

Feb. 4, 1958

K. H. BECKER
WASHING MACHINE

2,821,848

Filed July 15, 1955

2 Sheets-Sheet 1

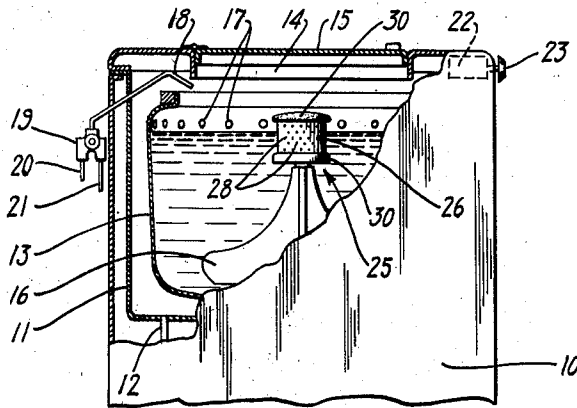


FIG. 1.

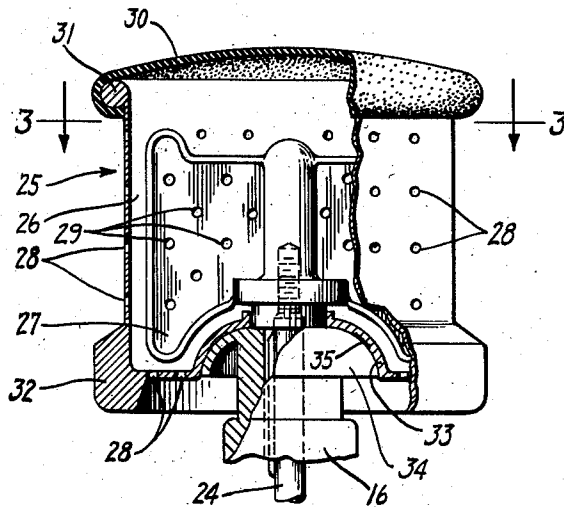


FIG. 2.

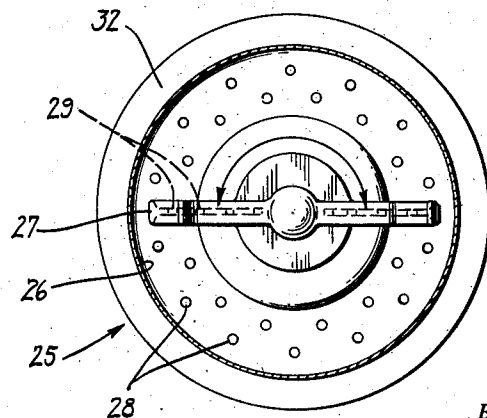


FIG. 3.

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2 Sheets-Sheet 2

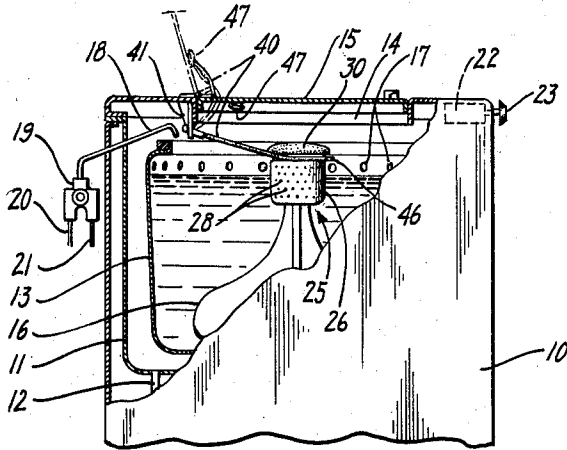


FIG. 4.

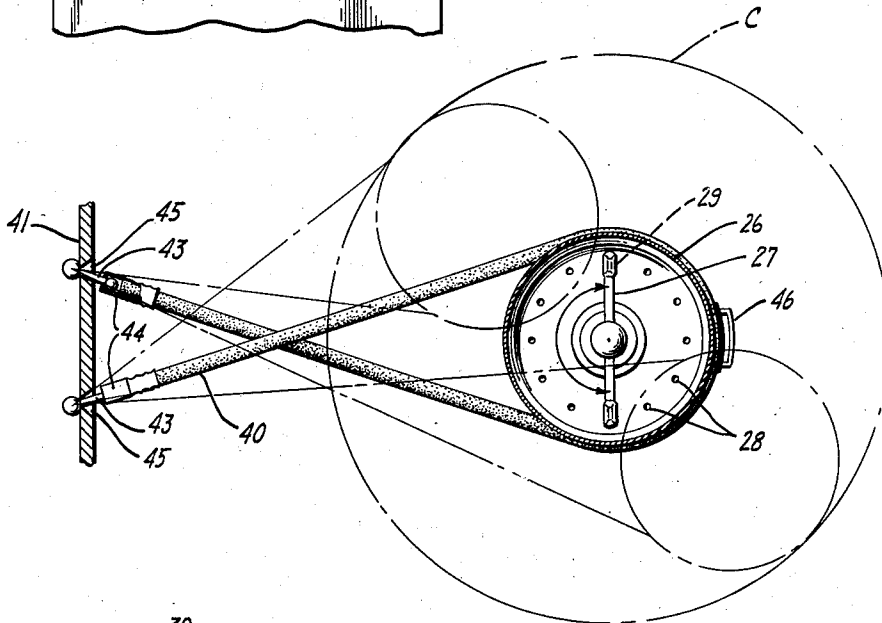


FIG. 5.

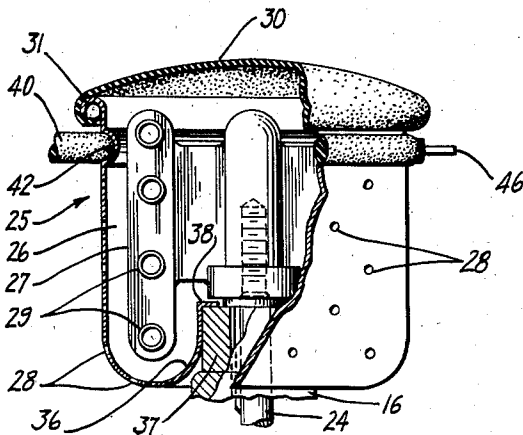


FIG. 6.

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2,821,848

WASHING MACHINE

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Application July 15, 1955, Serial No. 522,246

14 Claims. (Cl. 68—17)

The present invention relates generally to washing machines and particularly to automatic clothes-washing machines. Specifically, the invention herein disclosed and claimed has to do with means whereby a washing-aid material such as soap or detergent powder is automatically added to and mixed with water within the washing compartment or basket of an automatic machine of the type in which clothes are washed by function of an agitator mounted for rotating oscillatory motion within said container or basket.

Clothes-washing machines of the above-mentioned general variety usually include mechanism which provides for sequential washing, rinsing and water extracting operations. With most of these clothes-washing machines, manual addition of soap or detergent material to the wash water is required, and it is customary to recommend that such material be added after the washing basket has been filled with water and before the clothes are placed in the basket. However, the user is apt to load the washing machine with clothes and to add soap or detergent material before the wash water reaches the proper level in the washing basket, with the result that some of the soap or detergent material does not dissolve and adheres to the clothes even after repeated rinsing. To overcome these disadvantages, washing machines have been provided with devices for storing detergent or soap material and for dispensing this material into the wash water being fed to the washing basket. Although these known devices may satisfactorily dispense soap or detergent material, they usually make no provision to prevent lumping of the material when wetted by wash water admitted into the storage device.

It is an object of this invention to provide simple means adapted to contain a supply of soap or detergent material and including a simplified arrangement for positively preventing the soap or detergent material from lumping and also positively assuring thorough mixing of the material with wash water.

It is also an object of the present invention to provide an improved and novel arrangement whereby soap or detergent material is automatically added to wash water only when it reaches a desired level in the washing basket of an automatic washing machine.

Another object of the invention is to provide a clothes-washing machine with a soap or detergent supplying arrangement which utilizes existing parts of the washing machine and which operates in such a manner that soap or detergent is automatically added to the wash water at the required time without necessitating modification of the regular automatic functions of the machine.

Still another object and more specific feature of the invention has to do with the provision of a soap or detergent supplying device especially suited for use with an agitator-type washing machine and so arranged as not to interfere with vibrational or gyratory motions of the washing basket during normal operation of such a machine.

A characteristic feature of the invention resides in the

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provision of an inexpensive arrangement for supplying soap or detergent in an automatic clothes-washing machine of the mentioned type, which arrangement is constructed for novel combination and association with the oscillatory rotating agitator of the washing machine and which utilizes the oscillating motion of the agitator drive means to effect automatic addition of soap or detergent to the wash water at the time when the water reaches a predetermined level in the washing basket.

Broadly stated, the arrangement or device of the invention comprises a simple receptacle for containing a measured quantity of soap or detergent powder and constructed for mounting on the agitator of an automatic washing machine in such manner as to be partially submerged in the wash water within the washing basket of the machine. This receptacle encloses a mixing element coupled with the agitator driving member and driven thereby to produce a stirring action which causes the soap or detergent to dissolve in the wash water and to become thoroughly intermixed therewith. Motion resisting means is provided to restrain the soap or detergent receptacle against movement with the agitator and with respect to the aforesaid mixing element, so that the receptacle and mixing element co-function to dissipate the soap or detergent powder and to prevent lumping of the wetted powder.

According to a specific embodiment of the invention, the motion resisting means is in the form of a weighted portion which adds mass to the soap or detergent receptacle and acts as an inertia means to stabilize said receptacle and to maintain it in a substantially static condition as the agitator and mixing element oscillate rotatably. According to another specific embodiment, the motion resisting means takes the form of an anchoring arrangement which frictionally holds the soap or detergent receptacle in stationary position with respect to the oscillating rotation of the agitator and of the mixing element.

The full nature of the invention and the manner in which the above noted and other objects and features are achieved will be more 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 which incorporates a preferred embodiment of the invention;

Figure 2 is an enlarged side view of the soap or detergent supplying and mixing device of the embodiment illustrated in Figure 1, with parts broken away and shown in section;

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

Figure 4 is a view similar to Figure 1 and illustrates a portion of a clothes-washing machine which incorporates another embodiment of the invention;

Figure 5 is a fragmentary plan view, on a larger scale and with parts in section, schematically representing certain operational features of the soap or detergent supplying and mixing device illustrated in Figure 4; and

Figure 6 is a view similar to Figure 2 and illustrates the device of the embodiment shown in Figures 4 and 5.

With more particular reference to the drawings, Figures 1 and 4 illustrate those elements of an automatic clothes washing machine which are necessary for an understanding of the invention. The machine itself is of known domestic type, for example, as is shown and described in the co-pending application of Harold D. Johnson et al., Serial Number 496,847, filed March 21, 1955, and assigned to the assignee of the present application.

Generally speaking, the machine includes an outer casing or cabinet 10 housing 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

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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 rotatably within the basket while the latter is held stationary, and the clothes are spun-dried by accelerated rotation of the basket while the agitator is disconnected from its drive.

The basket 13 is imperforate except for overflow ports or apertures 17 which determine the normal level of the wash water and provide for escape of the water during spinning of said 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 setting knob 23, is provided to effect operation of said valve 19 as well as to direct 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 trade 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 which provides for actuation of the agitator and basket in the manner previously noted is generally known in the art and has not been illustrated. Such mechanism suitable for the purpose of this invention is shown and described in the aforesaid co-pending application and includes clutching and braking means to effect connection and disconnection between the basket and the usual motor and between the motor-operated reciprocating drive and the usual agitator shaft 24 (Figures 2 and 6), in response to the function of the above mentioned timer-operated control.

As illustrated, the washing machine is provided with soap or detergent supplying means indicated generally at 25. In particular accordance with the present invention, this soap or detergent supplying means is associated with the agitator 16 and its actuating shaft 24 to be operated by the latter so that soap or detergent material is automatically added to and mixed with water in the washing basket 13. Generally stated, the means 25 comprises a cup-shaped receptacle 26 and a mixing or stirring element 27 (Figures 2 and 3 and Figures 5 and 6).

As viewed in Figures 1 and 4, the receptacle 26 is supported on the upper end portion of the agitator 16 in a position to be substantially submerged in the wash water when filling the basket 13 to normal level. The receptacle is adapted to contain soap or detergent material and has perforations 28 so that wash water passes through said receptacle and wets said material.

As seen in Figures 2 and 3 and in Figures 5 and 6, the mixing or stirring element 27 which is also advantageously provided with perforations 29 to assist in its mixing action, is enclosed in the receptacle 26 and is connected, as by screw-threaded engagement, with the upper end portion of the agitator shaft 24 so as to oscillate rotatably with said shaft on an arc of approximately 180° as is represented by arrows in Figures 3 and 5. In this manner, the wetted soap or detergent material is splashed and tossed about, thus preventing said material from lumping, and causing it to become thoroughly mixed with wash water, the mixture oozing out through the perforations 28 but being prevented from emerging through the open top of the receptacle by means of a cover 30 which seals said open top. This cover is conveniently made of rubber or other pliable material to slip and snugly fit over a retaining ledge 31 at the top portion of the receptacle.

In order to enhance and insure the above mentioned non-lumping and thorough mixing action, it is desirable that the receptacle 26 be held substantially stationary with

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respect to the oscillating element 27. For that purpose and in accordance with the invention, means is provided for restraining the receptacle against movement with the agitator which, as above indicated, supports said receptacle. The preferred embodiment illustrated in Figures 1, 2 and 3 employs an arrangement which utilizes the mass of the receptacle to effect its stabilization on the agitator 16, whereas the modified embodiment illustrated in Figures 4, 5 and 6 employs an arrangement which positively anchors the receptacle to prohibit its rotary motion with the agitator.

With specific reference to the preferred embodiment and as best seen in Figure 2, the receptacle is advantageously die-cast with an enlarged massive rim 32 at the lower part of the receptacle, adjacent its point of engagement with the upper end of the agitator 16. This rim together with the remainder of the body of the receptacle presents considerable inertia which acts to stabilize the receptacle and to cause it to slip on the agitator as the latter rotates back and forth with the driving shaft 24. This slippage is conveniently assisted by providing the bottom of the receptacle with a hemispherical concave surface portion 33 freely resting on a hemispherical convex surface portion 34 which is disposed at the top of the agitator. The slippage is further advantageously aided by providing an annular undercut or recessed area 35 on the mentioned bottom portion 33 of the receptacle to lessen the frictional engagement between said bottom portion and the corresponding mentioned top portion 34 of said agitator.

In the modified embodiment and as best seen in Figure 6, the soap or detergent receptacle is die-pressed or otherwise conveniently formed with a reentrant bottom portion 36 adapted to fit about a neck portion 37 at the upper end of the agitator. This neck portion has a flattened upper surface, and said reentrant portion of the receptacle has an annular flange 38 resting on said surface.

An elongated anchoring belt 40 having its ends attached to a bracket 41 affixed to the machine cabinet (Figure 4) engages said receptacle which, as clearly shown in Figure 6, is provided with an annular groove 42 accommodating said belt. The belt is made of rubber or similar resilient material and is put under tension when placed in engagement with the receptacle so that the latter is thereby frictionally held against rotation with the agitator 16. Moreover, because the belt is resilient, the receptacle which is positively held against rotation, is nevertheless free to follow the side-to-side motions of the agitator in the event an unbalanced condition develops due to uneven distribution of the clothes and causes the basket and agitator assembly to gyrate. As is diagrammatically represented in Figure 5, the resilient belt allows for displacement of the receptacle from a normally centered position to an off-center position anywhere within an imaginary circle C representing the extent of the path of movement which the soap or detergent receptacle would traverse should the agitator gyrate during a condition of unbalance.

As seen in Figure 5, the belt 40 is so arranged that portions thereof cross one over the other between the receptacle and the bracket 41. In this manner, the belt tends to remain in operative engagement with the aforesaid groove on the receptacle 26 when the latter is displaced as the result of an unbalanced load in the basket 13. Also, as best seen in Figure 5, the connection between the belt 40 and the fixed bracket 41 is advantageously effected by means of dumbbell-shaped members 43, each of said members having one of its ball ends held rollably captive in ferrules 44 affixed to the end portions of the belt, and said members having the other of their ball ends rollably anchored in tapered apertures 45 formed through said bracket. Because of this arrangement, the crossover portions of the belt can unobstructedly assume various angular positions, as is represented in broken lines in Figure 5, so that the belt

readily adapts itself to any gyrating displacement of the soap or detergent receptacle.

A handle 46 is suitably attached to the belt 40 and is conveniently disposed centrally of the length thereof to provide for ease in manually placing the belt either in or out of engagement with the receptacle. A hook 47 (Figure 4) affixed to the inside surface of the cabinet cover 15 provides convenient means on which the belt is hung when disengaged from the receptacle. In this manner, the disengaged belt is kept from dangling loosely in the basket 13 and is supported in a readily accessible position.

In using the invention either in the form shown in Figures 1, 2 and 3, or in the form shown in Figures 4, 5 and 6, the cover 30 is removed and a measured quantity of soap or detergent material is placed in the receptacle 26 either before or during filling of the washing basket with water. The cover 30 is then put on the receptacle, and the soap or detergent material will be automatically mixed with and added to the water when it floods the receptacle and when the mixing or stirring element 27 is operated. It is pointed out that in washing machines of the type herein referred to, the agitator remains stationary during the time the basket is being filled with wash water. Accordingly the mixing or stirring element 27 which is coupled to said agitator also remains stationary during that time, so that there is then no substantial disturbance of the soap or detergent material in the receptacle and no substantial admixture of said material and water, although the water wets said material upon reaching a level where said receptacle becomes flooded. However, when said mixing or stirring element is activated by operation of the agitator at the start of the washing cycle, the wetted soap or detergent material is agitated and reduced to a mixed liquid which is added to the wash water.

It is to be noted that the mixing or stirring element 27 which serves to agitate the soap or detergent material and to cause it to mix with wash water, further serves as a wing-nut to effect retention of the agitator 16 on the agitator shaft 24. Thus when it becomes desirable to remove the receptacle and agitator for cleaning or other purposes, it is only necessary to unscrew the element 27, thus freeing both the receptacle and the agitator.

From the foregoing description, it will be appreciated that arrangements constructed in accordance with the present invention effectively insure mixture of soap or detergent with water in such a manner as to eliminate lumping of the wetted soap or detergent and to provide for the automatic addition of the mixture to the wash water within the washing basket. Particularly, it will be recognized that the novel association of the soap or detergent receptacle and of the soap or detergent mixing and stirring element with the agitator and its actuating shaft makes it possible to utilize the normal motion of the agitator drive in effecting the automatic addition of the washing-aid material to wash water in the basket.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a clothes washing machine, the combination of a washing basket adapted to be filled with water to a predetermined level, an agitator structure mounted for agitating movements within said basket, a receptacle for containing washing-aid material to be mixed with and added to the water in said basket, a mixing element movable within said receptacle, said element being connected with and driven by said structure for agitating movements within said receptacle to stir said material therein, and means for restraining said receptacle against said movements.

2. In a clothes washing machine, the combination set forth in claim 1, in which the mentioned receptacle is supported in a position to be within the water filling the basket, said receptacle having means for passage of

water therethrough and in contact with the washing-aid material contained in said receptacle.

3. In a clothes washing machine, the combination of a washing basket adapted to be filled with water to a predetermined level, a shaft extending within said basket and adapted for motion therein, an agitator disposed in said basket and mounted on said shaft to be driven thereby for agitating movements within said basket, a receptacle for containing washing-aid material and supported on said agitator in a position to be surrounded with water in said basket, said receptacle having perforations for passage of water into and out of said receptacle, a mixing element movable within said receptacle, said element being coupled with said shaft and driven thereby for agitating movements within said receptacle to stir said material and mix it with said water, and means for restraining said receptacle against said movements.

4. In a clothes washing machine, the combination of a washing basket adapted to be filled with water to a predetermined level, a driven shaft extending within said basket, an agitator disposed in said basket and mounted on said shaft to be driven thereby for agitating movements within said basket, a receptacle for containing washing-aid material, means for supporting said receptacle on said agitator in a position to be flooded with water in said basket, a mixing element movable within said receptacle, said element being coupled with said shaft and driven thereby for agitating movements within said receptacle to stir said material and mix it with said water, and motion resisting means for restraining said receptacle against said movements.

5. In a clothes washing machine, the combination as set forth in claim 4, in which the mentioned means for supporting the receptacle on the agitator is provided by a bottom portion of said receptacle and a top portion of said agitator, said portions being curved to fit one within the other, said portion of the receptacle resting freely in contact with said portion of the agitator.

6. In a clothes washing machine, the combination as set forth in claim 5, in which the mentioned bottom portion of the receptacle is curved to provide a hemispherical concave surface, the mentioned top portion of the agitator is curved to provide a hemispherical convex surface, and one of said surfaces has an annular recessed area confronting the other of said surfaces.

7. In a clothes washing machine, the combination as set forth in claim 4, in which the mentioned motion resisting means is in the form of a weighted portion adding mass to the receptacle and providing inertia stabilizing said receptacle and maintaining it in a substantially static condition on the agitator.

8. In a clothes washing machine, the combination as set forth in claim 7, in which the mentioned weighted portion consists of an enlarged massive rim on the receptacle.

9. In a clothes washing machine, the combination as set forth in claim 4, in which the mentioned motion resisting means is in the form of an anchoring belt frictionally engaged with the receptacle and holding it stationary.

10. In a clothes washing machine, the combination as set forth in claim 9, in which the receptacle is provided with an annular groove, and the mentioned belt is resilient and engageable in said groove.

11. In a clothes washing machine, the combination as set forth in claim 10, in which the mentioned belt is removably engageable with the mentioned groove and is provided with a handle for manually placing said belt in and out of engagement with the receptacle.

12. In a clothes washing machine as set forth in claim 4, in which the mentioned mixing element cooperates with the agitator to retain the receptacle in position thereon and cooperates with the agitator-mounting shaft to lock the agitator in position thereon.

13. In a washing machine having a washing basket and an agitator structure therein, a device for adding

washing-aid material to water within said basket, said device including container means for said material and mixing means in said container means, one of said means being coupled with said agitator structure to be driven thereby with respect to the other of said means, and means for restraining said other of said means against movement with respect to said one of said means.

14. In a washing machine having a washing basket and an agitator structure therein, a device for adding washing-aid material to water within said basket, said device including container means for said material and mixing means in said container means, both of said means being

carried by said agitator structure, one of said means being movable with respect to the other of said means, and means for restraining said other of said means against movement with respect to said one of said means.

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