The present invention relates to clothes washing machines of the automatic type in which clothes are washed and rinsed in water by movement of an agitator within a basket, and in which water is extracted from the clothes by rotation of the basket at high speed.

A clothes washing machine of the above mentioned variety usually functions first to wash clothes in water contained in the washing basket, then to extract the wash water from the clothes and basket, thereafter to rinse the clothes in water freshly supplied to the basket, and finally to extract the rinse water from the clothes and basket. In these machines, satisfactory washing of clothes requires the addition of a washing-aid material (soap or detergent) to the wash water, and better rinsing of the clothes is obtained when a rinsing-agent (for example a water softening solution) is added to the rinse water. In an automatic machine, it is desirable that the washing-aid and the rinsing-agent be automatically introduced into the clothes basket, and, for best results, the washing-aid and the rinsing-agent should be added when there is water in the basket.

It is therefore an object of this invention to provide a new and improved device for use with an automatic washing machine, which device is adapted to receive a charge of washing-aid and a charge of rinsing-agent before the machine is started in its operation, then to dispense the washing-aid automatically when the basket is filled with wash water, and thereafter to dispense the rinsing-agent automatically when the wash water has been extracted and the basket is filled with rinse water.

It frequently occurs that soap or detergent; when wetted, forms lumps which adhere to the clothes even after repeated rinsing. It is therefore a further object of this invention to provide a device adapted to contain and dispense soap or detergent, the device being constructed to insure mixing of water with the soap or detergent and to prevent undissolved soap or detergent from passing into the washing basket.

In washing and rinsing clothes in a machine of the above mentioned variety there is produced lint which remains suspended in the water and attaches itself to the clothes as a result of the spinning action to extract water. It is a characteristic feature of the invention that the structure which provides for mixing of water with washing aid and for preventing passage of insufficiently dissolved washing aid into the washing basket, also serves to effect removal of lint from the wash water and from the rinse water.

Another characteristic feature of the invention resides in the provision of a dispensing-fitting device which is capable of contributing to the washing and rinsing actions of the machine by assisting in turning the clothes over in water contained within the basket wherein the clothes are washed and rinsed.

In accordance with a preferred embodiment, the device of this invention is adapted to dispense powdered washing-aid and liquid rinsing-agent, and has two separate sections, one for the washing-aid and the other for the rinsing-agent. The device is adapted for mounting on and movement with the agitator of an automatic washing machine and is so constructed and arranged that the washing-aid mixes with water which enters and passes through the device. Also, the device is constructed and arranged in such a manner that during rotation of the device with spinning of the agitator, the liquid rinsing-agent is ejected into a compartment within said device to be thereafter mixed with the rinse water.

The device moreover is supported in such a manner as to be partially submerged in the water within the basket and embodies means which, during agitation causes the wash water, and also the rinse water, to circulate through the device and to pass through a filter portion incorporated therein.

The full nature of the invention and the manner in which its objects and advantages are achieved, will be fully understood from the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a side view, partly in elevation and partly in section, illustrating a portion of a clothes washing machine with which is associated a dispenser-filter device embodying the invention;

Figure 2 is an enlarged top plan view of the dispenser-filter device illustrated in Figure 1;

Figure 3 is a cross-sectional view taken on line 3—3 of Figure 2;

Figure 4 is a bottom plan view of the device shown in Figures 2 and 3, with parts broken away to illustrate certain structural features;

Figure 5 is a view similar to Figure 4 but with certain parts removed;

Figure 6 is a perspective view of one of the parts illustrated in Figure 5; and

Figure 7 is an exploded view in perspective illustrating cooperative elements of the rinsing-agent container included in the device of the invention.

With more particular reference to the drawings, Figure 1 illustrates those elements of an automatic clothes washing machine which are necessary for an understanding of the invention. The machine itself is of known type which includes an outer casing or cabinet 10 adapted to house a fixed tub 11 which is provided with a drain outlet 12 and which encircles a rotatable washing basket 13. The cabinet has an open top portion 14 which is provided with a hinged cover 15 to give access to said basket.

In machines of this type, clothes are placed in the basket 13 and are washed, rinsed and spun-dried therein. The clothes are washed by action of a bladed agitator 16 which is driven to oscillate back and forth within the basket while the latter is held stationary, and water is extracted from the clothes by accelerated rotation of the basket and agitator in one direction. The basket is imperforate except for overflow ports or apertures 17 which determine the normal level of water in the basket and provide for escape of the water during spinning of the basket. Water is introduced within the basket through an inlet nozzle 18 controlled by means of a suitable conventional solenoid operated mixing valve 19 which is connected with conduits 20 and 21 for supplying hot and cold water. A timer-operated control 22 having a setting knob 23, is provided to effect operation of said valve 19 as well as to govern the automatic function of the machine through a schedule of washing, rinsing and water extracting operations.

The solenoid valve and the timer-operated control are commercial items which are well known in the art and to which no claim of invention is made herein. These
items therefore have been conventionally represented in the drawings. Likewise the driving and coupling mechanism provides for activation of the agitator in the basket and which also provides for rotation of the agitator with the basket in the manner previously noted is commonly known in the art and has not been illustrated. Briefly stated the timer-operated control and the driving and coupling mechanism, as is generally known in the art, function to drive the agitator and basket in the following manner: after the basket 13 is filled with water to a level determined by the apertures 17, the agitator 16 is oscillated with respect to the basket to effect washing of the clothes; at the conclusion of the washing cycle, the basket and agitator are rotated in unison at high speed for the purpose of centrifugally extracting the wash water from the clothes and expelling the water from the basket through the apertures 17; after this extraction, high speed rotation of the basket and agitator ceases, the basket is filled with a fresh supply of water and the agitator is again oscillated in the basket to effect rinsing of the clothes; finally, following the rinsing cycle, the basket and agitator are once more rotated at high speed for a period of time sufficiently long to extract the rinse water and spin-dry the clothes.

As illustrated, the washing machine is provided with a dispenser-filter device indicated generally at 24. In the embodiment shown in the drawings, this device comprises a bottom or base member 25, a top or cap member 26 and a filter member 27.

The base member 25 and cap member 26 are cemented together at abutting portions such as those shown at 28 and 29 (Figure 3), and the filter member 27 is affixed to the base member as by means of fastening elements 30 (Figures 3 and 4). The base member 25 is in the form of a shallow pan and has a centrally disposed upright tubular post 31 which is in alignment with a hollow cylindrical projection 32 extending from the top surface 33 of the cap member 26. The aligned post 31 and projection 32 cooperate to constitute a continuous internal bore for receiving the upper end portion of the agitator. As seen in Figures 3 and 4, an annular gasket 35 of rubber or similar resilient material is fitted within the extension 32 to provide frictional engagement between said agitator and the device 24. The base member 25 is also provided with pockets 36 adapted to accommodate agitator blade portions which seat themselves within said pockets. In this manner the entire dispenser device 24 is supported so as to be partly submerged in water as the washing 33 is locked to the agitator to be positively driven thereby.

The filter member 27 is in the form of a dish in which the pan-like base member 25 and cap member 26 are nested. A bottom portion of the dished filter member 27 has enlarged perforations 37 through which water can pass into the dispenser device and thence out through fine perforations 38 in the side wall of said filter member. The passage of water into and out of the dispenser device is effected by means of radial fins 39 which depend from the bottom of the base member 25 and which, during oscillatory motion of said device with the agitator, act as pump fins or blades.

The cap member 26 has a trough-like or container section 40 for powdered washing-agent (soap or detergent) and a reception section 42 for liquid rinsing-agent. The trough-like or container section 40, as best seen in Figures 2 and 3, opens through the top surface 33 of the cap member and discharges into a portion 43 of the pan-like base member 25, said portion being defined and separated from the remaining portion 43a of said pan-like member by means of upstanding ribs 44 which extend partially across said members. Radially extending scoops or vanes 45 and slots 46 are formed in the bottom of the pan-like member 25 said vanes serving to lift water and pass it through said slots and into said portion 43 wherein mixing of water with soap or detergent takes place.

The receptacle section 42 is provided with an opening 47 which confronts and discharges into an annular compartment 48 (Figure 3) defined by the inner walls of the cap member 26 and by a ring 50 which is cemented or otherwise affixed to said cap member. The opening 47 is located in an upper portion of the receptacle 42 so that liquid rinsing-agent poured in a measured amount into said receptacle will not normally run out through said opening. Pouring of the rinsing-agent into the receptacle 42 is facilitated by providing the latter with a cover 51. In use, the device 24 is snugly seated over the upper part of the agitator center post. Before or during filling of the washing basket 13 with water, a measured quantity of washing-agent is placed in the trough-like or container section 40, and a measured quantity of liquid rinsing-agent is poured into the receptacle 42. The basket is filled to a level where, at the start of the washing operation, water flows into the pan-like member 25 of the device and mixes with the washing-agent in the portion 43, the mixture then passing into the basket. Back and forth oscillation of the device with the agitator causes the vanes 45 to pick up and disperse into the water into the portion 43. In this manner water is effectively pumped into said portion 43 to dissolve the washing-agent.

During washing operation, the rinsing-agent is retained in the receptacle 42 but, following the washing operation, high speed rotation of the device with spinning of the basket and agitator to extract the washing water, causes the rinsing-agent to be ejected from said receptacle through the opening 47, and into the compartment 48. When high speed rotation ceases, the rinsing-agent flows into and remains within the portion 43a of the pan-like base member 25. In order to ensure that the rinsing-agent will not run into the slotted portion 43 of said member 25, the sector of the ring 50 located over said portion is formed with a channel 52 which receives the rinsing-agent and delivers it for discharge into the mentioned portion 43a of said member 25. Rinsing water filling the tub flows into the pan-like member 25 and mixes with the liquid rinsing-agent, the mixture being charged from said member into the tub 13, as the agitator oscillates back and forth for rinsing the clothes in said tub.

Because of the enlarged perforations 37 in the bottom of the member 27, water is constantly present within said member 25. To this end, the device 24, in virtue of the device, act as pump blades causing the water to circulate through the finer perforations 38. In this manner the device filters lint and other foreign matter from the circulating water.

After each use, the device can be thoroughly cleaned by removing it from the agitator and flushing it with clear water. Also, thorough cleaning of the removable container 42 is easily done because as seen in Figure 7, the cover 51 can be removed to allow access to the interior of said container.

It will be noted that the cover 51 is provided with a depending lip 54 having a portion which is formed with a series of ridges 55 adapted to extend within the container 42 and to project transversely over the slot 47 in said container. This arrangement prevents liquid rinsing-agent within the receptacle 42 from passing outwardly thereof as the device oscillates back and forth with the agitator. However, the device provides a number of striction passages which allows the rinsing-agent to be ejected by centrifugal action during spinning of the device with the agitator and basket.

It should be noted that, as represented in Figure 3, the plane P—P of the outer wall of the receptacle 42 is substantially parallel to the axis of rotation A—A of the device and, as seen in Figure 2, said outer wall is
constructed on a radius \( R \) smaller than the distance between said axis and said plane. In this manner during spinning of the device, the liquid rinsing-agent within the receptacle 42 is forced by centrifugal action toward the point \( L \) on said outer wall where the slot 47 is located thereby insuring that virtually all of the liquid within said receptacle will be ejected therefrom.

From the foregoing description, it will be appreciated that the present invention provides an inexpensive and simplified arrangement which utilizes the motions of a washing machine agitator to effect automatic addition of soap or detergent to wash water in the washing basket, to effect automatic addition of rinsing agent to the rinse water filling said basket, and to effect removal of lint from the water in the machine during its washing and rinsing operations. Also because the device of this invention incorporates means which during agitation operates to effect circulation of water from the basket through said device and back to the basket, there is produced a churning action which cooperates with the agitator action to enhance the turning of the clothes in the water, thereby intensifying the washing and rinsing functions of the machine.

While a preferred embodiment has been shown and described, it is to be understood that the invention embraces such changes and modifications as may come within the scope of the subjoined claims.

We claim:
1. For use with a clothes washing machine provided with a washing basket adapted to contain water and a member movable to agitate the clothes within said basket; a device adapted for mounting on said member to move therewith and support thereon in a position to be partly submerged in water within the basket, said device comprising a container section for washing-aid, a pan member having a portion disposed below said section to receive the washing-aid therefrom and to impede passage of said washing-aid into the washing basket, and means for forcing water from said basket into said portion during such movement of said device whereby to effect mixture of washing-aid with water and passage of the mixture into the basket, said means including scooping elements leading into said portion and extending downwardly from said pan member to project into the water which surrounds the submerged part of said device.

2. A device as set forth in claim 1, in which a dished member encompasses the mentioned pan member, said dished member having a perforated bottom wall and a perforated side wall, and fins extending radially across said perforated bottom wall to pump water from the washing basket into said dished member through its said bottom wall and out of said dished member through its said side wall in response to the mentioned movement of said device.

3. For use with a clothes washing machine which provides for successive operations including a washing operation, an extraction operation and a rinsing operation, and which is provided with a washing basket adapted to contain water and a member movable with respect to said basket to agitate clothes within said washing basket and rinsing operations and to rotate with said basket during said extraction operation; a device adapted for mounting on said member in a position to be partly submerged in water within the washing basket, said device comprising a container section for washing-aid, a receptacle for retaining-aid during said washing operation and having a wall constructed for ejecting said rinsing-agent during said extraction operation, a compartment enclosing said receptacle and having an interior surface confronting said wall, said surface and wall being spaced laterally from and cooperating with each other to define a chamber for receiving and holding the ejected liquid rinsing-agent and for discharging it upon cessation of said extraction operation, a pan member having two portions separated from each other, one of said portions being disposed below said container section to receive the washing-aid therefrom and to impede passage of said washing-aid into the washing basket, means for forcing water from said basket into said one of said portions during movement of said device with respect to said basket whereby to provide for mixture of water with said washing-aid in said one of said portions and for passage of the mixture into said basket during the washing operation, said means including scooping elements leading into said one of said portions and extending downwardly from said pan member to project into the water which surrounds the submerged part of said device, and the other of said portions being disposed below said receptacle and compartment to receive the liquid rinsing-agent discharged from said chamber and water contained in said washing basket whereby to provide for mixture of water with said rinsing-agent in said other of said portions and for discharge of the mixture therefrom into said basket during the rinsing operation.

4. In a clothes washing machine, a washing basket adapted to be filled with water to a predetermined level, an agitator mounted in and movable with respect to said basket for washing and rinsing operations and to rotate therewith for water extraction operation, and a device mounted on said agitator to move therewith and consisting of a base member, a cap member and a cap memberFurther having a compartment enclosing said receptacle and having an interior surface confronting said wall, said surface and wall being spaced laterally from and cooperating with each other to define a chamber for receiving and holding liquid rinsing-agent centrifugally ejected from said receptacle during extraction operation; said base member having downwardly extended radial fins and upwardly projecting ribs, said ribs defining two distinct portions separated from each other, one of said portions being a container section to receive the powdered washing-aid therefrom and having means for passing water from said basket to be mixed with said washing-aid and then discharged into the basket during washing operation, the other of said portions being a compartment for containing the liquid rinsing-agent from said compartment upon cessation of extraction operation to be mixed with water from the basket and then discharged into the basket during rinsing operation; said filter member having a perforated bottom wall and a perforated side wall extending upwardly from said bottom wall, said walls cooperating with said fins of the base member to provide for circulation of water to and from the basket and through said filter member.

5. In a clothes washing machine, the combination set forth in claim 4, in which the mentioned outer wall of the mentioned receptacle has an inner surface which lies in a plane substantially parallel to the axis of rotation of the device and is constructed on a radius smaller than the distance between said axis and said plane.

6. For use with a clothes washing machine which provides for successive operations including a washing operation, an extraction operation and a rinsing operation, and which is provided with a washing basket adapted to contain water and an agitator mounted for oscillating movement with respect to said basket during said washing and rinsing operations and for oscillating movement with the basket during said extraction operation; a device adapted for mounting on said agitator to move therewith and supported thereon in a position to be
partly submerged in water within the washing basket, said device comprising a receptacle for retaining liquid rinsing-agent during said washing operation and having a wall constructed for ejecting the liquid rinsing agent during the extraction operation, a compartment enclosing said receptacle and having a surface confronting said wall, said surface and wall being spaced laterally from and cooperating with each other to define a chamber for receiving and holding the ejected liquid rinsing-agent and for discharging it upon cessation of said extraction operation, a pan member having a portion disposed below said receptacle and compartment to receive the liquid rinsing-agent discharged from said chamber and water contained in the washing basket to provide for mixture of said rinsing-agent with said water during the rinsing operation, a dished member surrounding said pan member, said dished member having a perforated bottom wall and a perforated side wall, and fins extending radially across said bottom wall to pump water from the washing basket into said dished member through its perforated bottom wall and out of said dished member through its said perforated side wall in response to oscillating motion of said device.

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