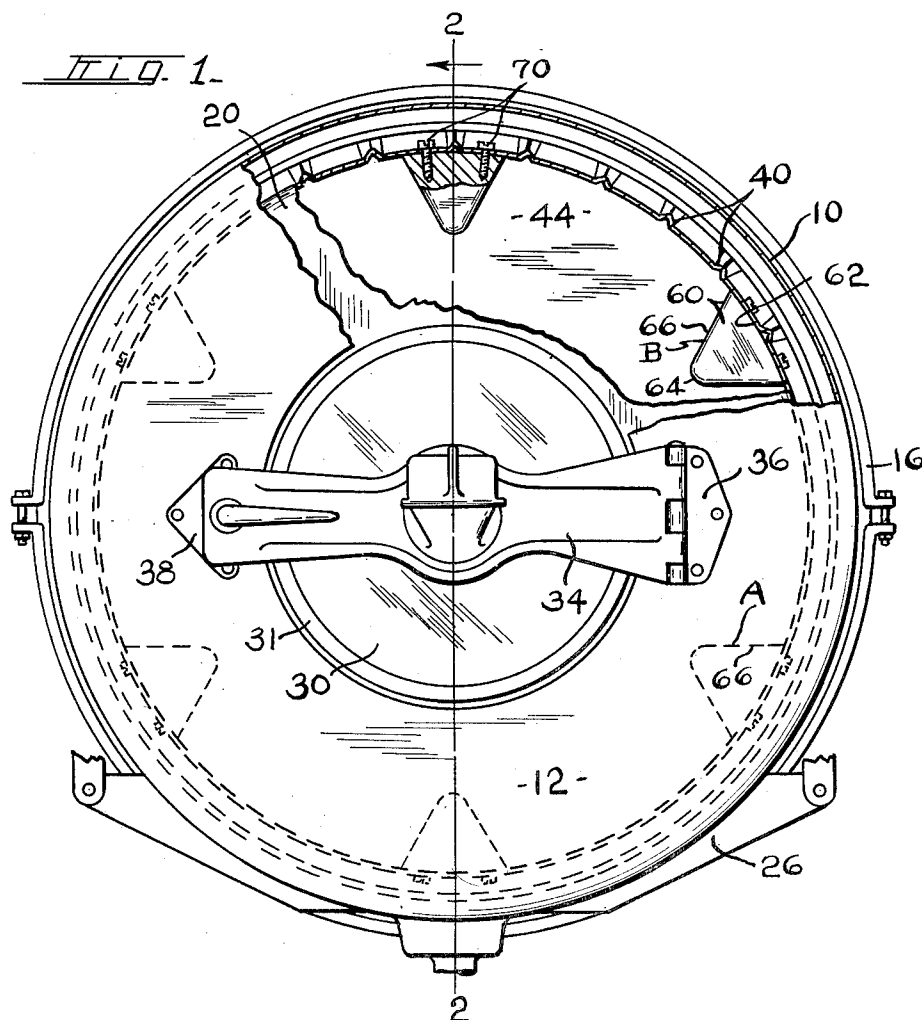


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LAUNDRY MACHINE TUMBLING DRUM

2 SHEETS--SHEET 1

Filed Nov. 21, 1947



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2 SHEETS—SHEET 2

FIG. 2.

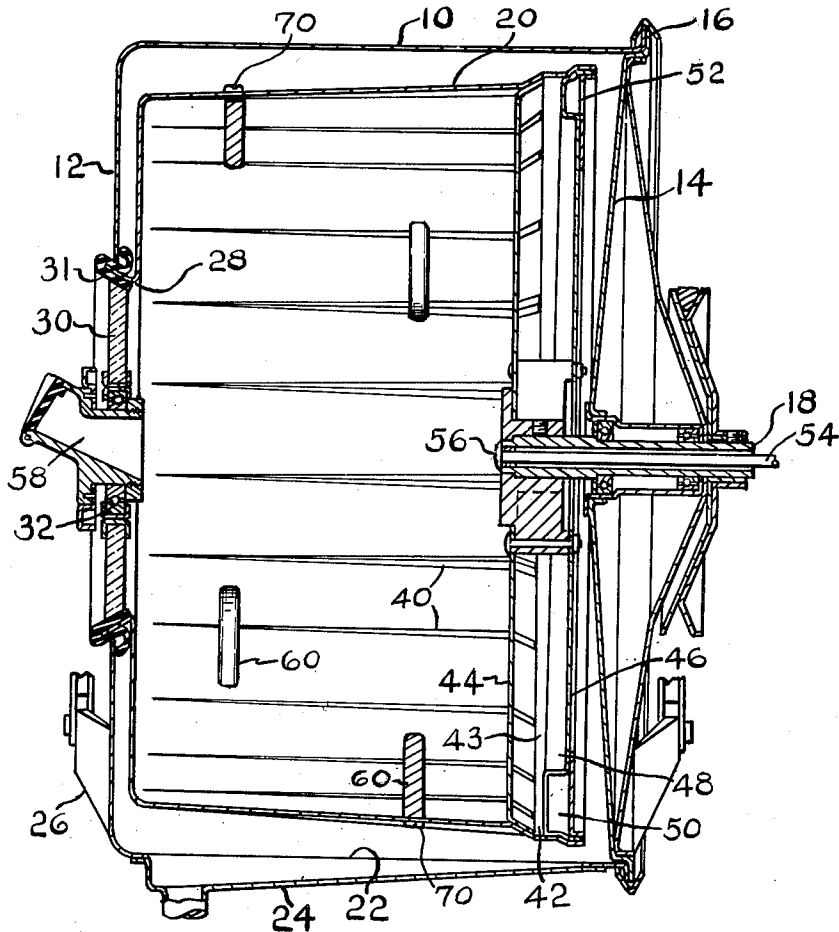
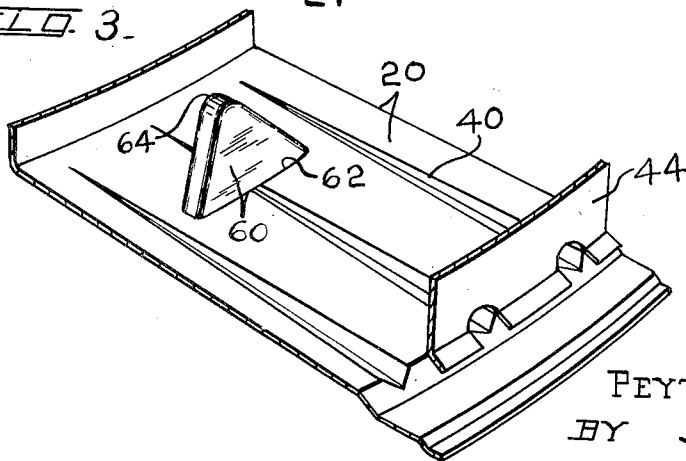


FIG. 3.



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LAUNDRY MACHINE TUMBLING DRUM

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12 Claims. (Cl. 68—142)

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This invention relates to laundry apparatus, and more particularly to washing machines of the type having a laundry container in the form of a revolving drum or basket adapted to contain or be immersed in washing fluid, and in which the laundry may be subsequently centrifugally rinsed and damp dried without removal therefrom.

In washing apparatus of the type described, wherein the laundry-containing drum revolves about an axis extending generally horizontal, it has been the practice to provide a plurality of transverse axially extending ribs or baffles upon the peripheral wall of the washing drum, the baffles tending to move laundry contained within the drum in the general direction of motion and to correspondingly agitate the washing fluid contained therein. Such a construction has the disadvantages of absorbing considerable power resulting from the turbulence set up in the fluid contained in the drum, and of continually tumbling the laundry contained therein in such a fashion as to frequently cause the various components of laundry to become twisted and tangled into a compacted knot-like mass. When the latter occurs, the laundry is no longer subjected to the repeated free flow of washing fluid through the fabric as is necessary for efficient washing action. Further, such a compacted mass after the washing fluid is drained from the drum resists subsequent distribution and arrangement upon the peripheral surface of the drum. Substantially uniform distribution and arrangement is quite essential for subsequent centrifugal extraction, since any unbalanced condition results in excessive vibration.

It is an object of the present invention to provide improved means within a washing drum of the type described, which shall have minimum power absorption qualities and at the same time maximum distributing effect in acting upon the laundry contained within the drum, the distributing effect being such as to continually rearrange and redistribute the laundry contained within the drum over the axial length of the drum and at the same time provide a lifting effect to the laundry whereby the laundry may be repeatedly lifted and dropped in the washing fluid.

Another object of the invention is to provide a washing drum having arranged internally thereof a plurality of short inwardly projecting vanes spaced about the periphery of the drum and axially thereof, the vanes being adapted to temporarily engage the laundry to partially lift

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the same within the drum as rotation takes place.

A further object of the invention is to provide within a drum of the type described, a suitable laundry distributing means which may be effective during washing operation as well as during a tumbling operation, the means being designed to evenly distribute the laundry within the drums circumferentially thereof immediately prior to centrifugal extraction of the washing fluid from the laundry.

A still further object of the invention is to provide in a washing drum of the type described a laundry distributing means which shall be effective to distribute the laundry within the drum uniformly during washing and during subsequent tumbling action and which is effective in its operation regardless of the direction of rotation of the washing drum.

A still further object of the invention is to provide a plurality of short laundry distributing vanes, arranged in spaced relation circumferentially upon a plurality of transverse planes within the drum, the vanes located in one plane being staggered with relation to the vanes in an adjoining plane, and the vanes being of triangular shape with suitable axial thickness and rounded edges and corners.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood, however, that the drawings are employed for purposes of illustration only, and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

Referring to the drawings, wherein like reference characters indicate like parts:

Figure 1 is a front elevation of a washing machine embodying the invention and having the tub and washing cylinder cut away for clear illustration;

Figure 2 is a vertical section taken on the line 2—2 of Figure 1; and

Figure 3 is a fragmentary perspective internal view of the washing cylinder construction.

Referring to the drawings, there is shown a tub containing a washing cylinder of the type generally illustrated in a copending application Serial No. 775,237, filed September 20, 1947.

In such an apparatus, there is provided a substantially cylindrical tub-like bearing support member and splash guard 10 having an annular integral front flange or wall 12, and a rear wall

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14 secured to the tub in any desired manner as by a V-clamp ring 16, the rear wall acting as a journal support for a trunnion 18 of the washing cylinder 20. The tub, which has been described as having a cylindrical wall, may be tapered if desired, and may have a drain aperture 22 in the bottom thereof opening into a drain trough 24, the latter being formed as an integral part of a supporting saddle 26 for the tub.

The washing cylinder 20, if of the imperforate type, is preferably tapered from front to back and is provided with a flanged circular opening 28 in the front to which is applied a rotatable transparent disk door 30. The rotatable door bears against a seal 31, and is mounted on anti-friction bearings 32, which are in turn supported upon an arm 34 hingedly secured at one end to the front wall 12 of the tub as at 36. The other end of the arm may be latched to the front wall by suitable manually operated means carried upon the arm and a cooperating latch plate 38 secured on the forward wall 12. The cylinder is provided with a plurality of tapered elemental grooves 40 adapted to drain into a slightly enlarged diameter section of the cylinder 42 formed at the rear thereof, the partition 44 and rear wall 46 forming a chamber 43. Semicircular drain conduits 48 having an opening 50 within the chamber 43 and a discharge port 52 in the rear wall 46 operate to maintain or drain washing fluid within or from the cylinder, depending upon the direction of rotation. Washing water is injected into the washing cylinder 20 by means of a pipe 54 arranged within the hollow trunnion 18, the pipe terminating in a spray rosette 56 within the cylinder. Soap or other washing powders are admitted to the cylinder through an inclined soap passage 58 passing through the arm 34 and extending through the bearing 32. The structure thus far described is one which has been found quite suitable and satisfactory for use with the inventive features presently to be described, but it will be understood that the structure illustrated may be varied in many respects without interfering with the principle of operation as will hereinafter appear.

In order to cause effective turbulence and to impart a gentle but positive washing action to laundry contained within the cylinder, there are provided upon the inside peripheral wall a plurality of pyramidal or triangular shaped vanes 60, the same having a substantial thickness to afford rounded edges, but otherwise lying in planes substantially transverse to the axis of rotation. In the form shown, three such vanes are positioned approximately 120° apart in two planes (six in all), one forward of the axial center of the washing cylinder. In the arrangement shown, the vanes in the forward plane are staggered in relation to the vanes in the rearward plane, the vanes being staggered so as to be spaced approximately 60° circumferentially with respect to one another. Each of the vanes are approximately triangular in shape, the base however being slightly arcuate as at 62 in order to nicely fit the inside wall of the washing cylinder. Additionally, the innermost angle or apex of the vane is rounded as at 64 in order to permit laundry to radially slip off the vane without danger of damage to the most delicate fabrics.

As shown in Figure 1, the angle of the forward edge 66 of each of the vanes is so inclined as to lift any fabrics carried circumferentially thereby to a point slightly above the horizontal plane passing through the cylinder axis, whereupon

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such fabrics are radially dropped by gravity into the washing fluid and allowed to rearrange themselves within the cylinder prior to subsequent action of a following or succeeding vane which may move in the path of such fabrics.

As will appear at A in Figure 1, the leading edge 66 is substantially horizontal and therefore has a lifting effect upon such fabrics as may embrace the vane; and upon reaching the position shown at B, the angle has become quite steep and can no longer retain such fabrics and carry them through a further arc. Thus, the successive action of the vanes' advance is such as to continually move the fabrics through the washing fluid and lift the fabrics to an elevated position, whereupon the fabrics drop by gravity into the washing fluid. Thereafter, the fabrics become rearranged by the turbulence thus caused and will at a subsequent time be moved by successive vanes, as will readily appear. While the vanes have substantial thickness in order to afford rounded edges, it will be appreciated that the vanes, lying in transverse planes as shown, offer little resistance to rotation of the drum resulting from their traverse through the washing fluid. The vanes are such as to provide a maximum agitation and a continual rearrangement of the fabrics undergoing treatment with a minimum of power required to rotate the washing container. The needless lifting of large quantities of water, as would occur were the vanes to extend along the axial length of the cylinder, is thus avoided. At the same time, the staggered arrangement of the vanes provides for a continual rearrangement of the fabrics undergoing treatment.

In practice, the vanes may be varied in shape and provided with differing angles on their leading and trailing edges. The vanes may be formed of composition, or stainless steel, or any other suitable material, and in the form shown, may be secured to the drum by the simple procedure of a pair of radially extending screws 70 extending through the cylinder wall. The vanes do not obstruct the passage of fluid through the channels 40 and aid in the arrangement of the fabrics as the wash water is drained from the cylinder for subsequent centrifuging action and extraction of the wash water or rinse water from the fabrics. Thus, the vanes not only produce a highly efficient washing action, but assist in arranging the fabrics in a substantially balanced manner for centrifuging. The continual redistribution of the fabrics by the vanes arranged substantially in the manner shown prevents the fabrics from "balling" or becoming tangled in a doughnut-like shape, which upon subsequent centrifuging cannot possibly become arranged in a balanced manner within the cylinder.

Although a single embodiment of the invention has been illustrated and described, it is to be understood that the invention is not limited thereto. As various changes may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A drum for use in laundering apparatus having an imperforate peripheral wall and spaced end walls, means for introducing laundry into said drum, means for introducing, retaining and removing therefrom washing fluid, means for rotating the drum about the axis of said peripheral wall, and a plurality of individual vanes se-

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cured to the inside surface of said peripheral wall, said vanes being of substantially equilateral triangular shape and of substantially uniform thickness in an axial direction and lying generally in two axially spaced transverse planes and being spaced circumferentially around the periphery of said drum, the vanes of one plane being staggered in relation to the vanes of the other plane.

2. A drum for use in laundering apparatus having a peripheral wall and spaced end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about the axis of said peripheral wall, and a plurality of individual substantially uniformly thick vanes secured to the inside surface of said peripheral wall, said vanes being of substantially triangular shape and having a leading edge extending approximately 30° from a radial extending therethrough and lying generally in at least one transverse plane and being spaced circumferentially around the periphery of said drum.

3. A drum for use in laundering apparatus having a peripheral wall and spaced end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about a substantially horizontal axis, and a plurality of individual substantially uniformly thick vanes secured to the inside surface of said peripheral wall, said vanes being of substantially equilateral triangular shape and lying generally in two axially spaced transverse planes and being spaced circumferentially around the periphery of said drum, the vanes of one plane being staggered in relation to the vanes of the other plane.

4. A washing drum for use in laundering apparatus having a substantially cylindrical wall and end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about a substantially horizontal axis, and a plurality of individual substantially uniformly thick vanes secured to the inside surface of said substantially cylindrical wall, said vanes being of substantially equilateral triangular shape and lying generally in two axially spaced transverse planes and being spaced circumferentially around the periphery of said drum, the vanes of one plane being staggered in relation to the vanes of the other plane, said vanes being rounded at their innermost extremities.

5. A drum for use in laundering apparatus having a substantially cylindrical outer wall and end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about a substantially stationary axis, and a plurality of individual substantially uniformly thick vanes secured to the inside surface of said substantially cylindrical wall, said vanes being of substantially equilateral triangular shape and lying generally in a plurality of axially spaced planes and being spaced circumferentially around the periphery of said drum, the vanes of one plane being staggered in relation to the vanes of the other plane, said vanes having rounded leading and trailing edges and being of a thickness sufficient for this purpose.

6. A drum for use in laundering apparatus having an imperforate substantially cylindrical wall and end walls, means for introducing laundry into said drum, means for introducing and

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removing therefrom washing fluid, means for rotating the drum about the drum axis, and a plurality of individual vanes secured to the inside surface of said substantially cylindrical wall, said vanes being of substantially equilateral triangular shape and lying in transverse planar relation to the drum axis, each of said vanes having substantially uniform axial thickness and rounded leading and trailing edges and a rounded innermost extremity.

7. A drum for use in laundering apparatus having an imperforate peripheral wall and end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about the drum axis, and a plurality of individual vanes secured to the inside surface of said peripheral wall, said vanes being of substantially triangular shape with the leading edge thereof extending 30° from a radial extending therethrough and lying in transverse planar relation to the drum axis, each of said vanes being substantially uniform in thickness axially of the drum and having substantial thickness and rounded leading and trailing edges and a rounded innermost extremity.

8. A drum for use in laundering apparatus having an imperforate substantially cylindrical wall and end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about a substantially horizontal axis, and a plurality of individual vanes secured to the inside surface of said substantially cylindrical wall, said vanes being of substantially triangular shape with the leading edge thereof extending 30° from a radial extending therethrough and lying generally in two axially spaced planes and being spaced circumferentially around the periphery of said drum, the vanes of one plane being staggered in relation to the vanes of the other plane, said vanes having rounded leading and trailing edges and being rounded at their innermost extremity.

9. A drum for use in laundering apparatus having an imperforate substantially cylindrical wall and end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about its axis, and a plurality of individual vanes secured to the inside surface of said substantially cylindrical wall, said vanes being of substantially equilateral triangular shape and lying generally in two axially spaced planes and being spaced circumferentially around the periphery of said drum, the vanes of one plane being staggered in relation to the vanes of the other plane, said vanes having rounded leading and trailing edges and being rounded at their innermost extremity.

10. A drum for use in laundering apparatus having an imperforate peripheral wall and end walls, means for introducing laundry into said drum, means for introducing and removing therefrom washing fluid, means for rotating the drum about its axis, and a plurality of individual substantially uniformly thick vanes secured to the inside surface of said peripheral wall, said vanes being of substantially equilateral triangular shape and lying generally in two axially spaced planes and being spaced circumferentially around the periphery of said drum, the vanes of one plane being staggered in relation to the vanes of the other plane, said vanes having

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rounded leading and trailing edges and being rounded at their innermost extremity.

11. A drum for use in laundering apparatus having a substantially cylindrical wall and end walls, and a plurality of individual vanes secured to the inside surface of said substantially cylindrical wall, said vanes being of substantially equilateral triangular shape and lying in transverse planar relation to the drum axis, each of said vanes having substantial thickness and rounded leading and trailing edges and a rounded innermost extremity.

12. A drum for use in laundering apparatus having a substantially cylindrical wall and end walls, and a plurality of individual vanes secured to the inside surface of said substantially cylindrical wall, said vanes being of substantially triangular shape and having a leading edge extending approximately 30° from a radial extending therethrough and lying in transverse planar re-

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lation to the drum axis, each of said vanes having substantial thickness and rounded leading and trailing edges and a rounded innermost extremity.

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