

Nov. 5, 1935.

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2,019,571

FABRIC CLEANSING AND EXTRACTING MACHINE

Filed June 8, 1932

3 Sheets-Sheet 1

FIG. -1

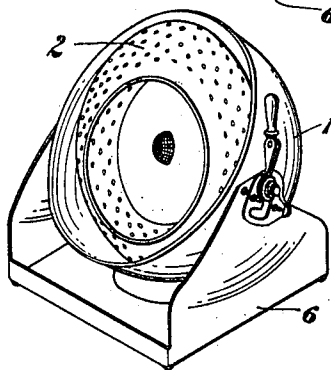
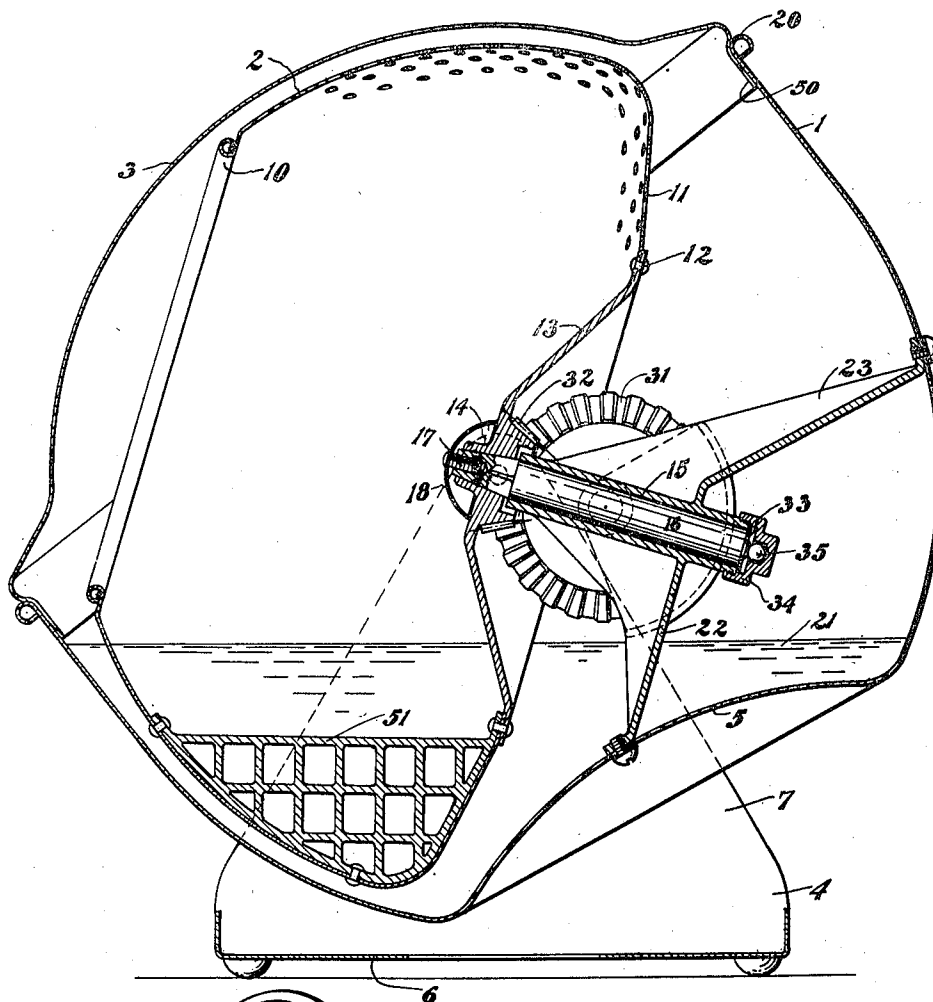


FIG. -4

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3 Sheets-Sheet 2

FIG.-2

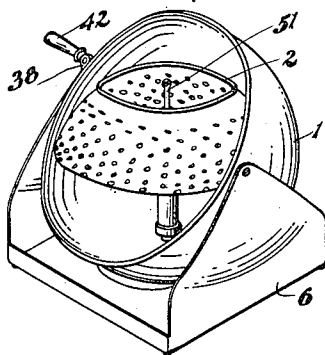
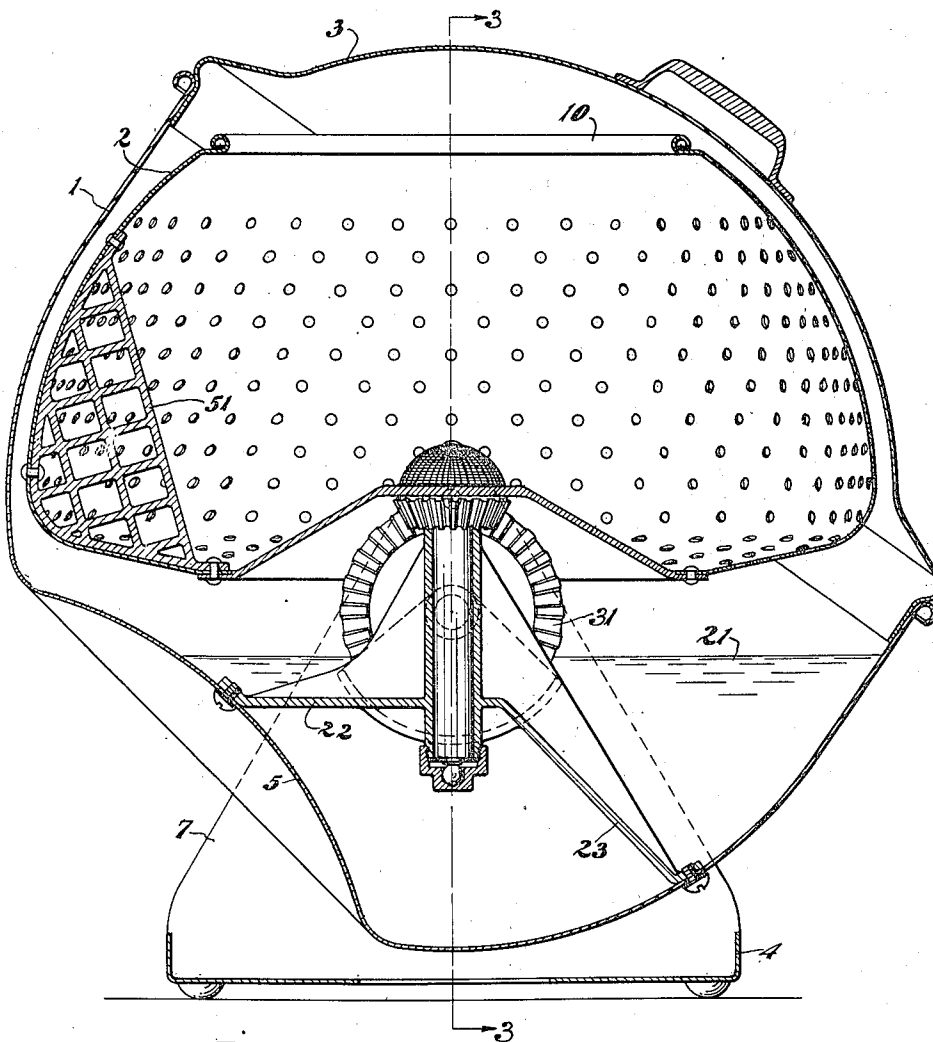


FIG.-5

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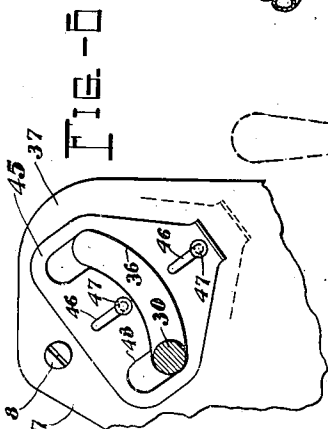
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FABRIC CLEANSING AND EXTRACTING MACHINE

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,019,571

FABRIC CLEANSING AND EXTRACTING MACHINE

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by mesne assignments, to The Apex Electrical
Manufacturing Company, Cleveland, Ohio, a
corporation of Ohio, as trustee

Application June 8, 1932, Serial No. 616,058

24 Claims. (Cl. 68—18)

This invention relates to fabric cleansing machines and has for its object the provision of a machine of utmost simplicity, economy, and compactness, capable of performing washing and extracting operations by hand-power and operating with a minimum amount of liquid. This machine is designed with special reference to dry-cleaning operations but is likewise useful for performing small washings with soap and water as the cleansing medium.

In the drawings accompanying and forming a part of this application I have illustrated a preferred embodiment of my invention, wherein Fig. 1 is a sectional view showing the device arranged for the washing or cleansing operation; Fig. 2 is a similar view showing the device arranged for the extracting operation; Fig. 3 is a vertical, sectional view corresponding to the line 3—3 of Fig. 2; Fig. 4 is a perspective view of the device arranged as shown in Fig. 1 but with the cover removed; Fig. 5 is a perspective view showing the machine adjusted as illustrated in Fig. 2 but with the cover removed; Fig. 6 is taken on the line 6—6 of Fig. 3 and is a detail view of one of the brackets showing the arrangement of the operating and suspending mechanism; Fig. 7 is a sectional view of a modified form of crank driving means; and Fig. 8 is a detail sectional view of the crank clutch corresponding to line 8—8 of Fig. 3.

Describing the parts by reference characters, my improved washing machine comprises a liquid-holding casing 1, a clothes-container 2, a cover 3, and a supporting frame 4, in conjunction with certain gearing and connecting and agitating devices. The casing 1 can be described as approximately kettle-shaped, namely substantially hemispherical with its bottom-part merging into a spherical portion; excepting that the bottom-part is introverted somewhat eccentrically as illustrated at 5, this being in its simplest form, essentially a large dent which is provided for a purpose to be hereafter described. The frame 4 is made with a bottom-part 6 to rest on a table, and is formed at each side with an up-standing bracket 7 closely embracing the casing and preferably of somewhat spherical contour so as both to produce added strength and to embrace the casing closely as illustrated in Fig. 3. Each of the brackets is provided at its upper end with a pivot element 8 operatively connected to the casing so that the casing is mounted to swing upon a horizontal axis.

The clothes-container 2 consists of a foraminous basket, also partly of spherical contour, slightly smaller in diameter than the casing.

This basket comprises approximately that portion of a spherical surface extending from near its equator to about two-thirds of the distance to one pole where it is formed with a rolled rim 10 defining a working opening. At the end opposite to this opening the wall of the container is turned more abruptly inward to form a perforated web 11 which is tightly joined to the peripheral flange 12 of a dished plate 13 carried by the hub 14.

Rigidly carried by the casing 1 is a bearing sleeve 15 in which is rotatably mounted a shaft 16 to which the hub 14 is tightly secured. Preferably the end of the shaft and the interior of the hub are tapered and squared or otherwise furnished with interfitting driving connections, and I have here shown the hub as secured to the shaft by an axial screw 17 tapped into the shaft and having a hemispherical fluted head 18 pressing on the hub. The sleeve 15 is perpendicular to the axis defined by the pivots 8—8 but is oblique to the plane defined by the rim 20 of the casing with the result that one side of the container always projects outside of this rim while the other side of the container always projects inside of this rim. As a consequence of this arrangement, when the casing 1 is tipped in one direction as shown in Fig. 1, one side of the container dips into a quantity of detergent liquid 21 with which the casing is supplied, while if the casing be tipped in the opposite direction as shown in Fig. 2, the container is brought entirely above the level of this liquid, without causing the liquid to overrun the rim of the casing in either direction. The introvert or dent 5 is located close to that part of the container which dips beneath the rim of the casing, thus raising the level of the liquid relative to the container when the latter occupies its washing position as shown in Fig. 1, while lowering the level of the liquid relative to the container when the latter occupies its extracting position shown in Fig. 2. The eccentric position of this liquid-well has therefore the double advantage of modifying the height of the liquid in both positions of the casing, and also of reducing the tendency of the liquid to spatter or whirl during the extracting movement of the container.

Projecting from opposite sides of the sleeve 15 are legs 22 and 23, respectively, suitably secured to the wall of the casing, and rigid with said sleeve at one side of the plane defined by these legs is a bracket 24 terminating in a threaded boss 25 perpendicular to the sleeve 15 and spaced therefrom. Threaded in the boss 25 is a horizontal bearing tube 26 having its extremity pro-

jecting through an aperture in the wall of the casing, and clamped thereto by gaskets 27 and nuts 28. Journalled in the sleeve 26 is a drive shaft 30 having at its inner end a bevel-gear 31 which meshes with a companion bevel-gear 32 carried by and here indeed formed integrally with the hub 14. To hold the shaft 16 in place and to withstand the thrust of these gears the shaft is provided at its lower end with a circular metal disk 33 which overlaps slightly the end of the sleeve, which in turn is provided with a closure-cap 34 provided with a thrust-bearing such as the anti-friction ball 35.

The extremity of the shaft 30 projects through an arcuate slot 36 in the corresponding bracket 7, the bracket being formed with an enlargement 37 at one side for this purpose. Movably carried by the bracket 7 is a suitable catch for holding the shaft 30 in one or the other end of said slot 36. Said catch in the present embodiment consists of a metal plate 45 slotted at 46 for slidable mounting on rivets 47 and having a tongue portion 48 adapted to project at one side or the other of the shaft 30 according to which end of the slot 36 it occupies, thereby preventing the casing from being rocked to its other position.

A crank attachment is carried at the end of the shaft 30 by means of which the container can be either oscillated or rotated, the crank quickly coming to rest after the rotation of the container has been carried on for the desired length of time. In this part of the machine a metal hub 50^a is attached to the shaft 30 by a set screw 51^a said hub having a reduced portion to which is applied a series of flat washers 52, 53, 54, all secured together by upsetting the end of the hub.

Loosely journaled on the projecting end of the shaft is a second hub 55 held against removal by a screw 56, and having riveted thereto a crank handle 57 and a pressed steel cup 58. The mouth of this cup closely surrounds the washer 52 which is circular and constitutes a backing plate; the periphery of the washer 53 is formed with a plurality of notches 59 having their bottoms all inclined in the same circumferential direction. Clutch balls 60 are located in the various notches in a position to engage the interior of the cup 58. A hand grip 61 pivoted for movement to the dotted line position shown, is carried by the end of the handle 57, and a longitudinally shiftable bolt 62 mounted in an eccentric boss 63 enables the crank to be attached rigidly to the shaft 30, the washer 53 being formed with a plurality of apertures 64 for the reception of this bolt.

It will be seen that when this bolt is pushed inwardly to engage one of these apertures the container can be oscillated and this operation is facilitated by shifting the handle 61 to the dotted line position shown in Fig. 3; but when the bolt is withdrawn the container can be driven only in one direction, and the crank will remain at rest when force is no longer applied to its handle. This arrangement constitutes a one-way clutch or a free wheeling drive in which the inclined faces of the notches 59 cooperate with the clutch balls 60 to provide a one-way driving connection with the cup 58. Practically with this device it is sufficient, after setting the casing in a position to bring the container upright, to crank vigorously for a few moments until the desired speed is attained and then allow the motion to die away gradually whereupon it will be found that the fabric contents have been sufficiently extracted.

As previously stated the washing operation may be effected by slowly turning the crank for a period of time depending upon the condition of the articles being cleaned. At the termination of the washing operation the speed of rotation of the clothes container may be increased so as to distribute the clothes uniformly about the inner periphery of the container and the container may then be shifted to the vertical position shown in Figs. 2 and 5 without stopping the rotation of the container whereupon the machine is ready for the extracting operation with the clothes uniformly distributed in the container so that it is substantially balanced.

The cover 2 is also made of spherical contour and is provided with a depending flange portion 50 fitting inside the casing in liquid-shedding relation.

Suitable agitating provisions are furnished inside the container, the same preferably consisting of one or more metal grids 51 as shown in Figs. 1 and 2, rigidly mounted in place and preferably having apertures of sufficient size to facilitate movement of the blades through the liquid but to compel all articles of clothing to move therewith.

Due to the peculiar shape of the casing and its peculiar relation to the container the washing or cleansing operation can be effected with a minimum quantity of liquid. The casing being inclined to the position shown in Figs. 1 and 4, the shaft 30 is operated to impart a washing movement to the container, either oscillation or slow rotation as may be desired. With the crank-lever construction, shown in Fig. 7 this is best accomplished with the handle 42 set radially as shown in dotted lines in Fig. 7, although it is possible to use the handle in the crank position shown in full lines therein, and it is possible, if the operator desires, to operate the device by continuous rotation instead of by rocking. When sufficient washing or cleansing action has been effected the casing is inclined in the opposite direction as shown in Figs. 2 and 5, and the handle, now in the crank position shown in full lines in Fig. 7, is rotated at such speed as to cause the centrifugal force to extract the liquid from the fabrics. To remove the container it is necessary first to remove the screw 17—18 after which by combined lifting and rocking the container can be removed from the casing. By a machine of this nature only fifteen inches in diameter it is possible to dry-clean articles as large as a woman's skirt or a man's coat, with an amount of dry-cleansing liquid not less than one quart nor more than three quarts. Due to the small size it is easy to secure a speed of 300 to 500 R. P. M. for extracting, which is sufficient to recover much the greatest part of the dry-cleansing fluid, thereby making the device very economical. Due to the friction connection between the handle and the drive-shaft, injuries due to the whirling shaft are avoided. The device is not, of course, limited to dry-cleansing fluid but soap and water can equally well be used therein for other types of washing. The shaft 30 is located above the surface of the liquid in the casing thus avoiding leakage around the shaft. One way this can be assured is by locating the shaft at a level above that of the lower portion of the inclined working opening. The location of the gears inside the casing and beneath the container shields them from danger of committing injury upon the operator or on the hands of children, dispenses with the need of special housings, and enables 75

them to be lubricated directly by the detergent fluid, the die-casting alloys from which they are preferably made being satisfactorily lubricated by most dry-cleaning fluids and by most soaps and soap powders while at the same time being free from the production of cloth-staining products.

In Fig. 7 I have illustrated the modified crank attachment in which the end of the shaft 30 is furnished with a suitable operating lever 38 here clamped against a flange 39 on the shaft by means of a spring-washer 40 and an adjustable nut 41 to produce a friction-connection. Carried by the outer end of this arm is a hand-grip 42 for either rotating or rocking the container.

While I have described my invention in detail I do not limit myself to these details except as the same are recited in my several claims which I desire may be construed each according to its own limitations and independently of limitations contained in other claims.

Having thus described my invention what I claim is:

1. In a fabric cleansing and extracting machine, in combination, a casing for detergent liquid, a container rotatably mounted inside said casing and having an apertured side-wall defining a surface of revolution about the container's axis of rotation, gearing inside said casing beneath said container and operatively connected thereto, means located outside of said casing and working through a wall thereof for actuating said gearing, and a one-way clutch interposed between said means and said container.

2. In a combined clothes cleansing and extracting machine, a casing for holding detergent liquid, a container rotatably mounted inside said casing and having an apertured side-wall which defines a surface of rotation about the container axis, means for supporting said casing in two angularly related positions, said axis being substantially vertical in one such position and substantially inclined to the vertical in the second position, said casing being liquid-retaining in both positions, gearing inside said casing beneath and operatively connected to said container, means located outside of said casing operating through a wall thereof for operating said gearing, and a one-way clutch interposed between said means and said gearing.

3. In a combined fabric cleansing and extracting machine, in combination, a supporting frame, a casing for detergent liquid mounted in said frame and movable to different positions therein with reference to a horizontal axis, a container journaled inside said casing upon an axis which is substantially vertical in one position of said casing and substantially inclined from the vertical in the second position of said casing, said container having an apertured side wall which defines a surface of revolution about said axis, gearing inside said casing beneath said container, and means comprising gearing and a one-way clutch for operating said container from a point outside of said casing.

4. In a combined fabric cleansing and extracting device, a casing, said casing having a working opening, a foraminous container having a wall defining a surface of revolution and having a working opening located at least in part above the plane of the working opening of said casing, one side of said container projecting outside and the opposite side of said container projecting inside the plane defined by said casing opening, a cover fitting inside of said casing opening and bulged

to accommodate said container, means for supporting said casing in two angularly diverse positions, in one of which said container is substantially upright and in the other of which said container is substantially inclined, means inside said casing whereby said container is rotatably supported, and means operable from the exterior of said casing for moving said container about its axis in all positions of said casing.

5. In a combined fabric cleansing and extracting machine, in combination, a casing for detergent liquid, said casing having a working opening, means for supporting said casing with said working opening slanted alternatively in two opposed oblique directions, a foraminous-walled container rotatably mounted inside said casing upon an axis which is oblique to the plane of said opening and is substantially upright in one of the named positions of said casing, the wall of said container defining a surface of revolution about said axis and projecting partly outside and partly inside said working opening, a horizontal shaft carried by and projecting through said casing beneath the bottom of said container, gearing operatively connecting said shaft to said container, and a cover fitting inside said working-opening and bulged to accommodate said container.

6. In a combined fabric cleansing and extracting machine, in combination, a supporting frame, a casing for detergent liquid pivoted to said supporting frame upon a substantially horizontal axis, said casing having an open upper side defining a working opening, means for securing said casing to said frame in each of two angularly separated liquid-retaining positions, the plane of said opening being oblique to the horizontal in each of said positions, a horizontal shaft journaled in said casing parallel to the pivot axis and traversing the casing-wall, a foraminous-walled container rotatably mounted inside said casing, the wall of said container defining a surface of revolution relative to its axis of rotation, and such axis being oblique to the plane of said working opening, and gearing operatively connecting said shaft to said container.

7. In a combined fabric cleansing and extracting machine, a casing for holding detergent liquid having a slanting top opening, means for moving and fixing the position of said casing relative to the horizontal to reverse the slant of said top opening, a foraminous container rotatably mounted inside said casing on an axis which is oblique to the plane of said top opening, and means for rotating the said container for all positions of its axis.

8. In a combined clothes cleansing and extracting machine, in combination, a casing for detergent liquid having its top slanted obliquely to the horizontal and having its bottom introverted eccentrically, means for moving and fixing the position of said casing relative to the horizontal to reverse the position of slanting of said top, a foraminous-walled container rotatably mounted inside said casing on an axis which is oblique to the top of said casing, one side of said container projecting into said casing into proximity with the introverted portion thereof, gearing operatively connected to said container, and a shaft operatively connected to said gearing and operable exteriorly of said casing for all positions of said casing.

9. In a fabric cleansing and extracting machine, in combination, a casing for detergent liquid, a container rotatably mounted inside said casing and having an apertured side wall defining a sur-

face of revolution about its axis of rotation, means for tilting the axis of said container, a foraminous vane fixedly mounted inside said container, and driving means for said container for effecting the cleansing and extracting operations comprising a horizontal shaft permanently connected to said container and extending from said casing and gearing inside said casing interposed between said shaft and container and exposed to the liquid in said casing.

10. In a fabric cleansing and extracting machine, a casing for detergent liquid having a part of its side wall formed to define a surface of revolution and having a top opening, a foraminous container journaled inside said casing on an axis which is oblique to the axis of said casing, the wall of said container also defining a surface of revolution about the container axis and being concealed at least in part inside one wall of said casing, means for supporting said casing in either of two alternative positions, in one of which said container axis is substantially vertical and in the other of which said container axis is substantially inclined, and means for moving said container about its axis in either of said positions.

11. In a combined fabric cleansing and extracting machine, in combination, a partly hemispherical casing for detergent liquid, said casing having a working opening substantially coincident with its equator and having an introverted bottom portion, the plane of such opening being oblique to the horizontal, and a foraminous container rotatably mounted inside said casing upon an axis which is oblique to such opening, the bottom of said container being located near such introverted portion and the side wall of said container being of similar curvature to the side wall of said casing and located adjacent to one side thereof.

12. In a combined fabric cleansing and extracting machine a partly hemispherical liquid-holding casing having a working opening coincident with its portion of greatest diameter and defining a plane normal to the casing axis, means for supporting said casing with the plane of said working opening slanted in either of two directions relative to an intermediate horizontal axis, a foraminous container rotatably supported inside said casing above the level of the liquid therein with its axis substantially vertical when the casing occupies one of said positions, the side wall of said container curving inwardly and upwardly and corresponding in contour to the side wall of said casing which it closely approaches at one side only, and means for rotating said container from outside said casing.

13. In a combined fabric cleansing and extracting machine, a partly hemispherical liquid holding casing having a working opening substantially parallel to the plane of its equator, a supporting frame having a base and having two outwardly bulged brackets located at opposite sides of said base and embracing said casing, means pivotally supporting said casing from said brackets, the pivot axis being horizontal, means for securing said casing to said frame with the plane of said working opening slanted alternatively in opposite directions relative to the horizontal, a foraminous container journaled in said casing on an axis which is perpendicular to the pivot axis, said container being at least partly immersed in the liquid in said casing for one position thereof and being located wholly above the level of the liquid in said casing for the other position thereof, and

means for rotating said container from outside said casing.

14. In a combined fabric cleansing and extracting machine, a casing for holding detergent liquid, said casing having a working opening at its top, means for supporting said casing in different fixed stable positions with the plane of said top slanted selectively in opposite directions, a foraminous container located inside said casing with its axis oblique to the plane of said working opening whereby a liquid receiving space is provided between the bottom of said container and the opposite wall portions of said casing for one of the positions of said casing, and means for manually rotating said container from outside said casing.

15. In a combined cleansing and extracting machine, a casing for holding detergent liquid, a frame embracing said casing, means pivotally securing said casing to said frame upon a horizontal axis, means for latching said casing to said frame in alternative positions of inclination relative to said axis, a foraminous container journaled inside said casing upon an axis which is perpendicular to said first axis, a drive shaft journaled in said casing parallel to said first axis, means connecting said drive shaft operatively to said container, and means for applying power to the outer end of said drive shaft.

16. In a combined fabric cleansing and extracting machine, a casing for detergent liquid, means for tilting said casing to cleansing and extracting positions, a horizontal drive shaft journaled in said casing and traversing the casing wall at a level above the liquid for all positions of said casing, a foraminous container journaled inside said casing on an axis which is perpendicular to said drive shaft, and gearing beneath said container operatively connecting said shaft and container inside said casing.

17. In a combined fabric cleansing and extracting machine, a hollow casing, a supporting frame having bracket arms embracing opposite sides of said casing, means pivotally securing said casing to said bracket on a horizontal axis, a foraminous container journaled inside said casing on an axis perpendicular to said first axis, a drive shaft journaled in said casing parallel to and displaced from said first axis, said shaft traversing said casing wall, and one of said brackets having an arcuate slot through which said shaft projects, an operating handle carried by the outer end of said shaft, and operative connections between said shaft and container inside said casing.

18. In a combined fabric cleansing and extracting machine, a casing for detergent liquid, said casing having a working opening at its top, and the portion of the casing below said working opening having hollowed-out portions adapted to retain the liquid contents thereof, means for tilting said casing to shift the liquid thereof from one hollowed-out portion to another of said casing, a foraminous container journaled in said casing upon an axis which is oblique to the plane of such working opening and having a part at least extending into one of the hollowed-out portions of said casing, and manual means for rotating said container from outside said casing in the different positions of inclination of said casing.

19. In a fabric cleansing and extracting machine, in combination, a casing for detergent liquid, a container rotatably mounted inside said casing, and driving means operative from outside

of said casing and comprising a one-way clutch, means for selectively locking the cooperating parts of said clutch to each other and speed increasing gearing effective for rotating or oscillating said container.

20. In a fabric cleansing machine, in combination, a casing for detergent liquid, a container rotatably mounted inside said casing, operating means comprising a one-way clutch for rotating said container at high speed, means for shifting the position of said casing with respect to said support, and means for rendering said clutch inoperative whereby said casing may be oscillated about its axis by said operating means.

21. In a combined fabric cleansing and extracting machine, a casing for detergent liquid having a working opening in its top, a foraminous container rotatably mounted in said casing with a portion to one side of the axis thereof located closely adjacent to the side and bottom of said casing and with its opposite portion spaced a substantial distance from the opposite side and bottom portions of said casing, and means for changing the position of said casing to displace the liquid in said casing from a position in contact with said container to a position out of contact with said container.

22. In a combined fabric cleansing and extracting machine, a casing for detergent liquid having a working opening in its top, a foraminous container rotatably mounted in said casing with a portion to one side of the axis thereof located closely adjacent to the side and bottom of said casing and with its opposite portion spaced a substantial distance from the opposite side and bottom portions of said casing, and means for changing the position of the liquid in said casing from a position in contact with said container to a position wholly below said container.

23. In a combined fabric cleansing and extracting machine, a casing for detergent liquid having a working opening in its top, a foraminous container rotatably mounted in said casing with a portion to one side of the axis thereof located closely adjacent to the side and bottom of said casing and with its opposite portion spaced a substantial distance from the opposite side and bottom portions of said casing, means for changing the position of said casing and container with respect to the liquid in the casing whereby to immerse at least a part of the container in the liquid of said casing during the cleansing operation of the machine and bring said container out of contact with the liquid in said casing during the extracting operation of the machine, and means for operating said container for effecting the cleansing and extracting operations.

24. In a combined washing and extracting machine, a casing for a cleansing liquid having a working opening in the upper part thereof, a perforate container rotatably mounted in said casing and having an opening accessible through said casing opening, means for rotating said container for first washing and then extracting adherent liquid from articles of fabric in said container, the side walls of said casing and container defining in part at least a surface of revolution and having outwardly bulging spherical portions of similar curvature when viewed in a vertical section, said casing having wall portions approaching relatively closer to the side and bottom of one part of said container than do the opposite parts of said container and casing, and means for shifting the liquid in said casing from a position in contact with said container to a position out of contact with said container as a step preliminary to the extracting operation.

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