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**D1A ADKA**

(56) Documents Cited

**GB 2226233 A**

**GB 2208659 A**

**US 5229084 A**

**US 5066952 A**

**US 5007559 A**

**US 4462967 A**

(58) Field of Search

UK CL (Edition O ) **A4F , D1A**

INT CL<sup>6</sup> **A47L 15/44 , D06F 39/02**

Online: **WPI**

(54) Cleaning apparatus with a detergent dispenser

(57) An apparatus for progressively adding powdered or solid detergent to a dish washer or clothes washing type machine by dissolving and entraining the detergent in water. The water is supplied to means for directing a plurality of jets onto the detergent. The means may comprise a tubular ring 66 having a plurality of holes 70 arranged to provide a conically converging array of jets. The detergent is held in an inverted container 50 which is disposed in a receptacle 52 which communicates, via opening 74, to the interior of the machine. Preferably the container has an open neck 56 provided with an external screw thread 54, engageable by a removable cap (not shown). Additionally the neck may have an internal push fit grid 58. The means for directing the plurality of jets may be disposed concentrically and closely beneath the neck of the container. Water may be provided either direct from the mains or from water already within the machine. Conduit 82 acts as an overflow outlet.

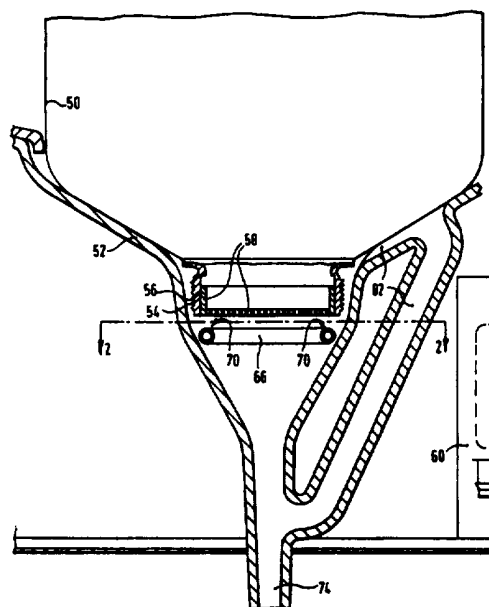


FIG.1.

GB 2 306 301 A

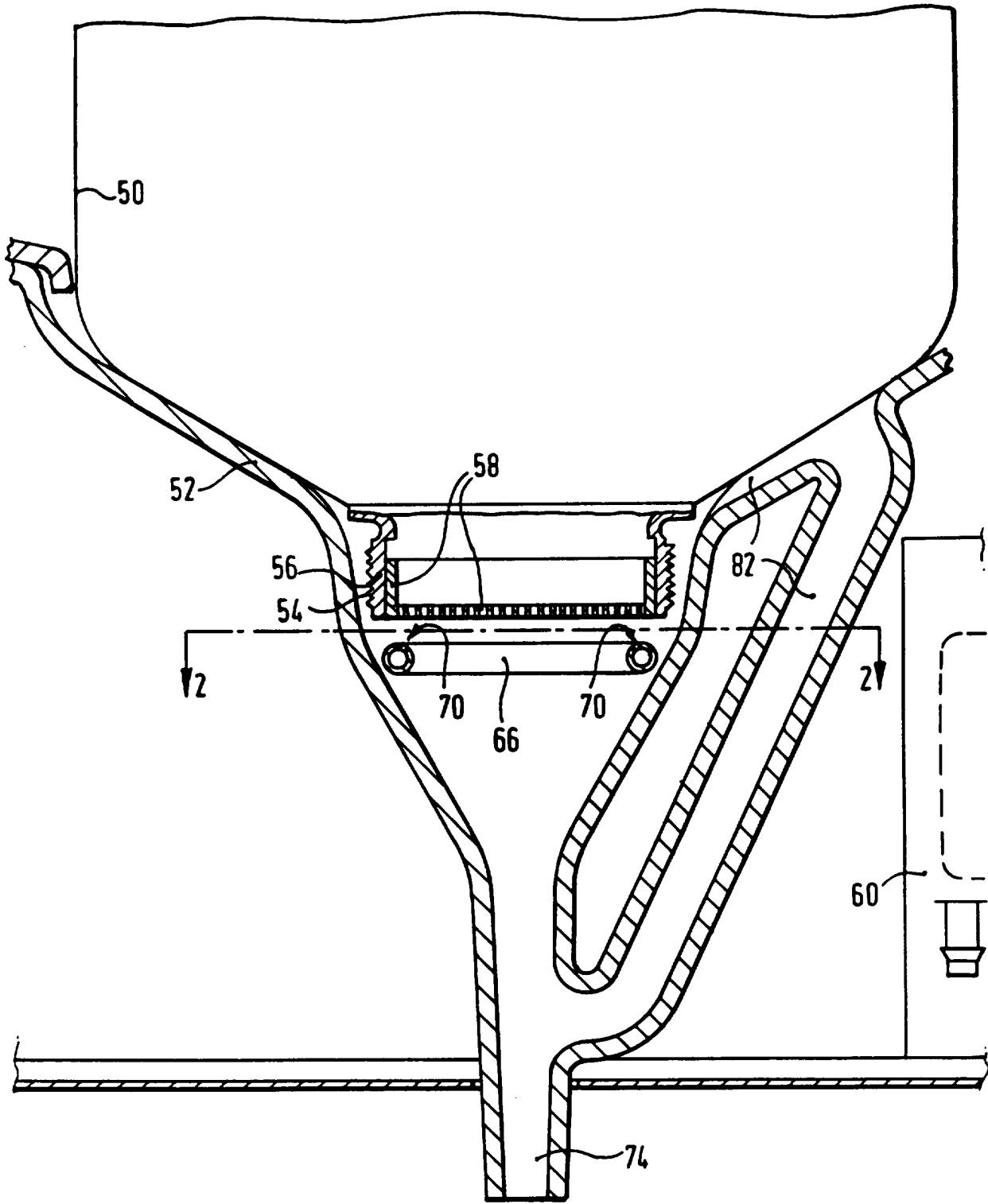


FIG.1.

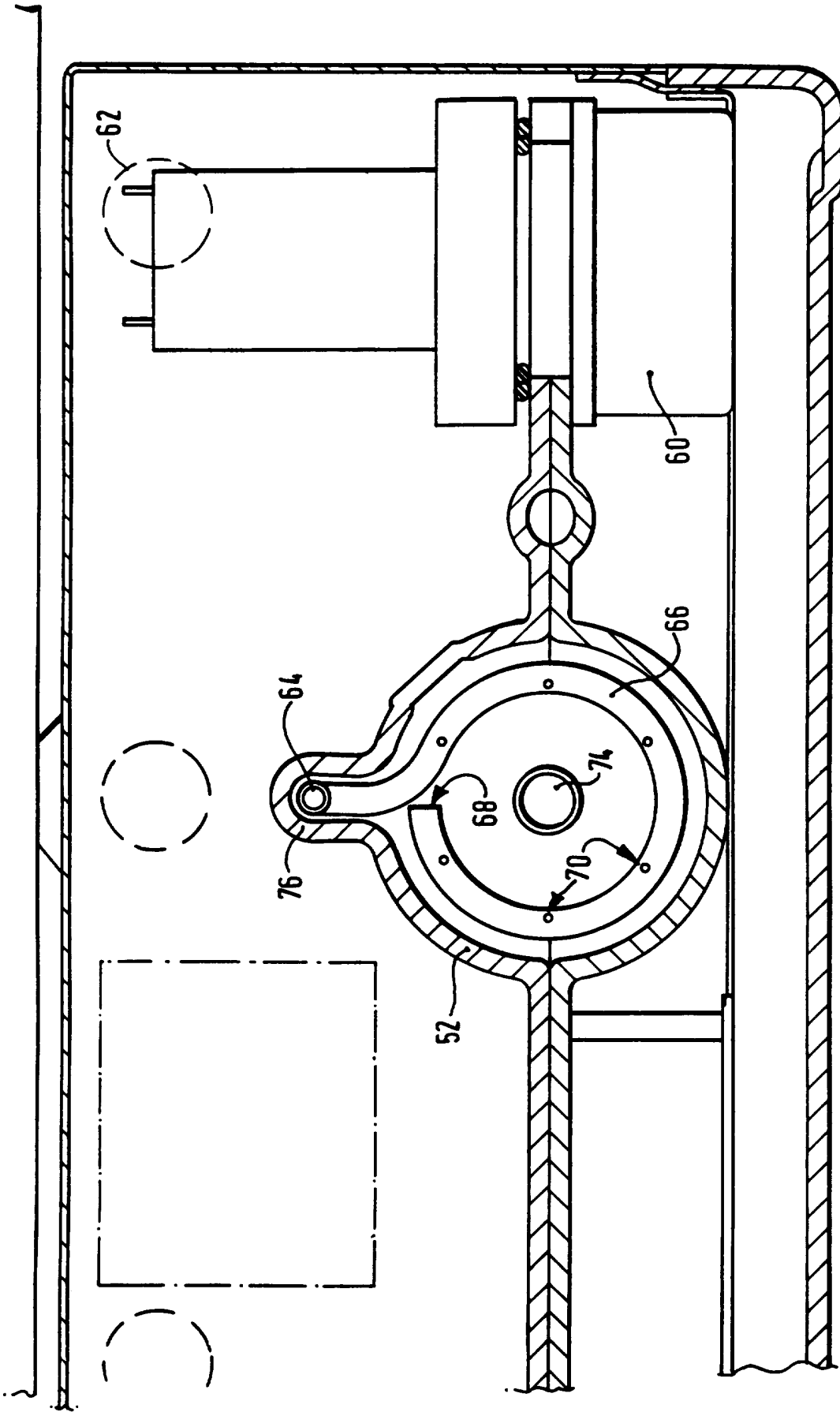


FIG. 2.

CLEANING APPARATUS

This invention relates to apparatus for cleaning with water to which there is added a powdered or solid cleaning agent, and particularly, but not exclusively, to dishwashing apparatus of industrial type for use in large establishments such as hospitals, hotels, canteens and the like.

Hitherto, such apparatus has dispensed the cleaning agent by directing onto it a single jet of water. Such a jet does not spread sufficiently well to dispense the agent efficiently, unless the jet were to be disposed some distance away from the agent thus disadvantageously increasing the overall size of the dispensing means.

The object of the present invention is to provide means for enabling water to dispense a powdered or solid cleaning agent more effectively.

According to the invention, there is provided apparatus for cleaning with water to which there is added a cleaning agent progressively dispensed from a powdered or solid mass thereof by water, in which apparatus, in use, the water for dispensing the agent is supplied to means for directing a plurality of jets onto the said mass.

Preferably, the means comprise a tubular ring having a plurality of holes.

Preferably, also, the holes are arranged to provide a conically-converging array of jets.

Preferably, the holes are between 1 and 2mm in diameter and the rate of supply of water thereto is between 0.5 and 2 litres per minute.

5            Preferably, the mass of the cleaning agent is in an inverted container and the means are disposed concentrically with and closely beneath an open neck of said container.

10           Preferably, also, the inverted container is operatively disposed in a receptacle which communicates with the interior of the apparatus.

The neck of the container is preferably provided with  
15 an external screw-thread, engageable by a removable cap.

The neck of the container may also be provided with an internal push-fitted grid, especially when a powdered cleaning agent is used.

20           Preferably, the water for dispensing the agent is abstracted from the water contained within the apparatus.

The apparatus is preferably a dishwasher. However,  
25 it could be another ware-washing machine, such as a clothes washing machine.

The invention further relates to a method of washing articles, comprising use of apparatus as herein described.

30           A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings of which:

Figure 1 is a sectional side elevation of powdered or solid detergent dispensing means for an industrial dishwashing machine; and

5 Figure 2 is a section on the line 2-2 in Figure 1.

Referring now to the drawings, an industrial dishwashing machine washes in conventional manner with a volume of, typically, 18 to 20 litres of water contained within it which has been supplied directly from the mains and heated to a suitable temperature, typically, 55°C. Powdered or solid detergent is progressively dispensed by water from an inverted container 50 into a funnel-like plastics receptacle 52 and thence into the interior of the machine. The container 50 has a removable cap (not shown) engageable on an external screw-thread 54 formed on its neck 56 and in the case of powdered detergent there is provided a grid 58 which is a push-fit in the neck. A peristaltic pump 60 abstracts water from that contained within the machine through a pipe 62 and an in-line suction filter (not shown) which strains out fragments of food, and delivers it to a tube 64 which terminates in a ring 66 having a closed end 68. The ring 66 is disposed concentrically with and closely beneath the neck 56 and the grid 58 therein if provided, and has a plurality of holes 70 formed in its upper side. The holes 70 are slightly inclined so as to provide a very slightly conically-converging array of upwardly-directed jets and are, typically, 1.5mm in diameter, and the rate of supply of water to said holes is, typically, between 0.5 and 2 litres per minute. The receptacle 52 includes an opening 74 which communicates with the interior of the machine, and said receptacle is shaped at 76 to accommodate an upright portion of the tube 64.

In operation, the cap is removed from a container 50 of powdered or solid detergent and said container is inverted and placed in the receptacle 52. Water abstracted by the pump 60 from that contained within the machine is delivered to the ring 66, and is sprayed in a very slightly conically-converging array of upwardly-directed jets through the neck and the grid 58 therein if provided onto the detergent. Thus, there is furnished in effect a blanket of water which impinges at a slight angle on different segments of the detergent, so as to slice off segments slightly at an angle towards the centre. The detergent is thus efficiently displaced from the container 50 into the receptacle 52 whence it is carried by the water through the wide plastics opening 74 which is not susceptible to blocking, to the interior of the machine where it mixes with the water contained therein to perform the washing operation. It should be noted that in the unlikely event of a blockage occurring in the receptacle 52 beneath the container 50, parts 82 are available to serve as an overflow or auxiliary outlet conduit. A sensor (not shown) may be provided in the overflow conduit to detect the occurrence, and a visual or audible indication may be given to the operator. In this embodiment, the overflow conduit connects to the outlet 34 adjacent the lower end of the receptacle but in other embodiments it may connect further downstream, or even provide an entirely parallel pathway to the dishwashing machine.

In a non-preferred modification which falls within the scope of this invention, the water for dispensing the powdered or solid detergent is supplied to the ring 66 directly from the mains.

The invention is also potentially applicable to other ware-washing machines, such as machines for washing clothes.



**CLAIMS:**

1. Apparatus for cleaning with water to which there is added a cleaning agent progressively dispensed from a powdered or solid mass thereof by water, in which apparatus, in use, the water for dispensing the agent is supplied to means for directing a plurality of jets onto the said mass.
2. Apparatus according to claim 1, wherein said means comprise a tubular ring having a plurality of holes.
3. Apparatus according to claim 2, wherein said holes are arranged to provide a conically-converging array of jets.
4. Apparatus according to claim 2 or claim 3, wherein said holes are between 1 and 2mm in diameter.
5. Apparatus according to claim 2 or any succeeding claim, wherein the rate of supply of water to said holes is between 0.5 and 2 litres per minute.
6. Apparatus according to any preceding claim, wherein said mass of the cleaning agent is in an inverted container.
7. Apparatus according to claim 6, wherein said inverted container is operatively disposed in a receptacle which communicates with the interior of the apparatus.
8. Apparatus according to claim 6 or claim 7, wherein said container comprises an open neck.

9. Apparatus according to claim 8, wherein said means are disposed concentrically with and closely beneath said open neck of said container.
- 5 10. Apparatus according to claim 8 or any succeeding claim wherein said neck is provided with an external screw-thread, engageable by a removable cap.
- 10 11. Apparatus according to claim 8 or any succeeding claim, wherein said neck is provided with an internal push-fitted grid.
- 15 12. Apparatus according to any preceding claim, wherein the water for dispensing the agent is abstracted from water contained within the apparatus.
13. Apparatus according to any preceding claim comprising a ware-washing machine.
- 20 14. A method of washing articles, comprising use of apparatus, according to any preceding claim.
- 25 15. Apparatus or method substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.



Application No: GB 9621917.5  
Claims searched: 1-15

Examiner: David Glover  
Date of search: 21 November 1996

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): A4F, D1A

Int CI (Ed.6): A47L 15/44, D06F 39/02

Other: Online: WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X, Y	GB 2226233 A (UNILEVER PLC) see figure 1 and page 3 lines 10-33	X: 1 Y: 6-8, 10, 11
X, Y	GB 2208659 A (UNILEVER PLC) sse page 1 lines 1-3 & 35, page 2 lines 1-5 & claim 2 page 4 lines 9-13.	X: 1, 12 Y: 6-8, 10, 11
X, Y	US 4462967 (BERELSON) figure 2 column 1 lines 60-68	X: 1, 9 Y: 6-8, 10, 11
Y	US 5229084 (LIVINGSTON <i>et al</i> ) see figure 1 & 2	Y: 6, 8, 11
Y	US 5086952 (KRYK) see figure 2, column 2 lines 59-68, and column 3 lines 1-20	Y: 6-8, 10, 11
Y	US 5007559 (YOUNG) see figure 5 and column 3 lines 14-40	Y: 6-8, 10

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.