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⑰ **Dishwashing machine with self-cleaning pump protection filter.**

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Description

The present invention relates to a dishwashing machine provided with a discharge pump protection filter adapted to be automatically cleaned during operation of the machine, as set forth in the preamble of claim 1.

This dishwashing machine, known from IT—A—952 947 comprises a water collection well at the bottom of a washing tub, with the inlet of a water circulation pump and the inlet of a water discharge pump connected to said well.

The water collection well houses a fine-mesh recirculation filter disposed in the flowpath of the water aspirated by the circulation pump. The fine-mesh filter is formed with an opening directly connecting the interior of the tub with the inlet of the discharge pump. Disposed in this opening is a coarse mesh filter, referred to as a discharge pump protection filter and having as its main purpose the retention of coarse impurities, such as bits of china or glass, bones and the like which might otherwise obstruct or even damage the discharge pump.

The coarse-mesh pump protection filter will of course also retain shreds and bits of softer materials, such as paper shreds, breadcrumbs, fatty matter and the like, which may in the long run obstruct the filter, as part of the water aspirated by the circulation pump also passes therethrough.

The dismountable coarse-mesh filter has therefore to be cleaned at relatively short intervals. Furthermore, this dishwashing machine is provided with stationary jet nozzles for automatically cleaning the fine-mesh and coarse-mesh filters.

These jet nozzles are designed to produce jets of water substantially perpendicular to the axis of the coarse-mesh filter in proximity to the inlet side of the filter itself (where the tangential water jet has practically no effect at all) and in an intermediate zone, where the coarse-mesh filter is surrounded by the fine-mesh filter which disperses the water jet so as to render it ineffective with regard to the coarse-mesh filter.

Also known, for instance from US Patent 3,810,480 are dishwashing machines provided with rotating jet nozzles directed perpendicularly to the fine-mesh filter in countercurrent to the flow of the water aspirated by the circulation pump.

This construction does not provide a solution for the problem of automatically cleaning the discharge pump protection filter.

From European Patent Application No. 0068974 there is further known a dishwashing machine provided with rotating jet nozzles directed obliquely onto the surface of the fine-mesh recirculation filter so as to concentrate and to convey to the interior of the coarse-mesh discharge pump protection filter any particulate impurities collecting on the recirculation filter.

In view of their inclined positions, the rotating jet nozzles have no cleaning effect on the coarse-mesh filter, resulting in the latter being all the more readily clogged by the impurities.

From FR—A—2 445 130, a dishwashing machine is known, in which a part of the recircu-

lated water is passed through a collection chamber which is separate from the general flow of fluid and in which coarse particles entrained by the water are collected, as this chamber is closed by a fine-mesh filter and is situated in a bypass flow path of the recirculated water, so that most of the water fed to the spray nozzles for cleaning the dishes is not passed through said collection chamber and may be pumped with reduced pumping power. After termination of the dishwashing cycle, the flow of water through said collection chamber is reversed and the residuals collected therein are emptied through a discharge conduit by means of a discharge pump. During the discharge phase, water is still being circulated through the rotating spray arms of the machine, one of said spray arms being provided with an opening at the bottom side thereof located at a position so as to intermittently direct a water jet onto the fine-mesh filter of said collection chamber. Thus, coarse impurities, such as bits of china or glass, bones or the like, collected in said chamber may damage the discharge pump.

It is the object of the present invention to provide a dishwashing machine of the aforementioned kind, which is provided with a discharge pump protection filter arranged to be automatically and efficiently cleaned at the end at least of each dishwashing cycle, preventing a discharge pump from being damaged by coarse impurities collected therein.

This object is attained by characterizing features of claim 1. Preferred embodiments of the invention are subject matter of the dependent claims.

The spray jet means preferably comprise at least one additional opening formed in at least one rotatable arm provided for irrigating the dishes.

In this manner, operation of the circulation pump automatically results in the disintegration of impurities collected in the discharge pump protection filter, which is usually disposed in a relatively quiescent zone of the washing tub. The coarse-mesh filter is thus always kept sufficiently clean, its maintenance being limited to the infrequent necessity of removing coarse and relatively indestructible impurities, such as bits of china or glass, bones and the like, from the filter.

The characteristics and advantages of the invention will become more clearly evident from the following description, given by way of example with reference to the accompanying drawings, wherein:

Fig. 1 and 2 show diagrammatic representations of dishwashing machines in two functionally equivalent embodiments of the invention.

With reference to the drawings, a dishwashing machine comprises a washing tub 3 (only partially shown), the bottom of which is formed as a well 4 for collecting the dishwashing and rinsing water. Disposed in communication with well 4 is a circulation pump 5 supplying at least one rotatable arm 6 for irrigating the dishes and the like to be washed (not shown) in a per se known manner. Washing tub 3 contains a fine-mesh filter 7 disposed in the flowpath of the water collecting in

well 4 after having been sprayed onto the dishes, and to be aspirated again by circulation pump 5. Fine-mesh filter 7 is of a known configuration, having a frustoconical portion 7a for the insertion of a removable coarse-mesh filter 8 of corresponding shape disposed substantially in the flowpath of water from well 4 to a discharge pump 9.

Coarse-mesh filter 8 acts in a known manner as a discharge pump protection filter, protecting in particular the impeller of said pump.

According to the invention, in the dishwashing machine the spray jet means are arranged to direct at least one water jet onto filter 8 in a substantially coaxial direction thereof for automatically cleaning the filter by disintegrating low-consistency impurities collected therein.

In a preferred embodiment, the water jet may be produced by providing an additional opening 10 at the bottom side of rotatable irrigation arm 6 (Fig. 1). In this case the water jet 11 is effective to clean filter 8 in an intermittent manner.

In an alternative embodiment, water jet 11 may be produced by a stationary jet nozzle 12 (Fig. 2) connected to the outlet of circulation pump 5, preferably on a horizontal axis and associated with a deflector 13 for directing the water jet towards the pump protection filter 8.

Deflector 13 may of course be mounted at any position considered most favourable. Also, water jet 11 may be produced in any equivalent manner.

In any case, and in contrast to known arrangements, the discharge pump protection filter 8 will always have been efficiently cleaned at the end of each operating cycle of the dishwashing machine.

Claims

1. A dishwashing machine comprising a washing tub (3) provided with a fine-mesh filter (7) disposed in the flowpath of water aspirated by a circulation pump (5) and formed with a frustoconical portion (7a) providing an opening (14) directly connecting the interior of said tub (3) with the water intake of a discharge pump (9) and a frustoconical coarse-mesh filter (8) seated in said frustoconical portion (7a) of said fine-mesh filter (7), and further comprising spray jet means (10, 12, 13) adapted to direct at least one water jet (11) against said coarse-mesh filter (8) from the input side thereof, characterized in that said spray jet means (10; 12, 13) is arranged to direct said at least one water jet (11) in a substantially coaxial direction with said coarse-mesh filter (8) during the washing phase of the machine operation for automatically cleaning said filter (8) by disintegrating low-consistency impurities collected therein.

2. A dishwashing machine according to claim 1, wherein said circulation pump (5) feeds at least one rotatable spray arm (6) for spraying the dishes, characterized in that said spray jet means comprise at least one additional opening (10) formed in said rotatable arm (6).

3. A dishwashing machine according to claim 1,

characterized in that said spray jet means comprise at least one stationary jet nozzle (12) connected to the outlet of said circulation pump (5).

4. A dishwashing machine according to claim 3, wherein the axis of said stationary jet nozzle (12) extends substantially transversely of the axis of said coarse-mesh filter (8), characterized by comprising a deflector (13) adapted to direct the water jet (11) exiting from said stationary jet nozzle (12) towards said coarse-mesh filter (8).

Patentansprüche

1. Geschirrspülmaschine, enthaltend einen Waschbottich (3), der mit einem feinmaschigen Filter (7) versehen ist, das im Strömungsweg des Wassers angeordnet ist, das von einer Umwälzpumpe (5) angesaugt wird, und das mit einem kegeltumpfförmigen Abschnitt (7a) versehen ist, der eine Öffnung (14) ausbildet, der den Innenraum des Bottichs (3) mit dem Wassereinlaß einer Auslaßpumpe (9) direkt verbindet, und ein kegeltumpfförmiges, grobmaschiges Filter (8), das in dem kegelförmigen Abschnitt (7a) des feinmaschigen Filters (7) sitzt, und weiterhin enthaltend eine Sprühstrahleinrichtung (10, 12, 13), die dazu eingerichtet ist, wenigstens einen Wasserstrahl (11) gegen das grobmaschige Filter (8) von der Zulaufseite desselben her zu richten, dadurch gekennzeichnet, daß die genannte Sprühstrahleinrichtung (10; 12, 13) dazu eingerichtet ist, den genannten wenigstens einen Wasserstrahl (11) in einer im wesentlichen mit dem grobmaschigen Filter 8 koaxialen Richtung während der Waschphase des Maschinenbetriebs zu richten, um das genannte Filter (8) automatisch durch Zerteilung von darin gesammelten Verunreinigungen niedriger Konsistenz zu reinigen.

2. Geschirrspülmaschine nach Anspruch 1, bei der die Umwälzpumpe (5) wenigstens einen drehbaren Sprüharm (6) zum Besprühen des Geschirrs versorgt, dadurch gekennzeichnet, daß die genannten Sprühstrahleinrichtungen wenigstens eine zusätzliche Öffnung (10) aufweisen, die in dem drehbaren Arm (6) ausgebildet ist.

3. Geschirrspülmaschine nach Anspruch 1, dadurch gekennzeichnet, daß die Sprühstrahleinrichtungen wenigstens eine stationäre Strahldüse (12) enthalten, die mit dem Auslaß der Umwälzpumpe (5) verbunden ist.

4. Geschirrspülmaschine nach Anspruch 3, bei der die Achse der stationären Strahldüse (12) sich im wesentlichen quer zur Achse des grobmaschigen Filters (8) erstreckt, dadurch gekennzeichnet, daß sie einen Ablenker (13) enthält, der dazu eingerichtet ist, den Wasserstrahl (11), der aus der stationären Strahldüse (12) austritt, gegen das grobmaschige Filter (8) zu richten.

Revendications

1. Lave-vaisselle comprenant une cuve de lavage (3), équipée d'un filtre à fines mailles (7) disposé dans le trajet d'écoulement de l'eau aspirée par une pompe de circulation (5) et

comportant une portion tronconique (7a) procurant une ouverture (14) raccordant directement l'intérieur de la cuve (3) à l'arrivée d'eau d'une pompe de vidange (9), et d'un filtre tronconique à grosses mailles (8) logé dans la portion tronconique (7a) du filtre à fines mailles (7), le lave-vaisselle comprenant en outre des moyens de jets pulvérisés (10, 12, 13) adaptés pour diriger au moins un jet d'eau (11) contre ce filtre à grosses mailles (8) depuis le côté entrée de celui-ci, caractérisée en ce que des moyens de jets pulvérisés (10, 12, 13) sont disposés pour diriger au moins ce jet d'eau (11) dans une direction pratiquement coaxiale au filtre à grosses mailles (8) pendant la phase de lavage du fonctionnement de la machine pour nettoyer automatiquement ce filtre (8) en désintégrant les impuretés de faible consistance qui y sont rassemblées.

2. Lave-vaisselle selon la revendication 1, dans

lequel la pompe de circulation (5) alimente au moins un bras de pulvérisation rotatif (6) pour arroser la vaisselle, caractérisé en ce que les moyens de jets pulvérisés comportent au moins une ouverture additionnelle (10) formée dans ce bras rotatif (6).

3. Lave-vaisselle selon la revendication 1, caractérisé en ce que les moyens de jets pulvérisés comportent au moins une buse de projection stationnaire (12) raccordée à la sortie de la pompe de circulation (5).

4. Lave-vaisselle selon la revendication 3, dans lequel l'axe de la buse de projection stationnaire (12) s'étend pratiquement transversalement à l'axe du filtre à grosses mailles (8), caractérisé en ce qu'un déflecteur (13) est adapté pour diriger le jet d'eau (11) sortant de cette buse de projection stationnaire (12) en direction du filtre à grosses mailles (8).

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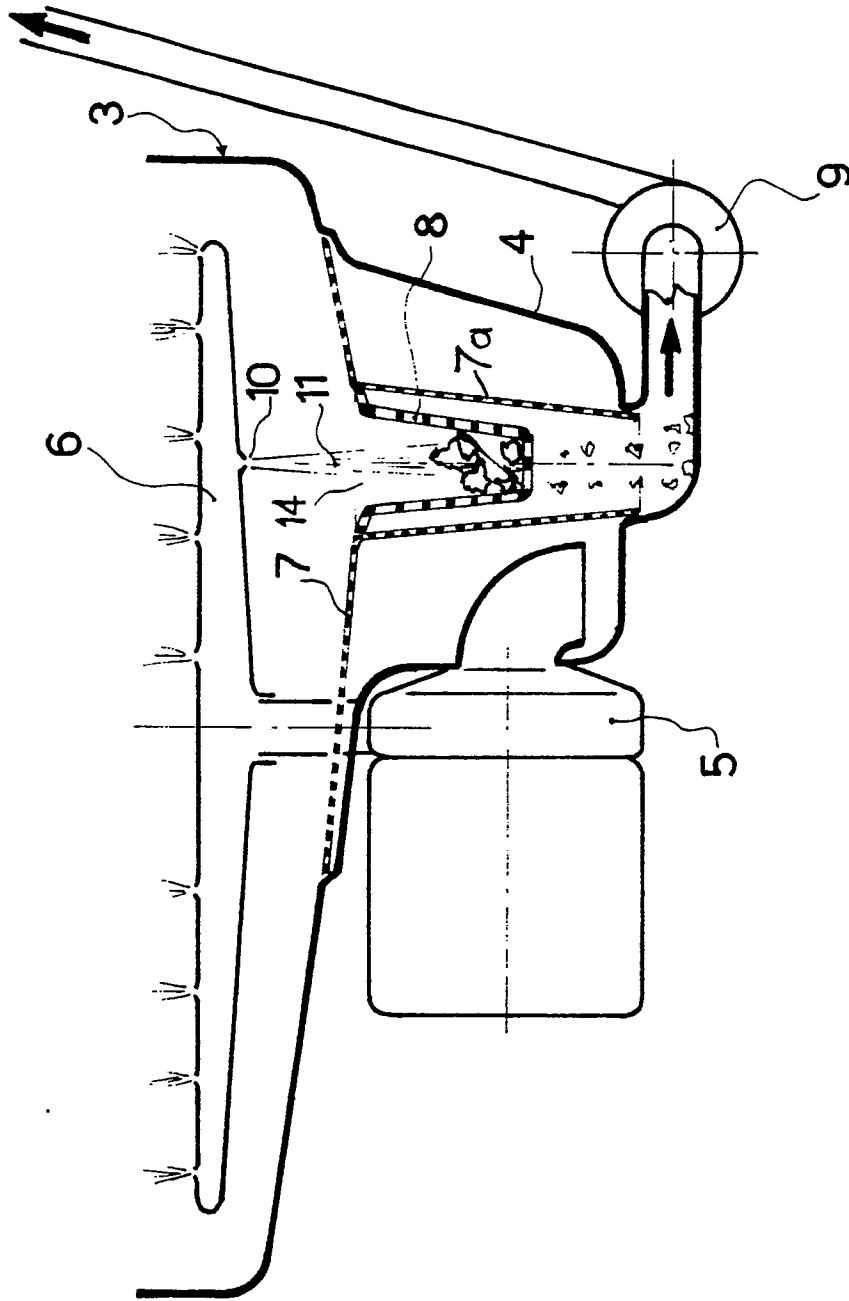


fig. 1

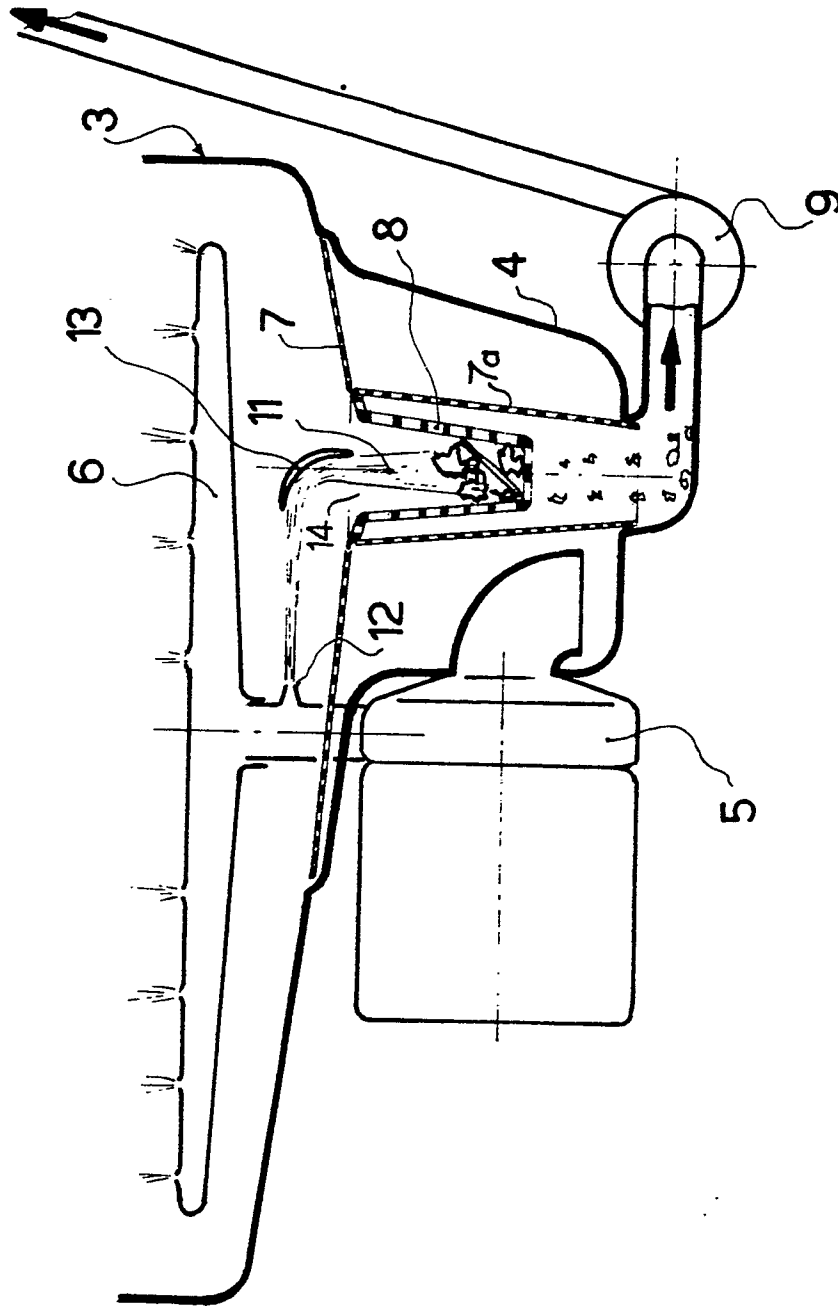


fig.2