supply
circuit, respectively so as to be intermittently filled
25 and emptied for displacing metered quantities of the
liquids towards the tub. The operation of this known
metering and distributing device is thus accomplished
by means of hydraulically actuated control means.
Although the described device operates satisfactorily,
30 it presents structural complications in that it requires
a three-way valve and an additional conduit for the water
supply as well as a hermetically closed separation by a
diaphragm for providing the two separate compartments
within the metering chamber. Said three-way valve and/or
35 said diaphragm are liable to cause malfunctions due to
wear during long-time use.

On the other hand, this embodiment does not allow for
suitable utilization of the free jet section customarily

1 required for safety reasons.

It is an object of the present invention to provide a liquid detergent and additive metering distributor for a washing machine which avoids the possible inconveniences of the hydraulically operated system by making use of a free jet section provided in the machine for obtaining the metering of said liquids and the introduction thereof into the tub by pneumatic actuation.

10 In view of this object, the invention provides a distributor device comprising a reservoir disposed in the lower portion of the machine and associated to at least one metering chamber located therebelow, the connection
15 between said reservoir and said chamber being adapted to be closed by automatic valve means, said chamber being connected to the tub of the washing machine.

According to the invention, a device of this type is
20 characterized in that said metering chamber is connected to an air chamber provided with automatic valve means and associated to a free jet section connected to the water supply circuit.

25 The characteristics of the invention will become evident from the following description of an exemplary and non-limiting embodiment with reference to the accompanying drawing.

30 The drawing shows in diagrammatic form a conventional laundry washing machine comprising a washing tub 1, connected to which is the outlet of a detergent powder distributor 2 supplied with water from the water mains 3 through a solenoid valve 4, a free jet section 5, and a
35 conduit 6.

Disposed in the lower portion of the machine is at least one reservoir 7 for containing liquid detergents and

1 additives, said reservoir 7 containing a metering chamber
8.

5 The latter is connected to reservoir 7 through an auto-
matic valve and is additionally connected to distributor
2 through a conduit 10.

10 Metering chamber 8 is further connected to an air chamber
13 associated with free jet section 5 through a further
conduit 11 and an automatic valve 12. Air chamber 13 is
also provided with an automatic venting valve 14.

15 The operation of the described device appears simple and
evident. When the machine is at rest, or during operating
phases which do not require the introduction of liquid
detergents or additives into the tub, valve 9 is open,
and metering chamber 8 is filled with a metered quantity
of the liquid from reservoir 7. In this situation, air
chamber 13 is not under pressure, and valves 12 and 14
20 are open. If it is required to introduce the metered
liquid into the tub, the program unit (not shown) of the
machine causes the water supply valve to be opened, so
that the water from the water mains fills air chamber 13
via free jet section 5.

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The pressure generated thereby within air chamber 13
causes venting valve 14 to close instantly, so that the
air contained in chamber 13 is displaced towards metering
chamber 8 through valve 12 and conduit 11.

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The pressurized air causes valve 9 to close and the liquid
contained in metering chamber 8 to be displaced towards
washing tub 1 through conduit 10 and distributor 2.

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After the water has completely filled air chamber 13,
valve 12 is closed by the hydraulic pressure to prevent
the water from entering conduit 11 and flowing into
metering chamber 8.

1 Subsequently the water supplied from water mains 3 and
passing through free jet section 5 is introduced into
washing tub 1 through conduit 6 and distributor 2 for
completeing the required charge for the following washing
5 or rinsing phase.

As soon as the water supply from the water mains stops,
chamber 13 is emptied, whereupon valves 12 and 14 open.

10 This results in a partial vacuum within metering chamber
8, causing valve 9 to open so as to admit a further
metered quantity of the liquid detergent or additive
into chamber 8.

15 According to the invention, the metering of the liquid
and the introduction thereof into the tub are thus accomp-
lished by substantially pneumatic actuation, reducing
to a minimum the number of components which are moreover
of extreme simplicity and reliability.

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The device according to the invention permits the eventual
problem of regulating the metered quantities of liquids
to be solved in a simple manner. To this effect, the
immersion depth of conduit 10 into chamber 8 may be
25 varied by employing a sliding sleeve 15 at the inflow
end of conduit 10.

Sleeve 15 is vertically displaceable by means for instance
of a pull rod 16 actuated by a lever or control knob 17
30 mounted at the front of the machine.

The device according to the invention thus accomplishes
the stated objects and provides the additional advantage
that the liquids employed may be metered with high accur-
35 acy independent of their density and viscosity.

EP 959

20 Liquids Metering and Distributing Device
 for a Washing Machine

Patent Claims

- 25 1. A liquid detergent and additive metering and
 distributing device for a washing machine, comprising
 a reservoir disposed in the lower portion of the
 machine and associated to at least one metering chamber
30 located therebelow, the connection between said reserv-
 oir and said chamber being adapted to be closed by
 automatic valve means, said chamber being connected to
 the tub of the washing machine, characterized in that
 said metering chamber (8) is connected to an air chamber
35 (13) provided with automatic valve means (12, 14) and
 associated to a free jet section (5) connected to the
 water supply circuit (3).

1 2. A distributing device according to claim 1,
characterized in that said air chamber (13) is provided
with first automatic valve means (12) adapted to estab-
lish communication between said air chamber (13) and
5 said metering chamber (8), and with second automatic
valve means (14) adapted to establish communication
between said air chamber (13) and ambient atmosphere.

3. A distributing device according to claim 1,
10 characterized in that manual control means (15, 16, 17)
are provided for controlling the depth of immersion
within said metering chamber (8) of a conduit (10)
connecting the latter to the washing tub of the machine.

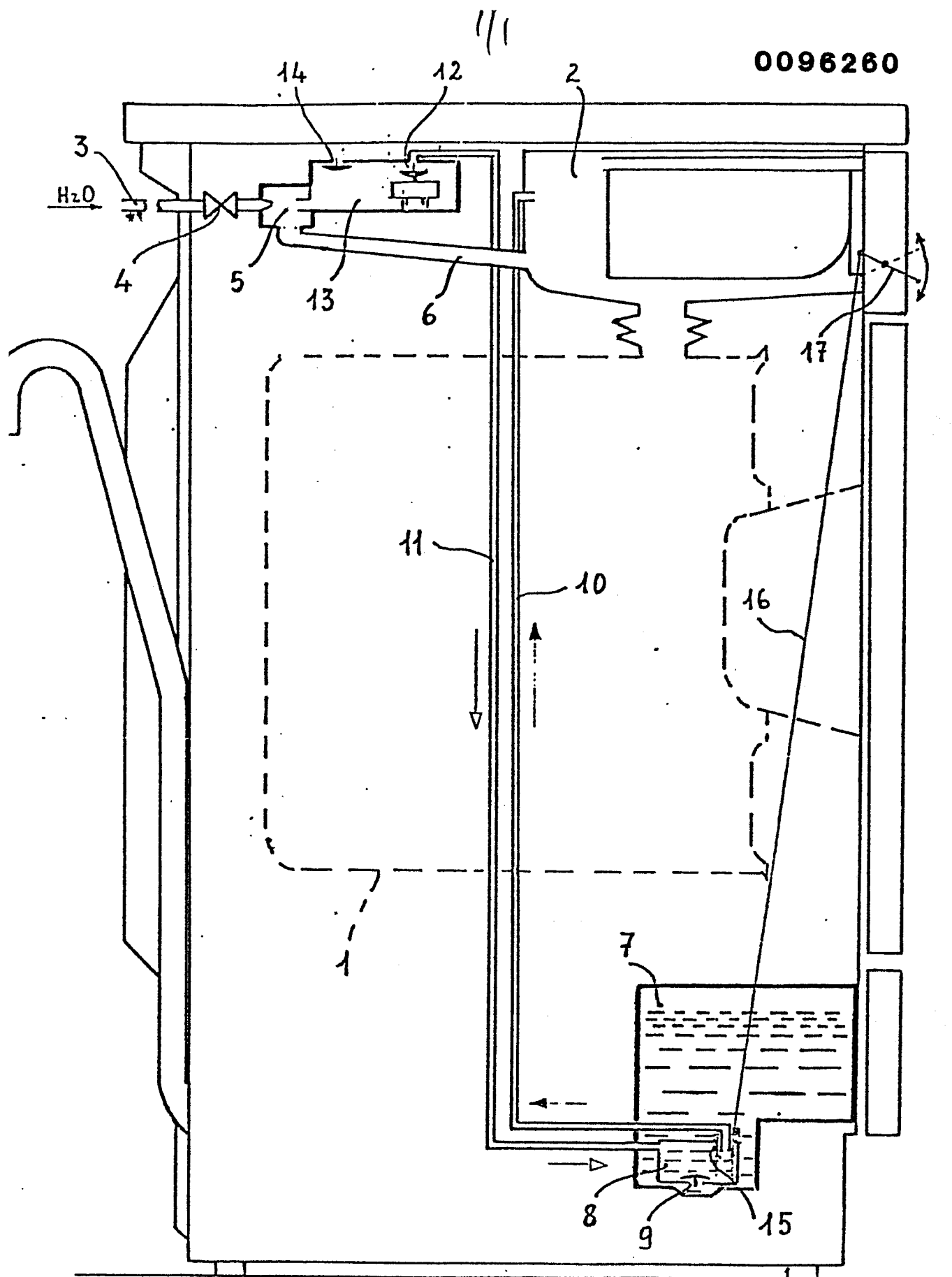
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	DE-A-2 421 041 (EUROPE MANUFACTURING TRUST)		D 06 F 39/02
A	US-A-3 021 702 (HOUSER) * Figure 1 *	1	
A	EP-A-0 033 684 (THOMSON-BRANDT)		
P,A	EP-A-0 077 463 (ZANUSSI) * Figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			D 06 F 39/00 A 47 L 15/44
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 05-09-1983	Examiner KLITSCH G
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	