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LINT FILTER FOR A CLOTHES WASHING MACHINE

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LINT FILTER FOR A CLOTHES WASHING MACHINE

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The present invention relates to clothes washing machines and more particularly to means for recirculating and filtering the water of a clothes washing machine.

Automatic clothes washing machines with which the present invention is associated comprise a cylindrical tub containing a cylindrical cup-shaped basket having an oscillatable agitator therein. The agitator is oscillated during the wash cycle of the machine and the basket is rotated at high speeds to extract the water from the clothes. Clothes are inserted into the basket and the basket is filled to the desired water level, after which the agitator is vigorously oscillated to provide the washing action. As the washing operation proceeds, lint and scum accumulate in the wash water and unless removed therefrom, will adhere to the clothes during the extraction cycle. Various systems have been employed for removing the lint and scum from the wash water, including overflowing the basket to wash the lint and scum down the drain. Other systems employ various methods of recirculation and filtering of the water in the basket of the machine. Most of these methods overflow water from the basket into the tub and pump the overflowed water back into the basket through some sort of filter. There are several disadvantages to such a recirculating system, however, in that some of the scum and filth that is present in the tub from the previous washing operation is circulated into the basket of fresh wash water when the washing cycle begins. Another undesirable feature of such a system is the cost requirement.

It is an object of the present invention to provide a filter system for a clothes washing machine which does not have the aforementioned undesirable characteristics of the prior recirculating systems.

The present system involves the use of the oscillating agitator to provide a recirculation of the fluid within the basket and a filter disposed on or about the top of the agitator in the path of the recirculated water to remove the lint and scum from the water.

The invention consists of the novel constructions, arrangements and devices to be hereinafter described and claimed for carrying out the above stated objects and such other objects as will appear from the following description of the preferred embodiment of the invention illustrated with reference to the accompanying drawings wherein:

Fig. 1 is a cross-sectional view of a washing machine having a new and improved agitator with a filter therein;

Fig. 2 is a cross-sectional view of the agitator;

Fig. 3 is a bottom view of the agitator partially broken away to show structural details of the agitator; and

Fig. 4 is a cross-section view taken on line 4—4 of Fig. 2.

Referring to Fig. 1, there is disclosed a washing machine of the type disclosed in Gerhardt et al., Patent No. 2,807,951, October 1, 1957, and comprising a casing 10, an imperforate tub 11, and a vertically disposed imperforate wash basket 12. The basket 12 has disposed therein an agitator 13 which is oscillated by a conventional

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driving means. Water is supplied to the basket 12 by the water supply means 14 and access is provided to the basket 12 by means of a hinged door 15.

The agitator 13 comprises an upstanding hollow post portion 16 for receiving the usual oscillated drive shaft 17, a radially spaced wall 18 having a vertical upstanding portion 19 with a plurality of openings 20 therein, and a downwardly and outwardly flaring base portion 21. Disposed about the outer surface and extending outwardly from the flaring base portion 21 are a plurality of vanes 22 for causing water turbulence within the basket 12 when the agitator is oscillated. Disposed about the inner surface and extending outwardly to substantially the periphery of the flaring base 21 are a plurality of vanes 23. A conical shaped, imperforate plate 24 is suitably secured to the post 16 by means of a plurality of screws 25. The plate 24 nests against the bottom edges of the vanes 23 thereby defining a plurality of spaces 26 in the base of the agitator. A plurality of openings 27 in the agitator 13 provide fluid communication between the radial space defined by the post 16 and the wall 19, and the spaces 26.

An annular filter, designated generally by the reference numeral 28, is disposed in the agitator 13 in the radial space between the post 16 and the wall 19. The filter comprises spaced annular walls 30 and 31 joined by means of a transverse wall 32. The wall 32 has a depending wall 33 defining a space or pocket 34. A plurality of openings 35 are provided in the transverse wall 32 for the passage for water. A U-shaped screen member 36 is attached to the walls 30 and 31 near the top thereof. A tube 37 is disposed over the post 16 and provides a support for the filter 28 and also provides for easy removal of the filter for cleaning purposes. The tube 37 at its bottom has a peripheral flange 38 adapted to rest on a projection 40 on the post 16 and to support the filter 28 as shown. The tube 37 has a bead 41 at its top and this bead is removably secured in a groove 42 of a resilient cap 43.

At the beginning of a washing operation, water is admitted to the basket 12 through the water supplying means 14 to fill the basket to the water level A shown in Figure 1, and the agitator 13 is oscillated by appropriate driving means.

The oscillation of the agitator induces a circulation of water through the openings 20 into the filter member 28, through the openings 35 and 27, and through the spaces 26. The water within the basket is thus continuously recirculated by means of the pumping action of the oscillated agitator.

Since any scum or lint in the water is of a relatively light weight, it will be recirculated with the water as it flows through the agitator 13, and the filter member 28 arrests and removes the scum and lint from the circulating water.

The water level within the basket 12 may vary depending upon the particular operation being carried out by the washing machine. For example, in washing machines having an imperforate basket as disclosed in Fig. 1 of the present application, it is the practice during the rinsing cycle to add sufficient water to the basket to overflow water from the basket. In the present construction, the space 34 provides an air pocket which, when water is admitted to the basket 12, will provide a floating means for the filter member 28 and cause the top of the filter member to be above the water level of the basket during non-agitation periods. Thus, during the overflow rinse fill cycle, the filter member 28 will rise in the agitator 13 as the water level of the basket rises and prevent back flow of water through the screen or filter element 36. Without this floating action of the filter member, a reverse flow of water through the screen 36 would remove

the lint and scum from the filter and redeposit it in the water of the basket.

During the agitation periods, the filter 28 is forced downward to rest on projection 40, by a vacuum created by the pumping of water through the filter by the agitator. The filter will remain in this position as long as agitation continues. When the agitation period is completed or agitation stops for any reason, the filter will rise until it is above water level. This prevents the flushing of lint and scum back into the wash basket.

The filter 28 must be periodically removed and cleaned of scum and lint. To remove the filter, the operator merely grasps the knob 43 and lifts upwardly thereby lifting the tube 37, and the filter 28 which is supported thereon.

While we have described our invention in connection with a certain specific embodiment thereof, it is to be understood that this is by way of illustration and not by way of limitation and the scope of our invention is defined solely by the appended claims which should be construed as broadly as the prior art will permit.

We claim:

1. In a clothes washing machine, a clothes receiving basket adapted to be filled with water to a predetermined level, an agitator disposed within said basket, means for oscillating said agitator, means defining a water passage through said agitator whereby wash liquid is circulated through said agitator during the oscillation thereof in the water, a filter member associated with said agitator and disposed within the path of the circulating water, and float means on said filter member for maintaining said filter member above the water level of said basket during non-agitation periods.

2. In a clothes washing machine, a clothes receiving basket adapted to be filled with water to a predetermined level, an agitator disposed within said basket, means for oscillating said agitator, means defining a water passage through said agitator whereby wash liquid is circulated through said agitator during the oscillation thereof in the water, a filter member associated with said agitator and disposed within the path of the circulating water, and float means on said filter member for maintaining said filter member above the water level of said basket during non-agitation periods, said float means comprising an air pocket in the body of said filter member.

3. In a clothes washing machine, a clothes receiving basket adapted to be filled with water to a predetermined level, an agitator disposed within said basket, means for oscillating said agitator including an upstanding shaft, said agitator comprising a post portion for receiving said shaft and a wall radially spaced therefrom and defining a radial space, said wall terminating in a flaring base, at least one opening in said wall above said base portion, means defining a water passage through said agitator from said radial space through said base portion whereby wash liquid is circulated through said agitator during the oscillation thereof in the water, an annular filter member slidably disposed on said agitator post and disposed within said radial space, and float means on said filter member for maintaining said filter member above the water level of said basket during non-agitation periods.

4. In a clothes washing machine, a clothes receiving basket adapted to be filled with water to a predetermined level, an agitator disposed within said basket means for oscillating said agitator including an upstanding shaft, said agitator comprising a post portion for receiving said shaft and a wall radially spaced therefrom and defining a radial space, said wall terminating in a flaring base, at least one opening in said wall above said base portion, means defining a water passage through said agitator from said radial space through said base portion whereby wash liquid is circulated through said agitator during the oscillation thereof in the water, an annular filter member slidably disposed on said agitator post and disposed within said radial space, float means on said filter member for maintaining said filter member above the water level of said basket during non-agitation periods, and means for supporting and removing said filter comprising a tube slidably disposed over said agitator post portion and having its upper end extending to a point adjacent the top of the post and having its lower end formed to provide a seat for said annular member.

5. In a clothes washing machine, an imperforate clothes receiving basket adapted to be filled with water to a predetermined level for a wash cycle and adapted to be overflowed during a rinse cycle, an agitator disposed within said basket, means for oscillating said agitator, means defining a water passage through said agitator whereby wash liquid is circulated through said agitator during the oscillation thereof in the water, a filter member associated with said agitator and disposed within the path of the circulating water, and float means on said filter member for maintaining said filter member above the water level of said basket during said predetermined water level during the non-agitation periods.

6. In a clothes washing machine, an imperforate clothes receiving basket adapted to be filled with water to a predetermined level for a wash cycle and adapted to be overflowed during a rinse cycle, an agitator disposed within said basket, means for oscillating said agitator including an upstanding shaft, said agitator comprising a post portion for receiving said shaft and a wall member radially spaced therefrom and defining a radial space, said wall member terminating in a flaring base, at least one opening in said wall member above said base portion, means defining a water passage through said agitator from said radial space through said base portion whereby wash liquid is circulated through said agitator during the oscillation thereof in the water, an annular filter member slidably disposed on said agitator post and disposed within said radial space, and float means on said filter member for maintaining said filter member above the water level of said basket during said predetermined water level during non-agitation periods.

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