Feb. 8, 1966 G. M. GIBSON 3,233,436

APPARATUS FOR WASHING CLOTHES

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Fig. 1.

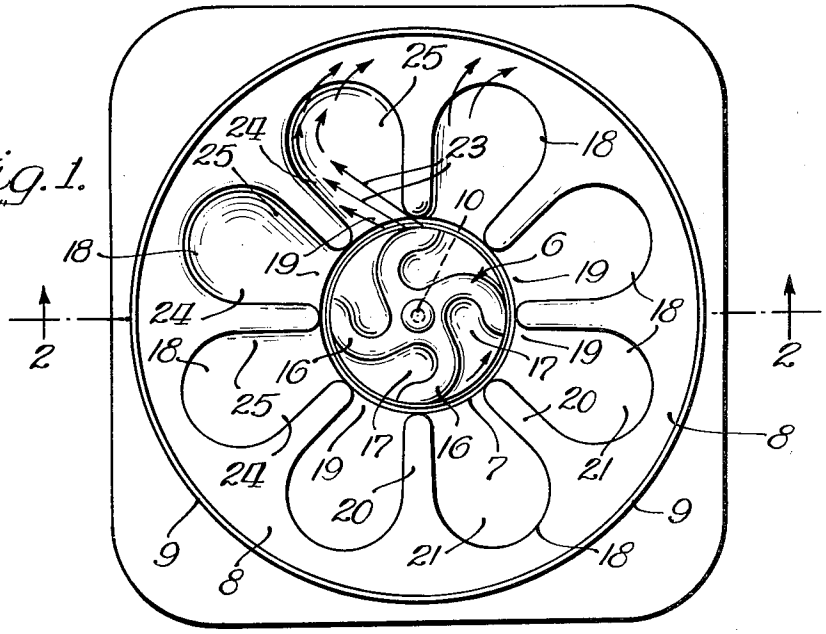
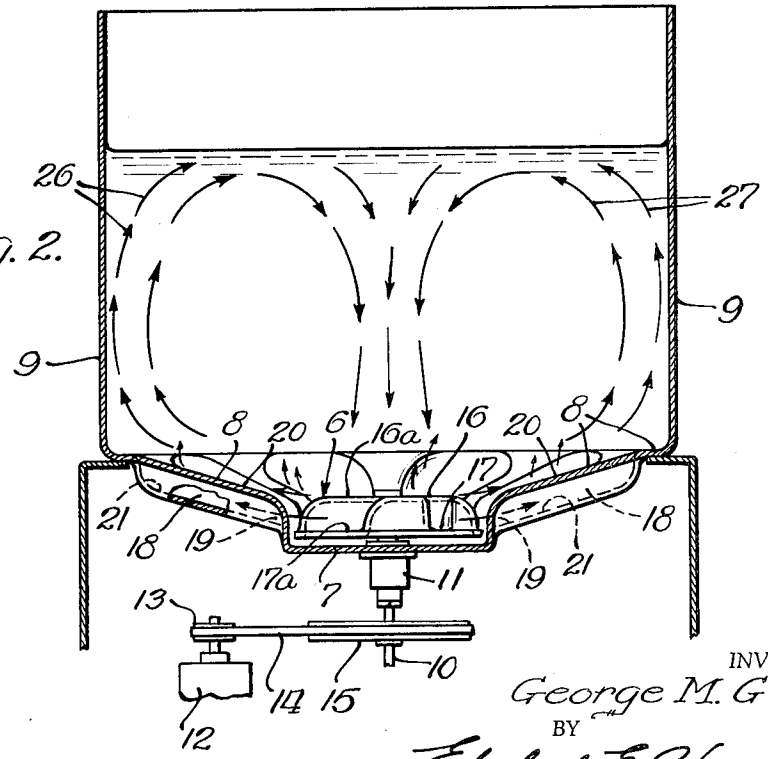


Fig. 2.



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Fig. 3.

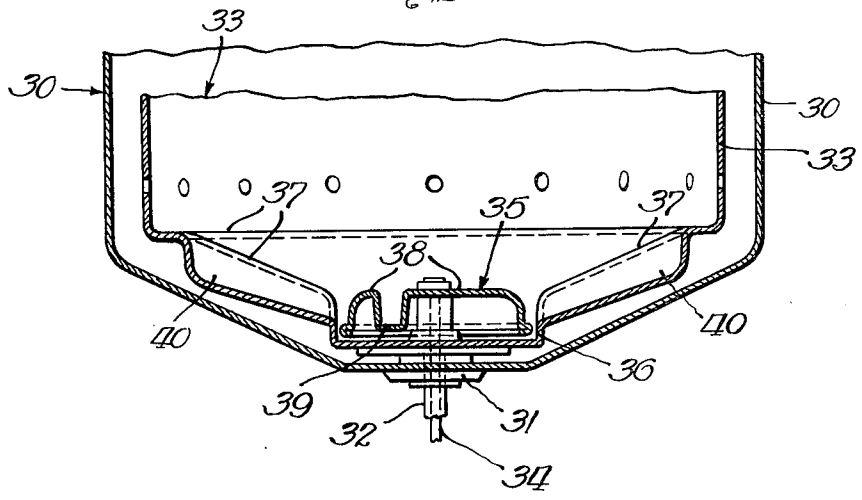


Fig. 4.

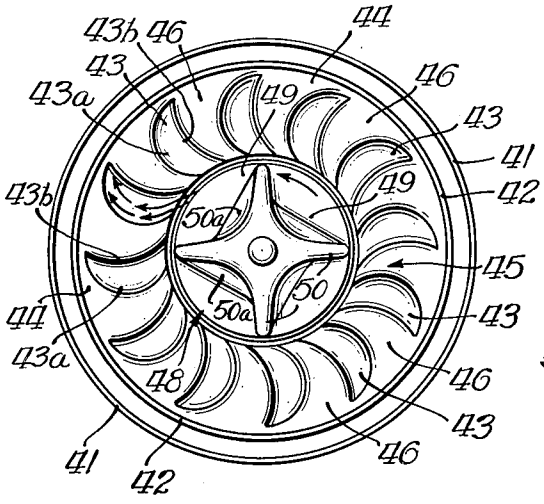


Fig. 6.

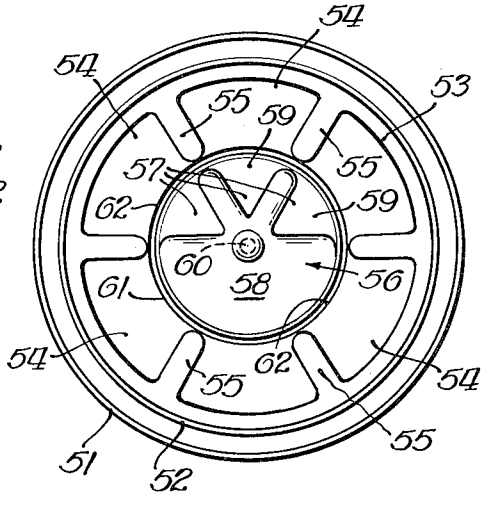
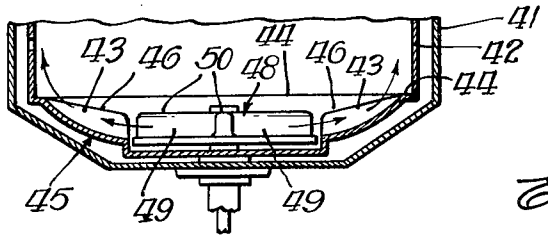


Fig. 5.



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Fig. 7.

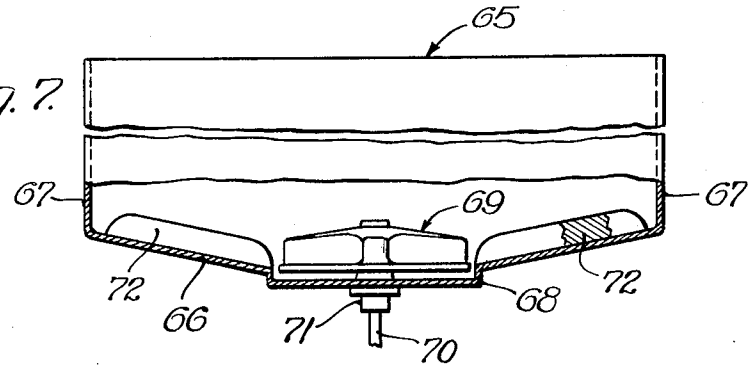


Fig. 8.

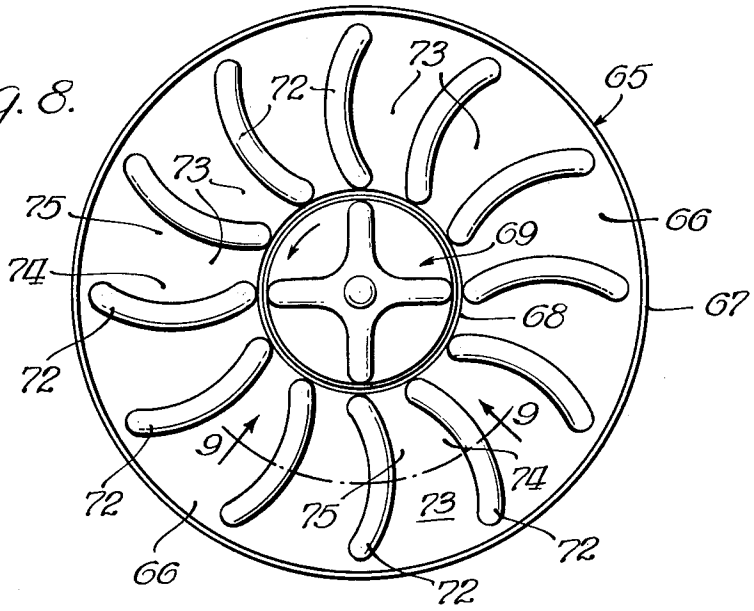
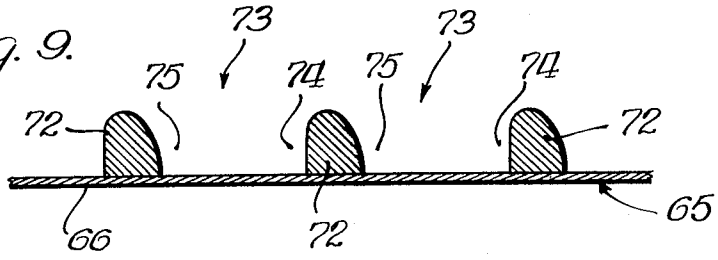


Fig. 9.



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3,233,436

APPARATUS FOR WASHING CLOTHES

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Filed Mar. 21, 1963, Ser. No. 267,887
24 Claims. (Cl. 68—133)

This invention relates to a coacting fluid or wash water and tub contour generated washing action developed in an apparatus for washing various fabrics, garments or clothes and the like.

More specifically, the invention concerns a new and novel washing mechanism developed for washing clothing in a body of water as in a domestic or commercial washing machine equipped with a unidirectional impeller means combined with a predetermined tub wall water diversion configuration to establish a new clothes washing concept in a freely open and unobstructed clothes washing tub as herein disclosed and described.

This invention is an improvement over the inventions fully described in my prior Patents No. 2,071,622 issued February 23, 1937, and No. 2,478,188 issued August 9, 1949.

The prior art practice relates to washing machines in general using unidirectional "dashers" actually in the form of rotors or fluid impellers which were made to occupy certain predetermined positions in relation to various wash tubs of special contour shapes. Actually the impellers used had inherent qualities that produced certain predetermined water currents in the tub water that caused the clothes to follow given paths of operation in relation to the position of the rotor or impeller in the tub.

As shown in Patent No. 2,478,188, the rotating impeller was mounted on the vertical or upright wall structures while the tubs were made in various external shapes to produce the washing results. None of the tub walls were deformed or shaped for direct cooperation with the rotor as in the present invention.

In Patent No. 2,071,622, the rotor agitator occupied an eccentric location in the tub and three high baffle plates were used in the upright tub area in the washing space for the purpose of retarding whirling of water and clothes next to the tub wall. The low height beads in the tub bottom of this patent only act to strengthen the tub bottom and serve no purpose as far as the washing cycle is concerned.

The present invention is directed to a washing machine which eliminates side wall mounting of the rotor agitator and provides a clear open washing tub free of baffles or other deflectors that are located in the clothes washing area of the machine. The new machine also provides a centrally located rotor agitator which by the use of the new cooperative means on the rotor and tub bottom wall opposes objectionable clothes load rotation within the open wash tub.

One of the objects of the present invention, therefore, is to provide cooperative means on both an impeller or turbo rotor agitator and on the tub or clothes basket, as the case may be, to control the clothes washing water action and the movement of the clothes, with the rotor occupying a position at the bottom of the tub or basket and with the cooperative means surrounding the rotor.

It is a further object to establish a wash water current control rotor in the mid-portion or axial center of a washing machine tub or basket for the symmetrical washing treatment of a complete load of clothing so as to avoid preferential and/or more efficient treatment of the clothing in one portion of the machine tub or basket in contrast to some inferior washing action in certain other portions of such tub or basket.

A further object of this invention is to provide coacting mechanisms located generally centrally of a tub or basket of a clothes washing machine wherein such mechanisms produce a washing action that will generate a water flow pattern to counteract any objectionable rotation of the clothes load about the tub or basket to lead to inefficient clothes washing conditions due to this relatively inert but more or less bodily rotating action of the clothing in a tub.

Another object is to provide a clothes washing action wherein a unidirectional agitator or rotor is employed to kinetically sling or propel wash water in a given plane or into an annular ring zone of water discharge activity and to force the water into multiple pocket areas provided in a tub and in its bottom or in the bottom wall of a clothes basket carried within a tub as the case may be all to qualify the washing action to meet certain conditions of operation and manipulation.

A still further object is to provide a unidirectional agitator or rotor having an exterior surface contour with ledges and pockets having their limits ranging between given spaced horizontal planes and wherein a tub or basket bottom is also provided with annularly aligned troughs or pockets with ridge or ledge and bottom areas also disposed in spaced horizontal planes, at least adjacent the rotor, which respective spaced planes are substantially coplanar with the top and bottom horizontally arranged ledges and pocket bottom areas of the rotor. Thus the wash water transition from convoluted rotor impeller into the fixed tub convolutions provides and develops new washing action that imparts a radially vertical encircling motion to the clothes load within various specified radial zones in the tub or basket while also holding such annular clothes load against objectionable horizontal rotation around the tub or basket because of the unidirectional agitator or rotor unit action in the machine.

Another object of this invention is to be able to establish and confine the washing apparatus of this clothes washing machine in or at one tub wall or on the bottom wall of the tub or basket as will be hereinafter shown thereby making available and free the entire space of the tub or basket compartment for the clothes load with the washing apparatus developing the washing cycle activity within the open and unobstructed tub or basket water area by means of the new and novel mechanism of this invention.

Other objects and advantages of this invention shall hereinafter appear in or become evident from the following detailed description having reference to the accompanying drawings forming a part of this specification and disclosing the inventive concept involved.

In the drawings:

FIG. 1 is a diagrammatic plan view of a washing machine embodying the coacting elements of the present invention that provide the new and novel washing principle of this invention;

FIG. 2 is a vertical cross sectional view of the washing machine illustrated in FIG. 1 and as it is substantially viewed in the plane of the line 2—2 in FIG. 1;

FIG. 3 is a fragmentary vertical cross sectional view of another washing machine type embodying the same general washing mechanisms illustrated in FIG. 1;

FIG. 4 is a plan view of a modified washing machine to demonstrate certain other applications of the apparatus of this invention;

FIG. 5 is a vertical cross sectional view of FIG. 4;

FIG. 6 is a plan view of a modified washing machine arrangement with a pulsating rotor agitator;

FIG. 7 is a vertical cross sectional view of another stationary vane washer construction;

FIG. 8 is a top plan view of FIG. 7; and

FIG. 9 is a detail section on line 9—9 in FIG. 8.

The general concept of the invention is well illustrated in FIGS. 1 and 2 wherein the washing principle is effi-

ciently developed by the provision of a unidirectional agitator or rotor 6 positioned in a sump or well 7 formed in the bottom wall 8 of a clothes washing tub 9.

The rotor 6 is adapted to be driven in either direction, if desired, by a shaft 10 secured to the rotor, the shaft being rotatably mounted in a suitable bearing and gland structure 11 as seen in FIG. 2. Any suitable drive means may be employed to spin or drive the rotor 6. FIG. 2 illustrates a motor 12 for this purpose which has a drive pulley 13 to drive a belt 14 which connects with another pulley such as 15 secured to shaft 10 to complete the drive mechanism for revolving the rotor impeller 6 to operate the washing machine.

The rotor 6 is made with a specified external contour having ridges or ledges 16 all terminating or lying in a common elevated plane 16*a* and these elements are separated by troughs or pockets 17 that have their bottom portions all terminating in another lower common plane 17*a* spaced vertically below the plane 16*a* of the ledges as best seen in FIG. 2. The ridges 16 and trough 17 together form peripherally open depressions or cavities on the rotor 6 to receive and expel or sling wash water radially outwardly and spirally across the tub bottom.

For the designed purpose of coacting edgewise with the rotor 6 to absorb so to speak the radial, spiral and tangential wash water discharge from the rotor, the tub bottom 8 is made or deformed into a rosette design as in FIG. 1 providing radially positioned individual troughs such as 18 surrounding the sump or well 7 and rotor periphery.

The entrance mouths 19 of the troughs 18 are at the level of the rotor 6 while the troughs radiate outwardly from the rotor sloping upwardly and outwardly in the manner best illustrated in FIG. 2. The trough depths are such that the ridges or ledges 20 are vertically spaced above the trough bottoms 21 substantially an amount equal to the vertical thickness of the rotor impeller means. And as stated before, the entrance or mouth areas 19 of the troughs or pockets 18 are radially disposed in line to receive the wash water discharged from the peripheral portion of the rotor to redirect and disperse this constant supply of wash water flow radially outwardly and upwardly along the trough path and also vertically outwardly thereof into the wash water of the machine tub 1.

As the rotor 6 revolves counterclockwise in the direction of the arrow shown in FIG. 1, the wash water is pulsatingly impelled in spiral fashion both centrifugally and tangentially outwardly from the spinning wheel or rotor and into the entrance areas 19 of the pockets or troughs with the pressurized water taking a path as generally shown by arrows 23. This action builds up pressure in the area along the sides 24 of the troughs 18 and tends to create a suction area in the lee areas 25 of the troughs 18. Since the pressure water flow zones of the rotor water emerge radially and upwardly from the pressure sides 24 of troughs 18, individual quantities of propelled water flow out of the troughs in radially upwardly streams in the tub water and through and into the clothes to counteract or to stem any concerted objectionable bodily rotation of the clothes load within the tub above the tub bottom area of the wash water activity. Simultaneously, the water ejected secondarily from the troughs will also follow in the radial arrow pattern indicated generally by the arrows 26 and 27 in FIG. 2. The arrows 26 and 27 also show the water flow return in the tub water toward the location of the rotor 6 for recirculation by the rotor toward the rosette troughs and for further washing action by said troughs 18 as described.

As best understood, the clothes are agitated by the water action described which results from a fast revolving rotor impeller that fans the wash water out radially and tangentially by the pocket design of the rotor and by its rotation. This expelled or impelled wash water enters the multipocket rosette cavities at the bottom of the tub for partial redirection into the tub water around the pocket cavities and for upward deflection from the pocket cavity treminal ends and sides. This establishes a circumferential retroactive wash water flow radially and in vertical planes or areas as shown by the arrows 26 and 27 in FIG. 2 to work on the clothes load and to counteract tub encirclement of the clothes while moving the clothes continuously up and down. It is further indicated that any clothing that does find its way horizontally about the tub will be activated in a vertical direction as a trough area is encountered so that each trough has its own individual upward water action to work the clothing even though the prime water action is generated from the fast rotating rotor providing the initial wash water impeller action and water deflection in conjunction with the respective annular trough areas of the tub.

FIG. 3 illustrates the same washing action and pattern in a modified type of a garment or clothes washing machine. In this arrangement, the construction comprises a wash water tub 30 provided with a suitable gland and bearing assembly 31 to accommodate a drive shaft or sleeve 32 that supports a washing basket 33 and acts to control the motion of this basket according to certain operative washing functions. A second shaft 34 is made to connect with and drive a rotor 35 located in a sump or well 36 in the bottom wall 37 of the basket 33.

The rotor has ledges 38 and pockets 39 fashioned after the rotor in FIG. 1. The basket includes the rosette arrangement of radially located pockets 40 as in the machine shown in FIGS. 1 and 2. The general washing action of this machine follows that of the described single tub machine with the exception that FIG. 3 provides an intermediate basket or auxiliary clothes holder or container to keep the clothes submerged in a water filled outer tub arrangement.

The construction in FIG. 4 comprises an outer tub 41 with an inner clothes basket 42 and the latter is provided with generally quarter moon shaped pockets 43 in the basket bottom 44 and spaced symmetrically thereabout. The pockets are defined in the bottom 44 by means of barrier ledges or ridges 46 that form ribs providing division means generally radially of the machine and with respect to the rotor assembly 48. The rotor 48 in this form of the invention is provided with pockets 49 having division walls or barrier ridges 50 with more or less vertical walls at the tip portions of the ridges 50 and sloping blending intermediate contour walls 50*a* joining the ridges 50. The rotor 48 and stationary curved pockets coact to provide a simulated water turbine action in the basket or tub.

The curvature of each depression or pocket 43 reverses with respect to the pocket portion adjacent the rotor and in the approximate plane of the rotor so as to accept the radial and tangential water current discharge from the rotor 48 into the tangential part of the pockets 43. After water is forced tangentially over the tub or basket bottom and directly into the middle curvature areas of the pockets 43, the direction of the water is turned radially outwardly and finally the water leaves the reversed curvature of the wall ends of the pockets 43.

This redirection of the water in the pockets 43 penetrates the tub water and clothes in a direction that is opposite with respect to the rotation of the rotor 48 and counteracts objectionable clothes load circulation along the tub walls in the same direction as the rotor rotates. In the water motion through pockets 43, the water will build up a pressure at the counterclockwise wall sections 43*a* of the pockets 43 and less pressure will be present at the clockwise suction side pocket wall sections 43*b*. This, as in FIG. 1, will further cause a reverse water projection upwardly into the overhead tub water and the clothes in a clockwise manner above the individual radial tub zones lying above the respective pockets 43 to augment the whole washing action and to counteract counterclockwise clothes rotation in the tub or basket.

This action in the tub coupled with the rubbing action and water activity of a kinetic rotor plus the stationary field of pockets and ridges or ledges surrounding the

rotor all act to promote a highly efficient washing apparatus accompanied with very little wear of the normal clothes load in the machines of the character shown in FIG. 4 and in FIGS. 1 and 3.

The bottom 45 of the basket 42 in FIG. 4 is dished downwardly toward the sump area as are the bottoms in the machines illustrated in FIGS. 1 and 3. This dished structure provides an added upward deflection of rotor impelled water toward and along the upright walls of the tub. However, a generally horizontally disposed rotor and cooperative rosette pocketed bottom of a tub or basket fully establishes the washing action and operation herein described.

FIG. 6 again provides a tub and basket combination 51 and 52 with a rosette bottom design in the bottom wall 53 of the basket comprising pockets 54 and dividers or barriers 55. With this design, a rotor 56 is employed which could also be used in the other structures already described.

The rotor 56 provides a pulsating water action radially thereof by reason of the grouped pockets 57 located in a portion of the circumference of the rotor 56 being used in combination with a large ledge or barrier section 58. In the example shown in FIG. 6, the grouped pocket section occupies about 180 degrees of the rotor facial and edge contour with edge discharge mouths as at 59, while the larger area or barrier section 58 approximately occupies the other 180 degrees of the rotor unit.

The rotor revolves on shaft 60 and in the sump or well 61 to intermittently drive wash water under definite rotary pulsations into the receiving mouths 62 of the pockets 54 creating a somewhat different timed water action in contrast to the equally spaced cavities or pockets of the rotors hereinbefore described. The washing action of the machine in FIG. 6 follows the actions of the other machines except that a more pronounced pulsative action is attained and transmitted to the water motion.

In the construction illustrated in FIGS. 7 to 9, the washer comprises a tub 65 with a bottom 66 extending from the upright tub walls 67 toward a central tub sump or well 68 as best seen in FIG. 7.

A rotary agitator 69 is positioned in the sump for rotation by a drive shaft 70 journalled in a bearing-gland assembly 71 carried by the sump portion of the tub bottom. A plurality of independent vane members 72 are individually secured to the annular tub bottom 66 to project upwardly therefrom into the washing space and to establish a plurality of trough areas 73 therebetween.

The vane members 72 are shaped and arranged to receive current discharged rotor agitator impelled water therebetween for redirection as in the other forms of the invention and also for upward deflection from between adjacent vanes similarly to the water action attained by driving or impelling the rotor water into the trough elements shown in FIGS. 1, 3, 4 and 6.

With this raised separate vane construction, the rotor ejected or impelled wash water will place a pressure flow along the general areas 74 between the vanes 72 and at the concave curvature portions of such vanes when viewed from the top. The water flow at the lee side of the vanes 72 along the areas 75 at the convex peripheries of the vanes will not have the same forced water flow due to eddies and to the shapes of the vanes, their locations, and by reason of the direction of discharge of the water outwardly from the rotor or agitator 69.

The foregoing description relates to several preferred forms of the invention to illustrate the concept of this invention and the washing principle developed by the apparatus herein disclosed. It is contemplated that certain variations may be possible in the combination of elements or in the elements per se without departing from the fundamental concept of this invention. The extent of such modifications shall, however, be governed by the breadth and scope of the language in the following claimed subject matter directed to the new and novel apparatus for washing fabrics according to the present invention.

What I claim is:

1. A clothes washing machine comprising a tub to contain clothes to be washed in a body of wash water, a unidirectional rotor mounted for rotation on the tub bottom to generate radially expanding wash water flow about said rotor in the plane of the tub bottom, and trough means for said tub bottom arranged in the general plane of the rotor discharge providing fixed open ended pockets to receive rotor impelled water for channeled directional radial dispersion through the pocketed tub bottom, said pockets including upwardly deflecting wall areas therein to divert the expanding wash water upwardly out of said tub bottom pockets and into the body of wash water and into the clothes positioned across the tub bottom.

2. In the clothes washing machine of claim 1 wherein said unidirectional rotor is continuously revolving in one direction and said deflecting wall areas of said open ended pockets are upwardly sloped along a radial edge thereof to intercept said expanding wash water expelled from said rotor and to divert said wash water into the tub in a direction away from the tub bottom out of said pockets and out of the normal plane of rotation of said rotor.

3. In an article washing machine, in combination, a wash water tub having upright walls and a generally horizontally disposed bottom, a revolving rotor for the tub bottom to generate radially expanding water currents leading outwardly from said rotor position, and cooperative surface configurations are provided about said rotor periphery and on the tub bottom below the surface thereof respectively, said tub bottom configurations being aligned in coplanar relation about said rotor configurations whereby water expelled from the rotor discharges directly into the tub bottom configurations, said tub bottom configurations having circumferentially upsloped surfaces thereon extending radially with respect to said rotor which redirect said water received from the rotor out of the plane of the tub bottom upwardly into the overhead water of the tub.

4. In the combination of claim 3 wherein said rotor occupies a position about the axial center of said tub and said tub bottom surface configurations provide a rosette shaped design surrounding said rotor location.

5. In the combination of claim 3 wherein said cooperative surface configurations of said rotor and tub bottom comprise coacting trough elements having discharge mouths on the rotor disposed in coplanar relation with respect to the receiving mouths of the tub bottom configurations respectively for wash water transfer from the rotor configurations to said tub bottom configurations, said latter including contiguous deflecting wall areas about the peripheries thereof to direct the wash water upwardly out of the plane of the tub bottom and into overhead water areas above the respective tub bottom configurations.

6. In the combination of claim 5 wherein said rotor trough element design is symmetrical about the circumference of said rotor and said trough element design of the tub bottom is symmetrical about the tub bottom radially and circumferentially with respect to said rotor.

7. In the combination of claim 5 wherein said trough element design in the face of the rotor and about its periphery is irregularly spaced to provide intermittent radial water discharge intervals per cycle of rotation of said rotor.

8. In the combination of claim 3 wherein the vertical depths of said cooperative surface configurations of the rotor and tub bottom are substantially the same and said respective configurations are disposed in close proximity to each other whereby the fixed tub bottom configurations receive and absorb the impelled water coming from the configurations of the rotor.

9. In an article washing machine, in combination, a

wash water tub having generally upright walls and a downwardly dished bottom contiguous with said upright walls, a sump in said dished bottom, a rotary agitator carried within said sump and providing means to radially outwardly impel wash water over the dished bottom both radially outwardly and upwardly toward said upright walls, said dished bottom including depressed cavities therein extending below said bottom and having entrance mouths communicating with the sump, said rotary agitator having pockets thereon to receive and expel tub water into said entrance mouths of the depressed cavities of the tub bottom to channel guide said active water outwardly toward segmental wall zones of the tub.

10. An article washing machine combination as set forth and defined in claim 9, wherein said depressed cavities in the dished bottom are moon shaped in plan view with the agitator ends thereof radiating tangentially with respect to the outer peripheral area surrounding the agitator, said bottom cavities providing expanding widths at their midsections that curve from the agitator tangency into radial directions with the outer depression points of said moon shaped cavities curving toward the direction of rotation of said agitator and terminating adjacent the tub walls, whereby actuation of the rotary agitator draws the articles and water thereover from the overhead tub water and tangentially radiates the water and articles in separate curved paths because of the depressed moon shaped bottom cavities and in the reverse direction in the tub in relation to the direction of rotation of said agitator and in the horizontal area overlying said agitator and depressed tub bottom zone of activity.

11. In the combination of claim 10 wherein said rotary agitator is located in the center of the tub and over the tub bottom and said tub bottom depressed cavities are aligned horizontally about the agitator periphery to receive the water currents from the agitator, said tub bottom depressed cavities providing side walls located to divert the impelled water into high and low pressure portions in the midsections of the depressed cavities for water diversion into upward and opposite currents considered in relation to the direction of motion of said agitator to further act upon the articles contained in the wash water.

12. A clothes washing machine comprising a clothes and wash water tub having side walls and a relatively smooth surfaced clothes deflecting bottom, said bottom being provided with radially arranged spaced depressions defined by convex ribs therebetween formed integral with the bottom, said bottom including a central tub sump and said depressions having communication with said sump while terminating outwardly and adjacent the side walls of said tub, a rotatable drive shaft projecting into the central sump and a rotary agitator in said sump connected with said shaft, said agitator having a top surface with smooth concave pocket sections radially formed thereon, the top area of said agitator occupying a level lying substantially in the plane of the tub bottom and the top area of the depressions, with the bottoms of the concave pockets in the agitator occupying a level lying substantially in the plane of the bottoms of the tub bottom depressions to accommodate agitator expelled wash water, and means for rotating the agitator to develop a pulsating water action and to centrifugally impel water from the agitator radially into the spaced depressions of the bottom causing the clothing to move radially outwardly from over the agitator across the depressions and tub bottom, said depressions acting to direct the water and clothing upwardly in the tub and along the tub side walls to counteract clothes load rotation about the tub, said agitator causing reentrant clothes motion with the water to draw the clothes downwardly centrally of the tub toward the area of the pulsating agitator activity for repeated recirculation in radial channel areas above the tub bottom depressions.

13. In the clothes washing machine combination in claim 12, wherein said rotary agitator and said clothes deflecting tub bottom coact to provide moving and fixed instrumentalities to produce turbine water activity in the tub directing the clothes through the tub water, and wherein said tub bottom depressions are quarter moon shaped with their rotor ends lying in a tangential fashion in relation to the exterior agitator periphery with the depressions curving outwardly and rearwardly with respect to the direction of rotation of said agitator so as to redirect centrifugal agitator water currents into the tub water to oppose the tendency of the clothes load to move about the tub with the diretcion of rotation of the agitator.

14. A wash machine comprising, in combination, a circular tub for wash water and garments, a unidirectional rotary agitator means arranged for developing an expanding pinwheel water agitation pattern from the axial center of the tub directed as a predetermined tangential discharge from the direction of rotation of said rotary agitator means and toward the annular portion of the tub bottom surrounding the agitator means, and stationary curved convolutions formed into the annular portion of the tub bottom, said convolutions each having end openings disposed adjacent to said rotary agitator means periphery to accept the tangential agitator means discharge and to redirect the water coming from the agitator means in a different direction across the annular portion of the tub bottom after leaving the agitator means, said convolutions including upsloped surface areas thereon arranged to slope upwardly in the circumferential direction of the tub to redirect the wash water upwardly into the overhead wash water and garments in the tub.

15. A clothes washing machine comprising an open unobstructed tub to contain the clothes to be washed in a body of wash water, said tub bottom having a depressed central area and an annular tub bottom sloping area surrounding said central area inclining upwardly and outwardly toward the upright tub walls, a water impelling agitator mounted within said depressed central area of said tub with the top of said agitator lying in the plane of the adjacent circumferential portion of said sloping tub bottom area, said agitator having water actuation pockets to impel water spirally and radially outwardly from the periphery thereof under operation, and said tub bottom sloping area being provided with radially depressed pockets extending from said agitator level and from the depressed central area of the tub toward the outer annular region of the tub, said pockets including deflecting surfaces arranged to divert some of the water discharged from the agitator upwardly into the overhead open unobstructed tub area into the water and clothes above the level of the tub bottom.

16. A clothes washing machine comprising an open unobstructed tub to contain clothes to be washed in a body of wash water in said tub, said tub having upright walls and a bottom to define the washing space of said machine, and a unidirectional water impeller disposed in the center of the tub adjacent said tub bottom and in a depression in said tub bottom to dispose the upper surface of said impeller at the level of the adjacent annular portion of said tub bottom to permit unobstructed clothes motion over the surfaces of the tub bottom and across said impeller, said tub bottom having outwardly disposed channels located below the surface thereof to divert wash water from said impeller below and across the tub bottom toward the walls of said tub, said channels including circumferentially arranged upwardly directed surface faces to direct a part of the outward flow of the water in said channels in radial waves into the overhead clothes and water moving in the open tub and across the tub bottom.

17. A clothes washing machine comprising, in combination, a freely open unobstructed tub to contain the clothes in a column of wash water and a rotary pulsating impeller at the bottom of said tub, said impeller having peripherally open surface cavities thereon to spirally and radially develop the water washing action across the tub bottom and in the lower adjacent zone of the column of wash

water, the outward water discharge of said impeller functioning to draw the overhead water above the impeller from said wash water column thereby circulating the water in said column through the center of the tub toward the impeller and outwardly from said impeller periphery to the walls of the tub to follow the walls and to return radially to again flow into the tub center and toward the impeller, said action causing the clothes to follow the flow from the lesser activity zone higher in the column of wash water toward and against the impeller and outwardly across the tub bottom in the greater activity washing zone developed by said impeller, said tub bottom providing a plurality of ridges outlining depressed trough portions therebetween in the annular space surrounding said impeller location, said ridges acting to guide the clothes in floating fashion over and above said trough portions and to deflect impeller water under the ridge guided clothes through said trough portions whereby the clothes moving from the impeller are frictionally slowed down by contact with said ridges while fast moving wash water is propelled through said depressed trough portions from the impeller underneath the ridge suspended clothes that are moving across and supported by said ridges.

18. A clothes washing machine comprising, in combination, a freely open unobstructed tub to contain the clothes in a column of wash water and a rotary pulsating impeller at the bottom of said tub, said impeller having water receiving pockets for water slinging purposes to spirally and radially develop the water washing action across the tub bottom and in the lower adjacent zone of the column of wash water, the outward water discharge of said impeller functioning to draw the overhead water above the impeller from said wash water column thereby circulating the water in said column through the center of the tub toward the impeller and outwardly from said impeller periphery to the walls of the tub to follow the walls and to return radially to again flow into the tub center and toward the impeller, said action causing the clothes to follow the flow from the lesser activity zone higher in the column of wash water toward and against the impeller and outwardly across the tub bottom in the greater activity washing zone developed by said impeller, said tub bottom providing a plurality of ridges outlining depressed trough portions therebetween in the annular space surrounding said impeller location, said ridges acting to guide the clothes in floating fashion over and above said trough portions and to deflect impeller water under the ridge guided clothes through said trough portions whereby the clothes moving from the impeller are frictionally slowed down by contact with said ridges while fast moving wash water is propelled through said depressed trough portions from the impeller underneath the ridge suspended clothes that are moving across and supported by said ridges, said impeller being located in the center of said tub to equalize the radially expanding wash water action in relation to the cross sectional area of the tub water column, and said ridges and depressed trough portions being arranged generally radially with respect to the axis of rotation of said impeller to further equalize the wash water action about the entire tub.

19. A clothes washing machine comprising, in combination, a freely open unobstructed tub to contain the clothes in a column of wash water and a rotary pulsating impeller at the bottom of said tub, said impeller having peripherally open water receiving cavities therein to spirally and radially develop the water washing action across the tub bottom and in the lower adjacent zone of the column of wash water, the outward water discharge from said impeller cavities functioning to draw the overhead water above the impeller from said wash water column thereby circulating the water in said column through the center of the tub toward the impeller and outwardly from said impeller periphery to the walls of the tub to follow the walls and to return radially to again flow into the tub center and toward the impeller, said action causing the clothes to follow the flow from the lesser activity zone higher in the column of wash water toward and against the impeller and outwardly across the tub bottom in the greater activity washing zone developed by said impeller, said tub bottom providing a plurality of ridges disposed coplanar with the tub bottom with trough sections depressed out of the general plane of the tub bottom below and between said ridges in the annular space surrounding said impeller location whereby the clothes moving from the impeller are frictionally slowed down by contact with said ridges and fast moving wash water is propelled through the trough sections from the impeller underneath the clothes that are moving across and supported by said ridges, said tub being circular in horizontal shape, said impeller being disposed to rotate on the center axis of said circular tub, and said trough sections providing water deflecting wall surfaces thereon to send water into the tub water column in a direction to counteract clothes batch rotation in said water column.

20. A clothes washing machine comprising a tub to carry clothes in a column of wash water and a rotor mounted for operation at the tub bottom, said rotor having a deformed surface area disposed for direct contact by the clothes in said tub and said tub bottom having a deformed bottom providing a stationary field surrounding said rotor for direct contact by the clothes in said column of water, said deformations in said rotor providing means to circulate the water and clothes toward and into contact with the revolving rotor and to redirect said clothes generally radially away therefrom across and into contact with the stationary deformed surface area of said tub bottom.

21. A clothes washing machine comprising a tub to contain clothes in a column of wash water and a rotary impeller in said tub to circulate the water and clothes to generate the washing cycle, said tub having peripheral and bottom walls to confine the water and clothes, and said impeller being mounted for rotation on one of said walls of said tub, said impeller having a plurality of pockets in the tub side face thereof to cause wash water to move the clothes toward and against the impeller face and to be redirected in the water that is radially discharged from the impeller over and in contact across the surface area of said one tub wall carrying said impeller, and said one wall is constructed with a plurality of stationary pockets surrounding the impeller and providing ridge portions to guide and to frictionally retard the motion of the clothes coming from the impeller location and to hold the clothes out of the open pocket areas to permit higher velocity wash water movement relatively to the motion of said clothes.

22. In the combination set forth and defined in claim 21, wherein said stationary pockets are made to include deflecting wall areas to receive some of the impeller discharged water and to redirect the same out of said pockets away from the plane of operation of the impeller to fan out angularly with respect to said one wall into the column of wash water and into the moving clothes adjacent said one wall to counteract clothes batch rotation in said water column about the axial center of the impeller location.

23. In the combination set forth and defined in claim 21, wherein said one wall of said tub has a dished area therein surrounding said impeller with a recessed center to accommodate the impeller, and wherein the exit portions of the pockets in said impeller are aligned with the entrance portions of the pockets in said one wall for direct wash water volume transfer from the impeller to the stationary wall pockets, said dished area and pockets providing cooperative means to circulate the wash water away and toward the impeller through said water column.

24. A clothes washing machine comprising a tub adapted to contain a body of washing liquid for washing fabrics therein, a rotor having a relatively smooth fabric contacting surface over the face thereof which surface faces toward the interior of the tub with means on the

rotor for causing a suction action on the fabrics toward said surface and a peripheral discharge of the fabrics and liquid therefrom, means mounting said rotor in a submerged position upon the bottom of the tub for rotating movement about the vertical center axis of the tub, means operatively connected with the rotor for actuating said rotor, and stationary deformations provided on the tub bottom about the location of said rotor to accept said rotor discharged fabrics and liquid, said deformations including certain raised surfaces areas to frictionally slow down the motion of said fabrics moving across the tub bottom and to guide said fabrics through the body of tub water, said deformations including certain other depressed surface areas disposed out of the path of movement of the clothes to permit free passage of the rotor discharged liquid across the tub bottom adjacent to said fabrics at speeds greater than the motion of said fabrics.

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