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(58) Field of search  
UK CL (Edition J) B8N NB ND, D1A ADKA ADKG

(54) Liquid detergents distributor-container for washing machines

(57) A clothes washing machine has a number of dispensers 5, 6, 7 for dispensing detergents or detergent component liquid into the washing water. Each of the dispensers comprises a flexible-walled container 9 containing the liquid. A delivery hose 12 extends into the container and is connected to a positive displacement pump 14, 21, 22 for delivering the liquid to the washing tub.

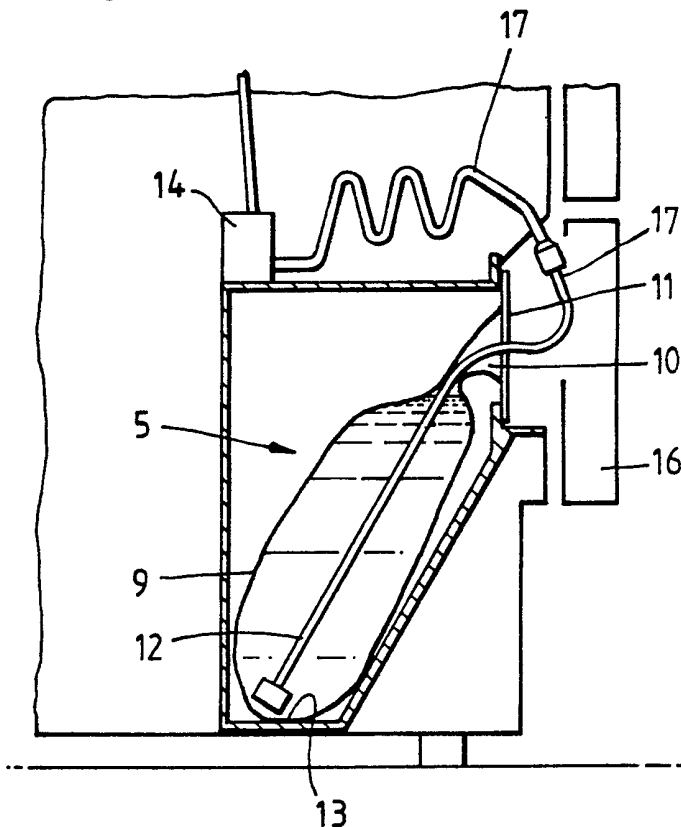


Fig. 2.

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Fig.1.

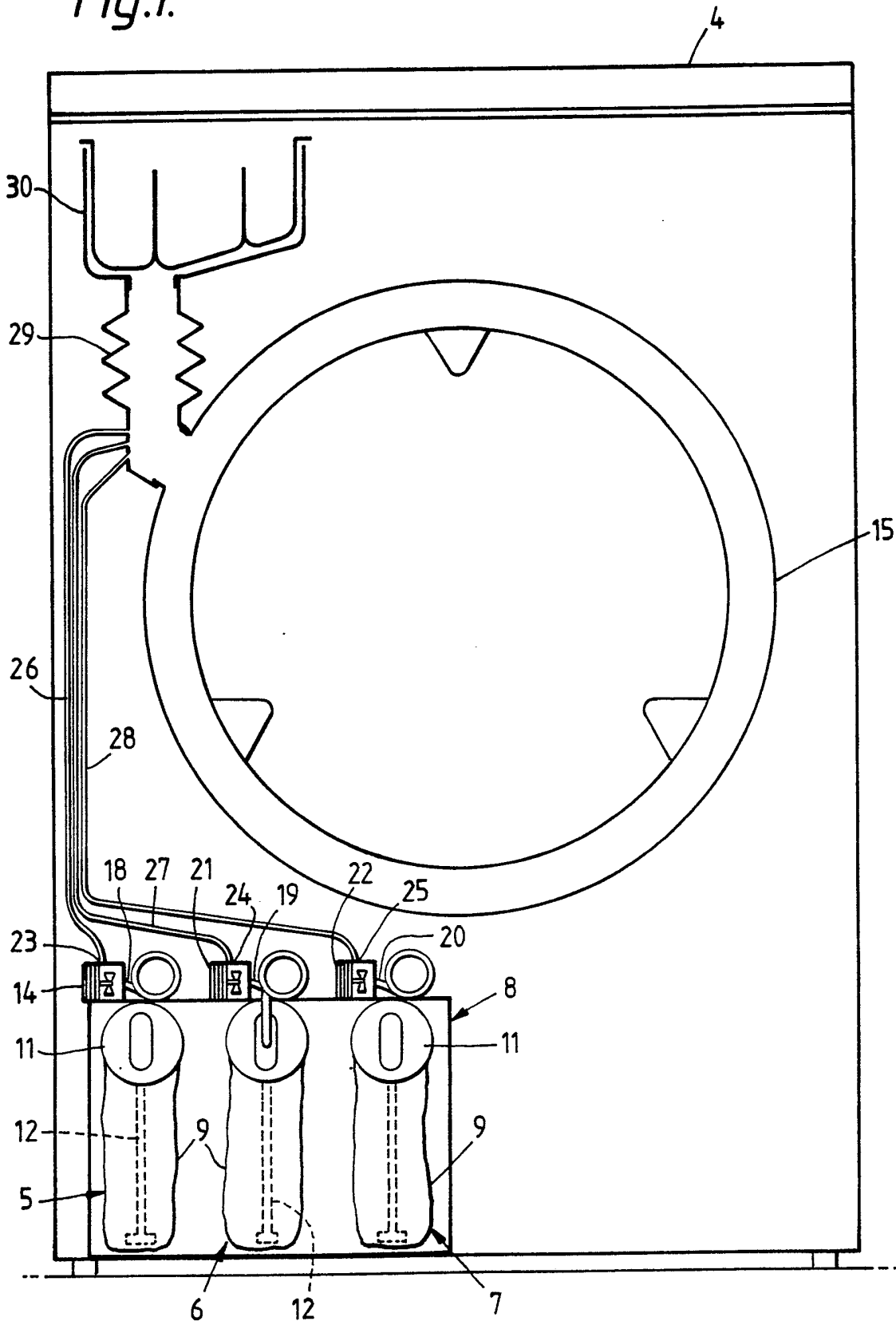


Fig. 2.

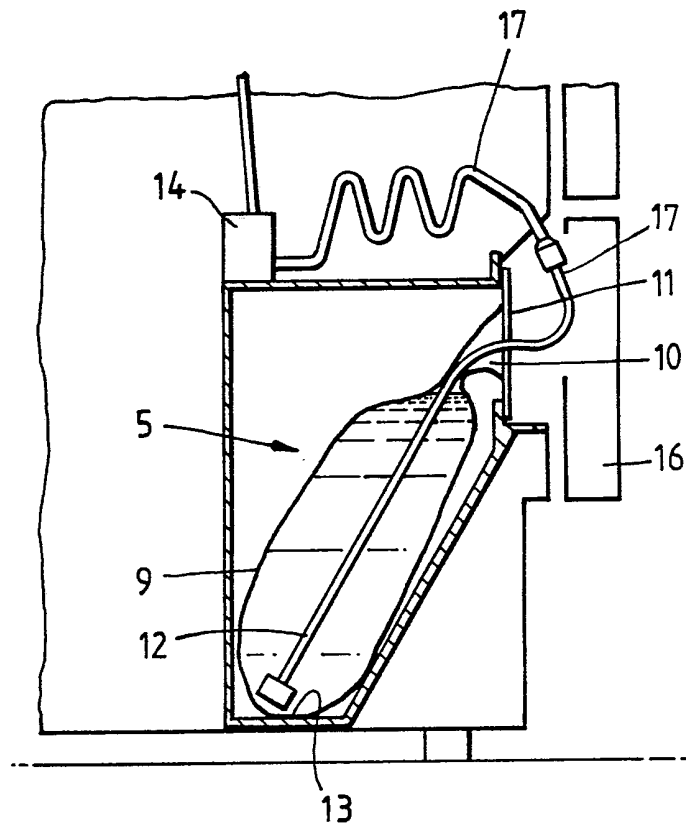
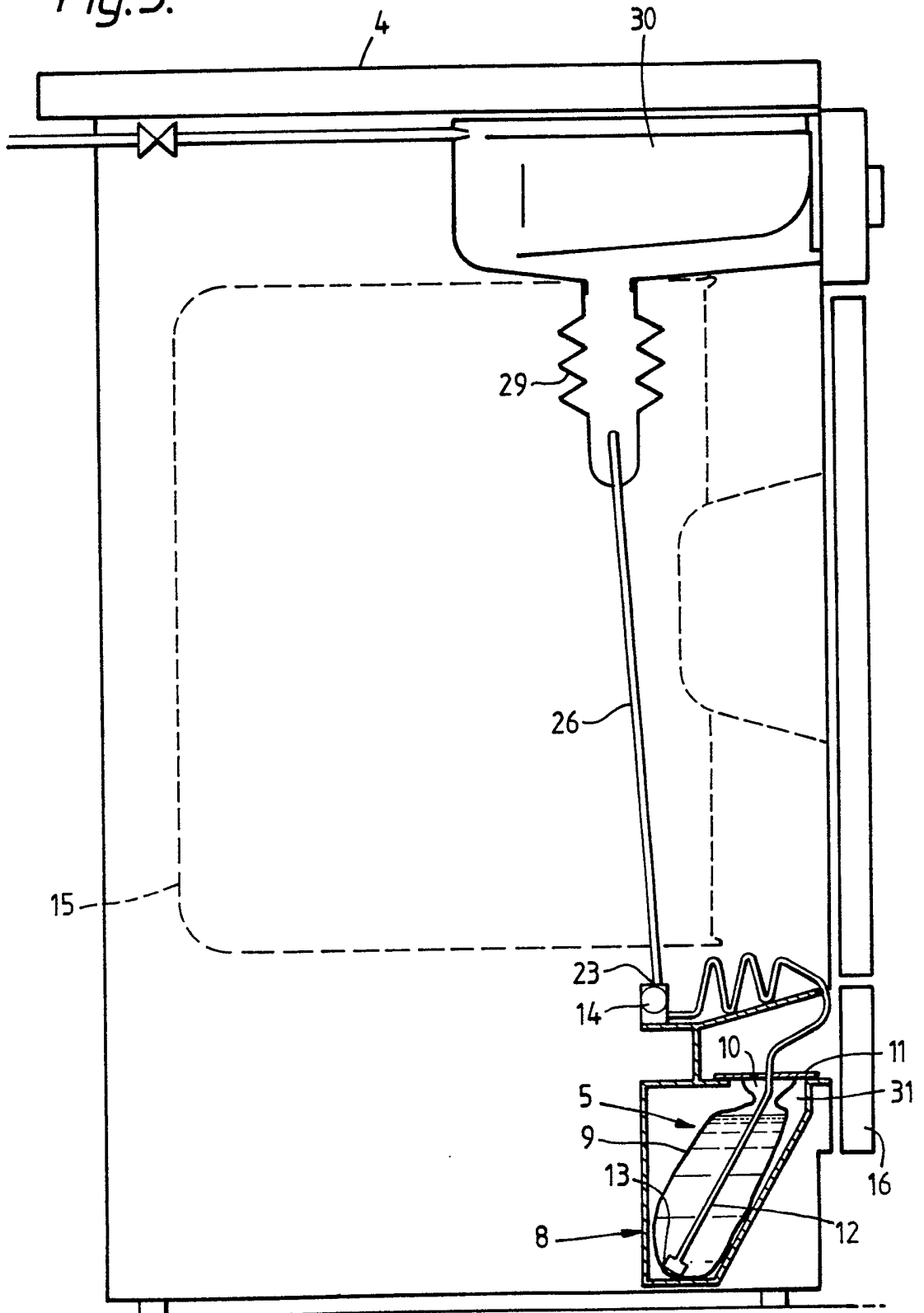


Fig. 3.



LIQUID DETERGENTS DISTRIBUTOR-CONTAINER FOR  
WASHING MACHINES

The invention relates to a liquid detergents  
5 distributor-container for washing machines, in particular  
clothes washing machines, which is able to contain doses of  
liquid detergents to be introduced into the machines tub for  
performing the clothes washing cycles.

At present, the clothes washing machines are  
10 designed for introducing powdered and liquid detergents into  
the washing tub, by utilizing a conventional detergent  
distributor connected to said tub which is subdivided in  
different separated and independent chambers for containing  
the respective detergents.

15 In this way, pre-established doses of the  
respective powdered and liquid detergents are poured in  
advance into the different chambers of the distributor  
referred to and such doses are removed by water fed into the  
tub, which selectively passes through the same chambers.

20 However, these detergent distributors while  
operating in a satisfactory and reliable manner have a  
limited holding capacity for the same detergents and  
therefore do not allow enough detergents doses to be stored  
therein for performing the different washing cycles.

25 Clothes washing machines predisposed for  
containing greater quantities of detergents, and in  
particular of liquid detergents, are known and substantially  
comprise a plurality of rigid containers of high holding  
capacity either for liquid detergents, or for the relevant  
30 component materials of the same detergents, the containers  
being connected to the tank through respective conduits  
provided with positive-displacement pumps which are able to  
displace either the liquid detergents or the relevant  
component materials thereof towards the tank.

35 Moreover, such clothes washing machines are

provided with conventional control devices acting on said positive-displacement pumps, in such a manner as to determine the displacement of metered quantities either of liquid detergents or of component materials thereof into the tank during each washing cycle. In particular, each of the rigid containers, is provided with a closing plug through which said conduit is inserted, said closing plug being unscrewable for permitting liquid detergents or component materials thereof to be introduced, and the periodical cleaning thereof.

This rigid container is also provided with a ventilation valve, which is automatically opened during the operation of the respective positive-displacement pump, to admit additional air to ensure correct development of the pumping operation either of the liquid detergents or of the relevant component materials thereof.

However, while permitting either the liquid detergents or the relevant component materials thereof to be fed into the tank in a satisfactory way, the presence of the rigid containers involves the inconvenience that the liquid detergents or the component materials thereof on contacting air tend in the long run to form incrustations, which collect in the containers and associated conduits, and these incrustations may obstruct and sometimes prevent the flow of the detergents or the component materials thereof.

In practice, the containers require rather frequent maintenance involving cleaning the incrustations which requires the containers to be disassembled in advance from the clothes washing machine and afterwards re-assembled in the same machine as soon as such cleaning operation is ended.

The invention seeks to eliminate the described inconvenience by means of a container-distributor for liquid detergents or relative component materials thereof, which can be fitted easily to the clothes washing machines so as

to permit and effective displacement of such detergents or component materials towards the tank of the same machines.

According to the invention there is provided a washing machine comprising a washing tub and at least one  
5 dispenser for introducing a liquid into the washing water, the dispenser comprising a sealed container having an elastically deformable wall, a delivery conduit extending at least part-way into the container and a pump for pumping liquid from the container via the delivery conduit for  
10 introduction into the washing water.

Further, optional features of the invention are defined in the sub-claims.

The invention will be further described by way of non-limitative example with reference to the attached  
15 drawings, in which:

Figure 1 shows, in a schematic front view, a first embodiment of a clothes washing machine according to the invention, provided with a plurality of  
20 container-distributors;

Figure 2 schematically shows a side view of a part of the machine of figure 1, where a container-distributor is fitted;

Figure 3 shows a side view of a clothes washing  
25 machine provided with a container-distributor according to a second embodiment of the invention.

Figures 1 and 2, schematically show a clothes washing machine 4 provided with a plurality of container-  
30 distributors 5,6,7 according to the invention, housed within a single box-shaped container 8 resting on the bottom panel of the machine, the container-distributors being able to contain either liquid detergents or the relative component materials thereof, provided for performing washing cycles of  
35 the machine.

Each container-distributor is constituted by a flexible enveloper 9 to be disposed of after use, made of elastically deformable material, preferably of plastics, and is provided at its upper side with a side opening 10, which may be tightly closed by a corresponding closing plug 11 and is able to permit either the respective liquid detergent or the component material thereof to be introduced into the container.

Moreover, each container is provided with a hose 12, sealingly inserted through the closing plug 11 and penetrating into the container to a position near the bottom 13 thereof, in order to suck such liquid detergent or component material from said container by means of a respective positive-displacement pump 14 of a conventional kind (see figure 2), which is fitted on the lower side of the machine, thus causing such liquid detergent or component material to be displaced into the tub 15 of the machine.

In practice, each container-distributor is filled up in advance with either the liquid detergent or the component material thereof, in a vacuum condition, up to the overflow level of the side opening 10, then the opening is sealingly closed by the associated closing plug 11 through which the hose 12 has been inserted in advance.

Afterwards, each container-distributor thus prepared is fitted to the respective seating of the box-shaped container 8, by arranging it with the opening 10 and the plug 11 facing a corresponding front panel 16 of the same (see figure 2), so that said container-distributor is easily accessible for permitting the respective free ends of the hose 12 and a further hose 17, which has been connected in advance to the intake side of the relative positive-displacement pump, to be coupled thereto.

In particular, figure 1 shows three such container-distributors 5,6,7, whose hoses 12 are connected as described to the corresponding intake sides 18,19,20 of



the respective positive-displacement pumps 14,21,22, the pumps also being provided with respective delivery sides 23,24,25 connected through respective rigid conduits 26,27,28 to the bellows 29 connected to the conventional container 30 of powdered detergents and the tank 15 of the machine. The machine is provided with a conventional control device (not shown) controlling the positive-displacement pumps 14,21,22 in such a manner as to displace into the tank 15 metered quantities of liquid detergents or component materials from the container-distributors 5,6,7 depending on the quantity of water fed into the tank during each washing cycle.

Such displacement, in particular, is effected in an effective and continuous manner during the pumping step, thanks to the temporary elastic deformation of the material of the envelope 9 of each container-distributor.

Additional advantages resulting from the presence of the container-distributor include the fact that such container, due to the lack of the conventional ventilation valve, is simpler in construction and reliable in operation, without forming undesired internal incrustations due to the lack of air inside the container.

The present container-distributor may be rapidly and easily assembled to and disassembled from the clothes washing machine, within restricted spaces too. thanks to its adapting capacity within such spaces, permitted by the elasticity of the material of the container, and also does not require any cleaning or maintenance operation and can be replaced, when the liquid detergent or the component material contained therein has been exhausted, by a new container-distributor of the same kind.

Referring now to figure 3, this shows a further embodiment of the present container-distributor.

This container-distributor is constituted by the same components as that previously described, and these are

marked with the same reference numerals, and is also assembled to the machine in a similar manner to the container-distributor of figures 1 and 2.

5 However, in this case each container is filled up in advance with the relevant liquid detergent or the component materials thereof, at the normal atmospheric pressure, up to the overflow level of the opening 10, which in this case is provided on the upper side of the same container.

10 Then, such opening is closed by a sealing closing plug (not shown); therefore, the container-distributor referred to can be fitted to the respective seat of the box-shaped container 8 of the clothes washing machine.

15 In particular, this operation is effected by removing the closing plug of the container-distributor therefrom and by arranging the opening 10 of this latter in correspondence of a respective opening 31 of the box-shaped container 8, which opening is accessible through the front panel 16 of the clothes washing machine and can be closed  
20 sealingly by a respective closing plug 11, through which the hose 12 is sealingly inserted after the other end of the hose 12 has been connected to the associated positive displacement pump. The hose 12 is then pushed up to the relative bottom wall 13 of the container-distributor.

25 Consequently, at its assembled position such closing plug is also inserted through the opening 10 of the respective container-distributor, thus causing the sealing closing thereof and permitting the same advantages of the previously described container to be obtained.

30

CLAIMS

1. A washing machine comprising a washing tub and at least one dispenser for introducing a liquid into the washing water, the dispenser comprising a sealed container having an elastically deformable wall, a delivery conduit extending at least part-way into the container and a pump for pumping liquid from the container via the delivery conduit for introduction into the washing water.
2. A washing machine according to claim 1 and which is a clothes washing machine.
3. A washing machine according to claim 1 or 2 wherein the delivery conduit comprises a flexible base extending into the container.
4. A washing machine according to claim 1,2 or 3 and wherein the container comprises a sealing plug closing a filling opening thereof.
5. A washing machine according to claim 3 and 4 wherein the hose is sealed to the plug and extends therethrough.
6. A washing machine according to any one of the preceding claims wherein the pump is a positive displacement pump connected to the end of the delivery conduit remote from the container.
7. A washing machine according to any one of the preceding claims wherein there are at least 2 such dispensers and control means are provided for controlling the respective pumps to deliver the respective liquids in predetermined proportions to the washing water.

8. A washing machine according to any one of the preceding claims wherein the container contains a detergent or detergent component.
- 5 9. A washing machine constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in Figures 1 and 2 or Figure 3 of the accompanying drawings.