

May 7, 1968

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3,381,504

OSCILLATABLE AGITATOR FOR A LAUNDRY MACHINE

Filed July 19, 1965

2 Sheets-Sheet 1

Fig. 1

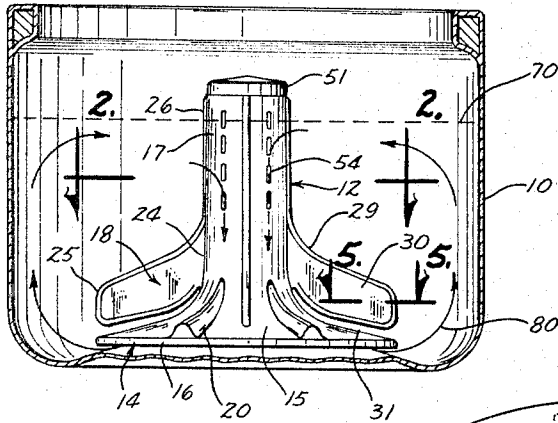


Fig. 6

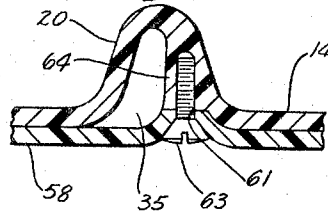


Fig. 4

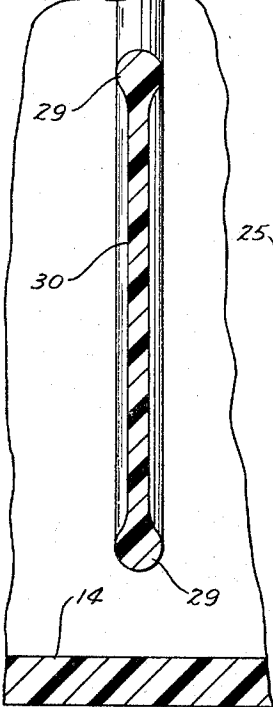


Fig. 2

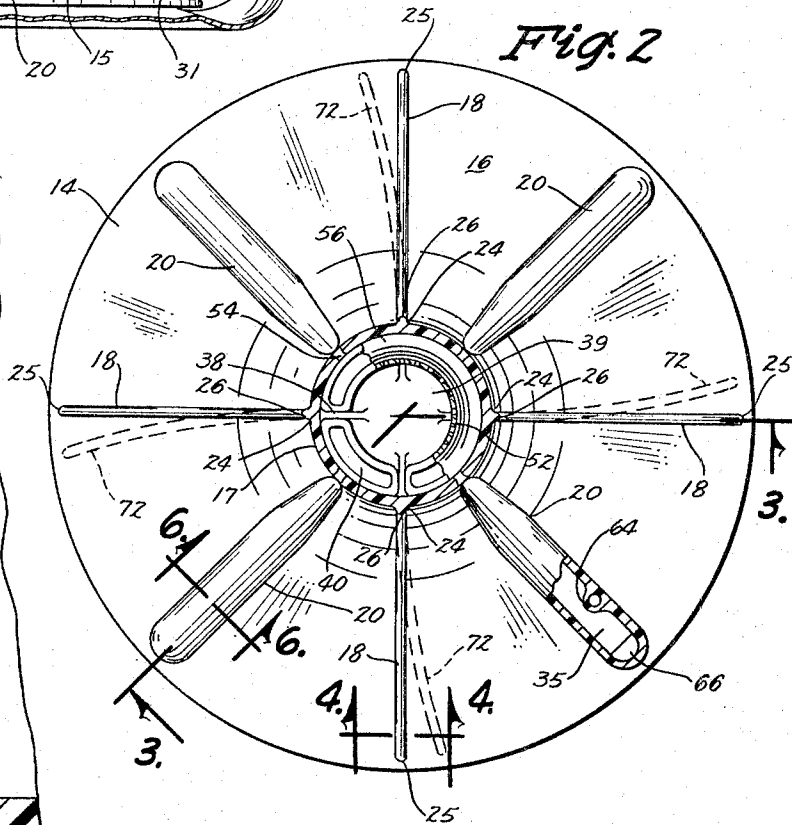
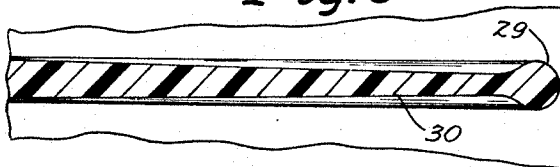


Fig. 5



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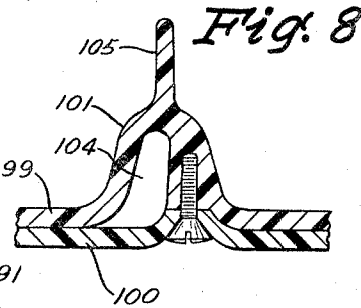
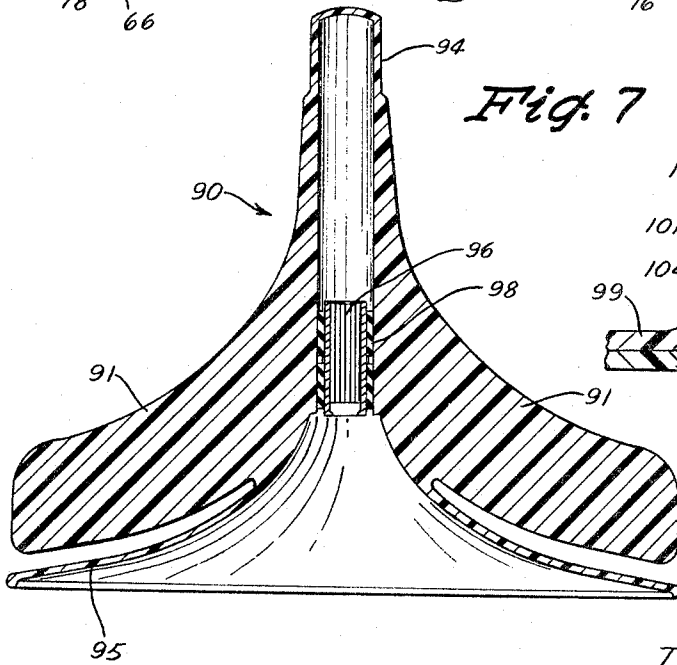
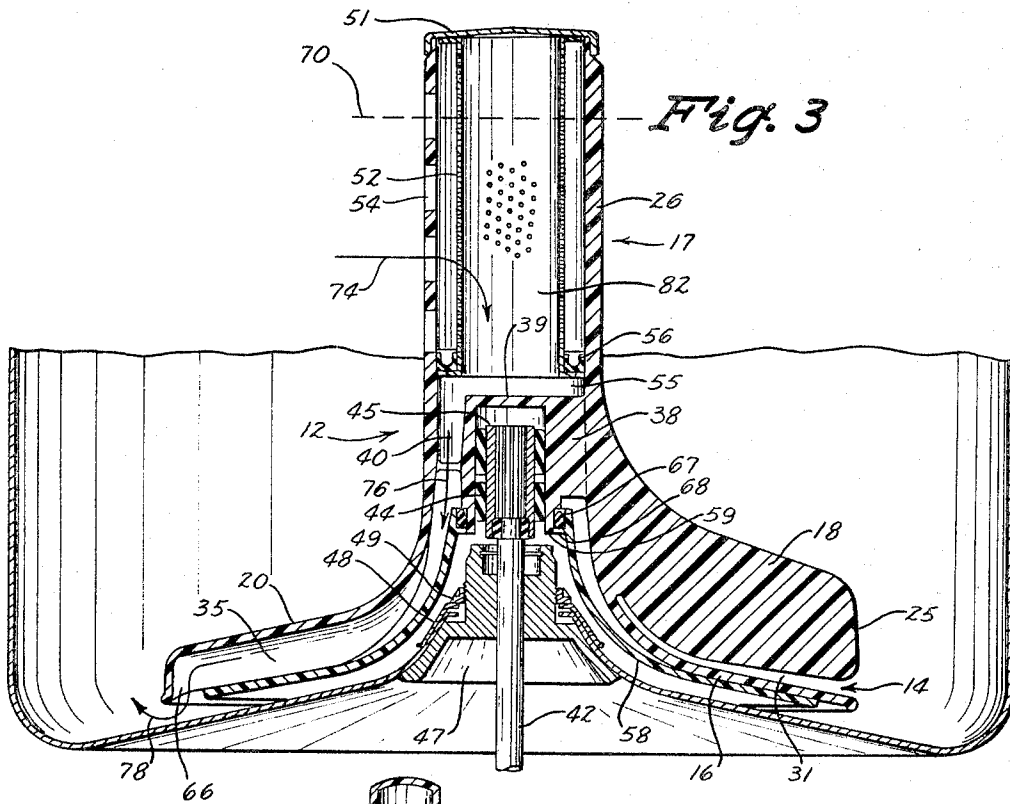
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2 Sheets-Sheet 2



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3,381,504
**OSCILLATABLE AGITATOR FOR A
 LAUNDRY MACHINE**

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 Filed July 19, 1965, Ser. No. 472,812
 19 Claims. (Cl. 68-18)

ABSTRACT OF THE DISCLOSURE

A unitary agitator construction having a centerpost and a plurality of flexible vane members extending radially outwardly from the centerpost. A flared portion extends downwardly and outwardly from the lower end of the centerpost below the vanes. At least a portion of the flared portion is detached from and spaced from the lower portion of the vanes to allow movement of the vanes relative to the flared portion.

This invention relates to the cleansing of fabrics in a domestic-type clothes washing machine by oscillation of an agitator in a container of fluid and specifically to an improved and novel oscillatable agitator construction incorporating flexible agitating vanes formed integrally with the centerpost.

Prior art has shown oscillatable agitators having composite agitating vanes including a flexible portion for achieving turbulent water currents to effect a cleansing of fabrics within the fluid. These composite, or built-up, agitating vanes generally have a number of crevices or protruding edges at each of the connections of adjoining parts. These crevices and ridges are subject to the accumulation of lint and other foreign objects as well as presenting the problem of excessive snagging and abrasion of the fabrics being washed. In addition, the fabrication and assembly of these individual components into the composite agitator add unnecessarily to the end cost of the product.

Other prior art incorporating the use of the flexible agitating vanes discloses an agitator construction which includes flexible vanes extending radially outward beyond a base portion. The extension of these vanes beyond the base portion creates a condition which may be harmful to the fabrics that are being washed because of the relative motion which occurs between the extended vane and the adjacent tub member, spaced below the vane, which remains stationary during the oscillation of the agitator. In such a construction, fabrics trapped between the extended vane and the stationary tub are subject to excessive wear and abrasion during the agitation.

It is further shown by prior art that there is a great amount of investigation being conducted to discover improved agitator shapes and constructions to achieve improved circulation of the washing fluid to thereby improve the washability of the fabrics.

It is therefore an object of this invention to provide an oscillatable agitator operable for achieving an improved washing action in a clothes washing machine.

It is an additional object of this invention to provide an improved oscillatable agitator useful in a clothes washing machine for achieving increased washability.

It is a further object of this invention to provide an improved flexible vane oscillatable agitator wherein the flexible vanes are integral with a centerpost portion and spaced from a flared base portion which is also integral with the centerpost portion.

It is a further object of this invention to provide a flexible vane agitator having an improved mode of construction and operation.

It is a further object of this invention to provide an improved agitator construction including a novel arrangement of flexible agitating vanes disposed around a centerpost and intermediate or secondary projections or ribs positioned between adjacent flexible vanes.

It is yet a further object of the present invention to provide an improved fluid filtering agitator having a plurality of flexible vanes disposed around a hollow centerpost and further including intermediate projections having an internal fluid conduit communicating with the hollow centerpost and terminating at a radially outward disposed position.

The present invention achieves these objects with an agitator construction including a plurality of flexible agitating vanes spaced about a centerpost and extending substantially radially outward therefrom. These vanes are formed integrally with the centerpost near a lower portion thereof adjacent a flared base portion which is also integrally attached to the centerpost but spaced below the flexible vanes. The agitating construction may further include a plurality of intermediate members projecting upwardly from the flared base portion between adjacent flexible vanes. This agitator may be further adapted to include a hollow centerpost and a plurality of fluid passageways through the agitator to effect a unidirectional flow of the washing fluid through fluid treatment means positioned within the hollow centerpost.

Further details of construction and operation of the device and further objects and advantages thereof will become evident as the description proceeds and from an examination of the accompanying drawings which illustrate a preferred embodiment of the invention and in which similar numerals refer to similar parts throughout the several views, wherein:

FIGURE 1 is a diagrammatic partial vertical section of a washing machine fluid container showing the agitator construction forming my invention;

FIGURE 2 is a top view of the agitator showing the centerpost in section as taken along lines 2-2 in FIGURE 1;

FIGURE 3 is an enlarged vertical cross sectional view of the agitator of the instant invention as taken along lines 3-3 of FIGURE 2;

FIGURE 4 is located below FIGURE 1 and shows a vertical section of one of the flexible vanes of the agitator of the instant invention as taken along lines 4-4 of FIGURE 2;

FIGURE 5 is located below FIGURE 2 and shows a horizontal section of one of the flexible vanes of the agitator of the instant invention as taken along lines 5-5 of FIGURE 1;

FIGURE 6 appears beside FIGURE 1 and is a sectional view of one of the intermediate rib-like projections between a pair of flexible blades showing a fluid conduit as taken along lines 6-6 of FIGURE 2;

FIGURE 7 is located below FIGURE 3 and is a vertical cross sectional view showing an additional embodiment of the instant invention; and

FIGURE 8 is a sectional view showing an alternate construction for the intermediate ribs.

Referring now to the accompanying drawings in detail, FIGURE 1 shows a tub or fluid container 10 receiving an agitator generally indicated by the reference numeral 12 and forming the subject matter of my invention.

Agitator 12 includes a base member 14 including a flared portion 16 and a central bell portion 15 which rises into a hollow upstanding centerpost 17. Formed integrally and extending generally radially outward from centerpost 17 with a downward taper are a plurality of flexible agitating vanes or blades 18. Vanes 18 are detached from and divergently spaced from base 14 except

for a short distance along bell portion 15. Projecting upwardly from base 14 between adjacent flexible vanes are a plurality of relatively shorter but heavier intermediate projections in the form of ribs 20. The construction and function of these intermediate projections will be more fully described hereinafter.

The agitator 12 is molded of an unmodified polypropylene material which possesses certain characteristics extremely useful and advantageous in the fabrication of an agitator for use in a laundry machine. Polypropylene has been shown to have a very high resistance to alkali solutions such as are generally found in washing fluids. The alkali resistance characteristics of polypropylene insure that operating characteristics of the agitator will be maintained through extended periods of contact with the washing fluids. The polypropylene material is further recognized as a material which is extremely tough while possessing flexibility. These characteristics combine to give the material an extremely high flexure life, thus making it useful in applications requiring repeated flexing, as evidenced by its use for integral hinges. These flexure characteristics are utilized in the present invention to provide a novel agitator operable for achieving an improved washing action.

As previously indicated, the agitating vanes 18 are formed integrally with the agitator 12 during the molding thereof. As best seen in FIGURE 2, these agitating vanes 18, of which there are four in this embodiment, extend generally radially outward from the centerpost 17. It is understood, however, that additional or fewer vanes may be positioned around the centerpost 17. It is noted that these agitating vanes are positioned equiangularly about the centerpost in this embodiment; however, it is recognized that this is not a requirement or limitation of this invention. Each of the agitating vanes is attached to centerpost 17 at an innermost juncture portion 24 and terminate at a tip portion 25 aligned generally with the extremity of base member 14. Contour of the agitating vanes 18, in a vertical plane, follows generally the shape of base member 14 though completely detached and spaced therefrom. The vane 18 sweeps inwardly and upwardly from the outermost tip portion 25 to join the centerpost 17 and then to continue upwardly along centerpost 17 with a small ridge 26.

As best seen in FIGURES 4 and 5, agitating vanes 18 include a bead and web construction. Extending around the web 30 of each of the agitating vanes 18, except at juncture portion 24, is a bead 29. FIGURE 4 shows the cross section of an agitating vane in a vertical plane and includes the web 30 connecting the beads 29 of the flexible agitating vane. Further, a horizontal sectional view of the agitator vane, as in FIGURE 5, shows that the web 30 has a tapering thickness increasing in thickness toward centerpost 17. This bead and web construction is useful in achieving the desired flexibility for agitating vanes 18. Furthermore, the tapering thickness of web 30 enables further control and selection of the relative flexibility of the agitating vane over its radial length. In the present embodiment, the tapered web 30 becomes the full width or thickness of bead 29 at the juncture portion 24 at centerpost 17. Bead 29 is further useful in providing the agitating vanes with a more abrasive resistant edge to prevent excessive wear of an otherwise thin edge by buckles and rigid objects within the clothing load.

It is recognized that polypropylene is subject to a change in flexibility with changes in temperature. The relative thickness of the agitating vanes is therefore selected to give the desired flexibility of the agitating vanes within the temperature range of 100 to 150 degrees F. which represents a normal operating range for fabric washing machines. This temperature range is not highly critical since this agitator will continue to operate satisfactorily, at perhaps a different level of efficiency, with either hotter or colder fluids.

The relative flexibility of agitating vanes 18 has been selected for the preferred embodiment to give approximately a 2" displacement of tip portion 25 with a load of approximately 4 to 6 lbs. applied perpendicularly to the agitator vane at tip portion 25. This deflection is a measure of relative flexibility of the vane and is not intended to represent that which occurs during oscillation of the agitator because actual deflection will be dependent upon the size of the load being washed and upon the power input to the agitator 12.

It has been further recognized that the flexible vane agitator requires a somewhat lower input to maintain a given speed of operation. Therefore, additional power may be put into the machine to achieve a higher speed agitation and improve washability.

As previously indicated, agitator 12 includes a base member 14 formed integrally with centerpost 17 and depending from the lower portion thereof. Base member 14 is spaced from flexible vanes 18 along essentially the entire radial length of the vane. The space 31 between vane 18 and base 14 becomes increasingly larger toward the outermost portion of the agitator 12 to facilitate the release of any fabrics which may become positioned, or momentarily trapped between the lower edge of the vane and the base 14.

The presence of the flared portion 16 below the flexible vanes 18 is essential to satisfactory operation of this device. The flared portion 16 is integral with the agitator and therefore rotates or oscillates with the agitator and vanes during the cleansing process. It is seen, therefore, that fabrics positioned, or momentarily trapped, between base 14 and vane 18 move with the base 14 during oscillation and there is no relative movement, except for the flexing movement of the vanes, to cause an abrasive action on the fabrics during the agitation process. Without the presence of base member 14, fabrics trapped beneath the flexible blade would be carried through a relatively large arc of oscillation and would move relative to stationary container 10 and cause severe wear and abrasion, or tearing of the fabrics.

As previously shown base 14 also includes a plurality of upwardly extending secondary agitating means or projections 20 intermediate adjacent pairs of flexible vanes. These projections may take the form of ribs 20 as in this embodiment and are useful in providing additional scrubbing and flexing of the fabrics as they are moved relative to the agitator by the flexing of vanes 18. In addition, ribs 20 are useful for increasing the turbulence and pulsations of the fluids to improve soil removal from the fabrics. These intermediate ribs 20 are formed in this embodiment to provide a fluid conduit 35 through the agitator as will be more fully described hereinafter.

Centerpost 17 is provided with internal webs 38 converging toward the longitudinal axis of the centerpost 17 to join an inverted cup-shaped driving hub 39. The webs and hub cooperate with each other and with the wall of centerpost 17 to define a plurality of internal apertures 40 as best seen in FIGURES 2 and 3. Driving hub 39 is connected to the oscillatable driving shaft 42 through resilient members 44 interconnecting the agitator drive hub 39 and the spline sleeve 45 receiving agitator drive shaft 42. The oscillatory movement imparted to shaft 42 may be produced by any of the conventional motion converting units now common in the appliance art. Agitator drive shaft 42 is journaled in the tub supporting member 47 which cooperates with the frusto-conical sealing washer 48 and clamp nut 49 to form a rigid watertight connection between container 10 and mounting member 47.

The upper end of the hollow centerpost 17 is normally covered by a cap member 51 rigidly connected to the flared upper end of the perforate cylindrical lint filter 52 located within the confines of the hollow centerpost 17 and adjacent the slotted water intake holes 54 formed in the periphery of the hollow centerpost. The lint filter

52 may include various available screen or mesh constructions for filtering out particles of lint, thread, scum or other foreign particles in the washing fluid flowing through holes 54.

A lip seal 56 encompassing the lower end of the lint filter member 52 and abutting the lower flared extension 55 of lint filter 52 provides a seal between filter 52 and the inside walls of centerpost 17 and thereby prevents lint and other particles from short-circuiting filter 52. The entire lint filter assembly formed by cap 51, lint filter 52 and seal 56 may be manually removed from the top of centerpost 17 for cleaning and for providing a means to deposit powdered detergent into the hollow centerpost for subsequent dispersion through the agitator assembly into the washing fluid as will be more apparent hereinafter.

A flared shroud member 58 conforms generally to the contour of the underside of flared portion 16. Shroud member 58 is provided with holes 61 at radially outward disposed positions for receiving screws 63 which are in turn threaded into lugs 64, formed integrally with the underside of base 14, to secure shroud member 58. Shroud member 58 covers substantially the entire bottom portion of agitator 12 and is imperforate except for a centrally located opening 59 and the previously mentioned holes 61. The shroud 58 has mating relationship with flared portion 16 along at least a portion thereof and cooperates with flared portion 16 to define a plurality of conduits or passageways 35 through the upstanding ribs 20. These conduits 35 communicate with the upper portion of hollow centerpost 17 through aperture openings 40 and extend to, and terminate at, radially outward disposed egress openings 66.

An O-ring seal 67 compressed between shroud member 58 at the centrally located flange 68 and the drive hub 39 provides an air bell effect to prevent water from rising under agitator 12 to a level above the upper surface of tub mounting 47. This protects the agitator drive shaft and its splined connection to the agitator 12 as well as preventing fluid seepage into the motion converting unit (not shown) for shaft 32 in the illustrated low center drive construction.

In operation, the container 10 is filled approximately to the level indicated by line 70 in FIGURES 1 and 3 for full tub operation or to some lower level within the elevational range of holes 54 for less than full tub operation. The oscillation of shaft 42 by a conventional power unit (not shown) causes the agitator vanes 18 to produce the desired washing action within container 10.

In the preferred embodiment of the instant invention, as described in the foregoing specification, the agitator is driven at a speed of 63 oscillations per minute through an arc of 204 degrees of rotation. This speed of oscillation and arc of rotation has been found to be effective for achieving improved washability with an agitator having four flexible agitating vanes and four intermediate ribs.

Referring now to FIGURE 2, the flexible blades are shown in dotted lines 72 to indicate the relative position of the flexible agitating vanes upon rotation of agitator 12 in a clockwise direction. This displacement of agitating vanes 18 from a purely radial position produces an outward thrust on the water and fabrics during rotation of agitator 12. There will also be centrifugal forces acting on the fluid. The combination of these radial forces effects movement of the washing fluid and fabrics radially outward in the lower regions of container 10, upwardly along the outer portions of the container, and inwardly toward the agitator in the upper regions. This type of water current and fabric movement also tends to prevent or eliminate the tendency toward trapping of clothing between base 14 and the lower edge of agitating vanes 18.

Upon a reversal in the rotation of agitator 12 to a counterclockwise direction, vanes 18 will flex in the opposite direction from that shown by numeral 72. This action

will move the fabrics contacting the side of the flexible vane across the adjacent intermediate rib. During the oscillations then, the flexible vanes move the fabrics back and forth over the ribs in addition to effecting the unidirectional fluid flow. Additional scrubbing and flexing of the fabrics is thereby effected.

It is therefore seen that the oscillation of agitator 12 induces a unidirectional fluid flow within container 10 and through agitator 12. The fluid enters the hollow centerpost 17 through intake openings 54 as indicated by arrow 74. Fluid passes through filter 52 and continues through the internal apertures 40 as indicated by arrow 76 and continues into the radially extending passageways 35 formed by upstanding ribs 20 and shroud member 58. Fluid passes through egress opening 66 as indicated by arrow 78 to complete its passage through agitator 12. The washing fluid will then tend to take an upward path, shown by arrows 80, within washing container 10 as previously indicated.

The oscillation of agitator 12 also normally causes a separation of lint particles from the fabrics being washed within the fluid and causes these particles to circulate within the body of the fluid contained within container 10 and become deposited on other fabrics unless they are separated from the washing fluid. The circulation of the fluid within container 10 as previously described causes washing fluid to enter the water intake apertures 54 and carry the particles of lint, thread, or other foreign particles, suspended within the washing fluid through the hollow centerpost 17.

These particles are filtered from the washing fluid entering the centerpost 17 by means of the cylindrical lint filter assembly 52 which retains the filtered particles on its periphery while permitting the filtered fluid to pass downwardly through the hollow post 17 to enter the openings 40 and pass through the radially extending passageways 35.

Upon termination of movement of agitator 12, the lint filter 52 may be removed from the centerpost 17 by grasping cap 51 and lifting it from centerpost 17. This action allows the self-biased lip seal 56 to scrape free any particles or sediment accumulating upon the inner surface of centerpost 17.

The assembly may also be used to gradually disperse powdered detergent into the fluid by providing a funnel-shaped opening within cap 51 or by merely removing the lint filter assembly formed by elements 51, 52, and 56 and inserting the desired quantity of powdered detergent into the detergent charging chamber 82 within centerpost 17. The lint filter assembly may then be replaced within centerpost 17 prior to the filling of container 10. The loading of the powdered detergent into centerpost 17 in this manner allows the detergent to gradually dissolve at a point isolated from the fabrics being washed and then to be dispersed through the passageways 35 during the filling and initial agitation operation without directly coming into contact with the fabrics placed within the container. The gradual dispersement of detergent in this manner prevents concentrated quantities of detergent from tending to weaken or deteriorate the fabric fibers being cleaned. It should be noted that other types of washing additive dispensers may be used in association with this agitator for using the fluid entering intake openings 54 to disperse washing agent into container 10 gradually and without immediate contact with the fabrics being washed.

While the relative sizes of the openings in the passageways formed within this filter agitator assembly 12 prevents the detergent inserted into centerpost 17 from flowing rapidly out these passageways, tests have shown that the unidirectional fluid flow through this agitator assembly successfully flushes these passageways clean during the agitation operation without producing accumulated detergent deposit formations in these passageways.

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Referring now to FIGURE 7, there is shown an agitator 90 which comprises another embodiment of the instant invention. Agitator 90 includes a plurality of flexible vanes 91 extending downwardly and radially outwardly from an upstanding centerpost 94. Agitator 90 includes a flared base portion 95 positioned below and detached from agitating vanes 91. Centerpost 94 is substantially imperforate except for an opening in the lower regions for receiving a splined hub 96 and resilient spacing members 98. Splined hub 96 is constructed and adapted to receive a drive shaft similar to that shown in the previous embodiment as numeral 42.

FIGURE 8 shows a sectional view similar to that of FIGURE 6 depicting a cross section of an intermediate rib and enclosed conduit construction. The embodiment shown in FIGURE 8 shows fragmentary portions of a base 99 and shroud 100. Base 99 includes a projection or rib 101 cooperable with shroud 100 for defining a conduit or fluid passageway 104. FIGURE 8, however, further includes an upwardly extending vane or blade 105 which serves to further enhance the agitating or fluid pulsating characteristics of intermediate rib 101.

In summary, it may therefore be stated that my proposed agitator construction provides an improved agitator which is effective for producing improved washing action and increased washability. This increased washability is maintained even with large loads of clothing being washed. This is an agitator which incorporates an improved arrangement of flexible vanes and intermediate projections for achieving improved cleansing of fabrics through increased flexing and pulsations of the fabrics. My proposed agitator construction includes means for filtering lint, thread and other foreign particles from the washing fluid contained within the tub. The pumping action and clothes washing action is obtained while maintaining the air bell required to prevent water from entering the low center drive construction of the illustrated embodiment. This is an agitator which is effective for achieving optimum washability while providing a useful means for dispersing washing agent into the washing fluid.

In the drawings, and specification, there has been set forth a preferred embodiment of the invention and, although specific terms are employed, these are used in a generic and descriptive sense only, and not for purposes of limitation. Changes in form and the proportion of parts, as well as the substitution of equivalents, are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of this invention as further defined in the following claims.

I claim:

1. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a base member including a generally outwardly extending flared portion; and a plurality of flexible vanes disposed about said centerpost, at least one of said vanes including a lower boundary portion adjacent said flared portion having at least a part thereof vertically spaced from said flared portion a distance providing a space sufficient to permit movement of fabrics therein; said centerpost, said base member, and said flexible vanes being formed integrally to comprise a unitary structure.

2. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a base member including a generally outwardly extending flared portion; and a plurality of flexible vanes disposed about said centerpost adjacent said flared portion, at least one of said vanes including an outwardly disposed lower portion detached from and vertically spaced from the adjacent flared portion a distance providing a space sufficient to permit movement of fabrics therein, said vane having its

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greatest degree of flexibility about an axis substantially parallel to the axis of rotation of said agitator; said centerpost, said base member, and said flexible vanes being formed integrally to comprise a unitary structure.

3. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a member connected to said centerpost and including a generally outwardly extending flared portion; and a plurality of substantially vertical flexible vanes connected to said centerpost juxtaposed said flared portion, at least one of said vanes including an outermost disposed lower portion vertically spaced from the adjacent flared portion a distance providing a space sufficient to permit movement of fabrics therein.

4. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a member connected to one end of said centerpost and including a generally outwardly extending flared portion; and a plurality of flexible vanes connected to said centerpost juxtaposed said flared portion, at least one of said vanes including an outwardly extending lower portion vertically spaced from the adjacent flared portion a distance providing a space sufficient to permit movement of fabrics therein.

5. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a member connected to said centerpost and including a generally outwardly extending flared portion; a plurality of flexible vanes angularly disposed about said centerpost juxtaposed said flared portion, at least one of said vanes having gradually increasing flexibility in the outward direction and including an outermost disposed lower portion detached from and vertically spaced from the adjacent flared portion a distance providing a space sufficient to permit movement of fabrics therein; and hub means associated with said centerpost adapted to receive means operable for oscillating said agitator within said washing fluid.

6. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible vanes connected to said centerpost and extending outwardly therefrom; a base member connected to said centerpost and including a flared portion extending outwardly along a lower portion of said flexible vanes, the outermost part of the lower portion of at least one of said flexible vanes being vertically spaced from said flared portion a distance providing a space sufficient to permit movement of fabrics therein and movable relative to said adjacent flared portion; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

7. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible vanes connected to said centerpost and extending substantially radially from a lower portion thereof; a base member integrally connected to said centerpost and including a flared portion extending outwardly along at least a part of a lower portion of said flexible vanes and vertically spaced from said lower portion a distance providing a space sufficient to permit movement of fabrics therein; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid to produce a fluid flow outwardly from said base member.

8. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: a base member including an outwardly extending flared portion; centerpost means connected to and extending upwardly from said base member; a plurality of flexible vanes connected to said centerpost and extending outwardly from a lower portion thereof, at least one of said flexible vanes including a lower portion having at least a part thereof vertically spaced from said outwardly extending flared portion and cooperable therewith to define a space between said vane and said flared portion, said space having increasing height toward the extremity of said flared portion for effecting release of fabrics from beneath said vane during oscillation of said agitator; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid to produce a fluid flow generally outward from said base member.

9. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible agitating vanes disposed about said centerpost and extending outwardly therefrom; a base member connected to said centerpost and including a flared portion extending outwardly along a lower portion of said flexible agitating vanes, at least part of said lower portion being spaced from said flared portion a distance providing a space sufficient to permit movement of fabrics therein and movable relative to said flared portion; secondary agitating means projecting upwardly from said flared portion between adjacently positioned flexible agitating vanes; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

10. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabric placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible agitating vanes disposed about said centerpost and extending outwardly from a lower portion thereof; a base member connected to said centerpost below said agitating vanes and including an outwardly extending flared portion vertically spaced from at least part of a lower portion of said agitating vanes a distance providing a space sufficient to permit movement of fabrics therein, said agitating vanes and said flared portion terminating at substantially the same diameter; secondary agitating members projecting upwardly from said flared portion between adjacently positioned flexible agitating vanes; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

11. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible agitating vanes connected to said centerpost and extending substantially radially from a lower portion thereof; a base member connected to said centerpost and including a flared portion extending along the lower portion of said agitating vane and vertically spaced from at least a part thereof a distance providing a space sufficient to permit movement of fabrics therein; at least one rib member projecting upwardly from said flared portion between adjacently positioned agitating vanes; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

12. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible agitating vanes connected to said centerpost and

extending substantially radially from a lower portion thereof; a base member connected to said centerpost juxtaposed to said flexible agitating vanes and including a flared portion vertically spaced from at least a part of a lower portion of said agitating vanes a distance providing a space sufficient to permit movement of fabrics therein; at least one rib member projecting upwardly from said flared portion between adjacently positioned agitating vanes and having an upper edge positioned substantially lower than an upper edge of the adjacent flexible agitating vanes; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

13. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabric placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible agitating vanes connected to said centerpost and extending outwardly from a lower portion thereof; a base member connected to said centerpost and including a flared portion positioned below and spaced from at least a part of a lower portion of said flexible agitating vanes a distance providing a space sufficient to permit movement of fabrics therein, said flexible agitating vanes and said flared portion terminating at similar radially outwardly disposed positions; secondary agitating members projecting upwardly from said flared portion between adjacently positioned flexible agitating vanes; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

14. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabric placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible agitating vanes connected to said centerpost and extending outwardly from a lower portion thereof, said agitating vanes having increased flexibility in the outward direction about an axis substantially parallel to the axis of rotation of said agitator to produce outward thrust on said fluid upon rotation of said agitator; a base member connected to said centerpost and including a flared portion positioned below and spaced from at least a part of a lower portion of said flexible agitating vanes a distance providing a space sufficient to permit movement of fabrics therein; secondary agitating members projecting upwardly from said flared portion between adjacently positioned flexible agitating vanes; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

15. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of agitating vanes formed integrally with said centerpost and extending outwardly from a lower portion thereof, said agitating vanes being formed of a non-rigid material and having a decreasing thickness in the outward direction to comprise a flexible agitating vane responsive to oscillation of said agitator within said body of fluid for effecting an outward thrust on the fluid; a base member connected to said centerpost and including a flared portion spaced below and extending outwardly along at least part of a lower portion of said agitating vanes; secondary agitating members projecting upwardly from said flared portion between adjacently positioned flexible agitating vanes; and a hub portion associated with said centerpost to receive means operable for oscillating said agitator within said washing fluid.

16. In an agitator as defined in claim 15 and further including a bead portion extending around said flexible agitating vanes to provide agitating vanes resistant to wear and abrasion by materials within said body of fluids.

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17. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding hollow centerpost; a plurality of fluid intake openings in said centerpost providing a means for fluid flow into said centerpost from said body of fluid; a plurality of flexible agitating vanes connected to said centerpost and extending substantially radially from a lower portion thereof; a base member connected to said centerpost and including a flared portion positioned below and spaced from at least a part of a lower portion of said flexible agitating vanes; a hub portion positioned within said centerpost; a plurality of webs interconnecting said centerpost and said hub portion and defining a series of internal apertures; a shroud member connected to the underside of said flared portion; radially extending secondary agitating means projecting upwardly from said flared portion between adjacently positioned vanes; a plurality of fluid conduits defined by cooperation of said flared portion and said shroud, said conduits communicating with said internal apertures and terminating in radially outward disposed egress openings into said body of fluids; fluid treatment means positioned within said hollow centerpost and disposed within the path of fluid flow therethrough, said hub portion being adapted to receive means operable for oscillating said agitator within said washing fluid and effecting a unidirectional fluid flow through said agitator.

18. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding hollow centerpost; a plurality of fluid intake openings in said centerpost providing a means for fluid flow into said centerpost from said body of fluid; a plurality of flexible agitating vanes connected to said centerpost and extending substantially radially from a lower portion thereof; a base member integrally connected to said centerpost and including a flared portion positioned below and spaced from at least a part of a lower portion of said flexible vanes; a hub portion positioned within said centerpost; a plurality of webs interconnecting said centerpost and said hub portion and defining a series of internal apertures; a shroud member connected to the underside of said flared portion; radially

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extending ribs projecting upwardly from said flared portion between adjacently positioned agitating vanes and defining a plurality of fluid conduits between said flared portion and said shroud member, said conduits communicating with said internal apertures and terminating in radially outward disposed egress openings into said body of fluids; fluid treatment means positioned within said hollow centerpost and disposed within the path of fluid flow therethrough, said hub portion being adapted to receive means operable for oscillating said agitator within said washing fluid and effecting a unidirectional fluid flow through said agitator.

19. An agitator adapted to be submerged in a body of washing fluid and oscillatable therein to effect a cleansing of fabrics placed within said fluid, the combination comprising: an upstanding centerpost; a plurality of flexible vanes disposed about and extending outwardly from said centerpost; means attached to said centerpost and including a generally outwardly extending flared portion adjacent a lower portion of at least one of said vanes, said lower vane portion including an innermost part having a common juncture with the innermost part of said flared portion and a lowermost part of said centerpost, said lower vane portion further including an outermost part spaced from the vertically adjacent flared portion a distance providing a space sufficient to permit movement of fabrics therein; said centerpost, said flared portion, and said vanes being formed integrally to form a unitary structure; and hub means associated with said centerpost adapted to receive means operable for oscillating said agitator within said washing fluid.

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Disclaimer

3,381,504.—*Thomas R. Smith*, Newton, Iowa. OSCILLATABLE AGITATOR FOR A LAUNDRY MACHINE. Patent dated May 7, 1968. Disclaimer filed Aug. 15, 1977, by the assignee, *The Maytag Company*. Hereby enters this disclaimer to all the claims of said patent.
[*Official Gazette November 15, 1977.*]