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Casanova et al.

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[54] **PROCESSING DRUM FOR TREATING HIDES**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **69/30**

[51] **Int. Cl.** **C14c 1/00**

[58] **Field of Search** 69/30, 31, 32; 68/142

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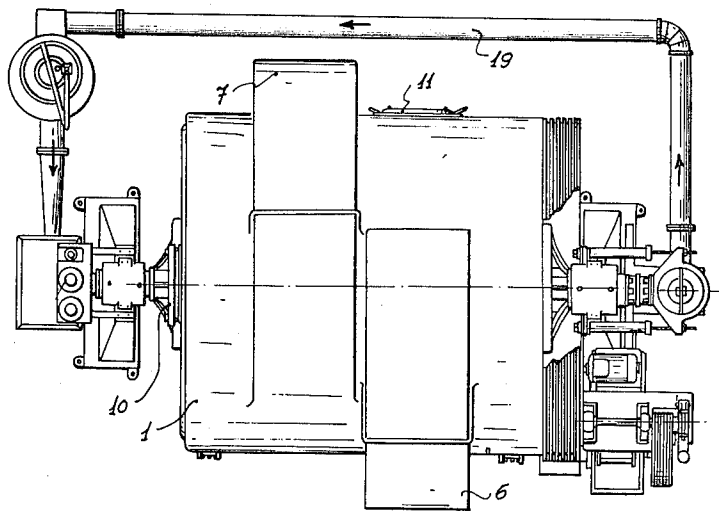
Primary Examiner—Alfred R. Guest

[57] **ABSTRACT**

The present invention relates to drums for hide-treatment processes in which the hide loading and unloading operations are effected automatically by simple reversal of the direction of rotation, introducing or removing them from the radial apertures directed in the same direction though diametrically opposing each other and located at the ends of two rectangular section ducts close to each other and fitting over more than 180° of the outside of the drum cylindrical face, communicating by the other end in the form of a bend with the inside of the drum. Connections also located diametrically opposite each other.

4 Claims, 6 Drawing Figures



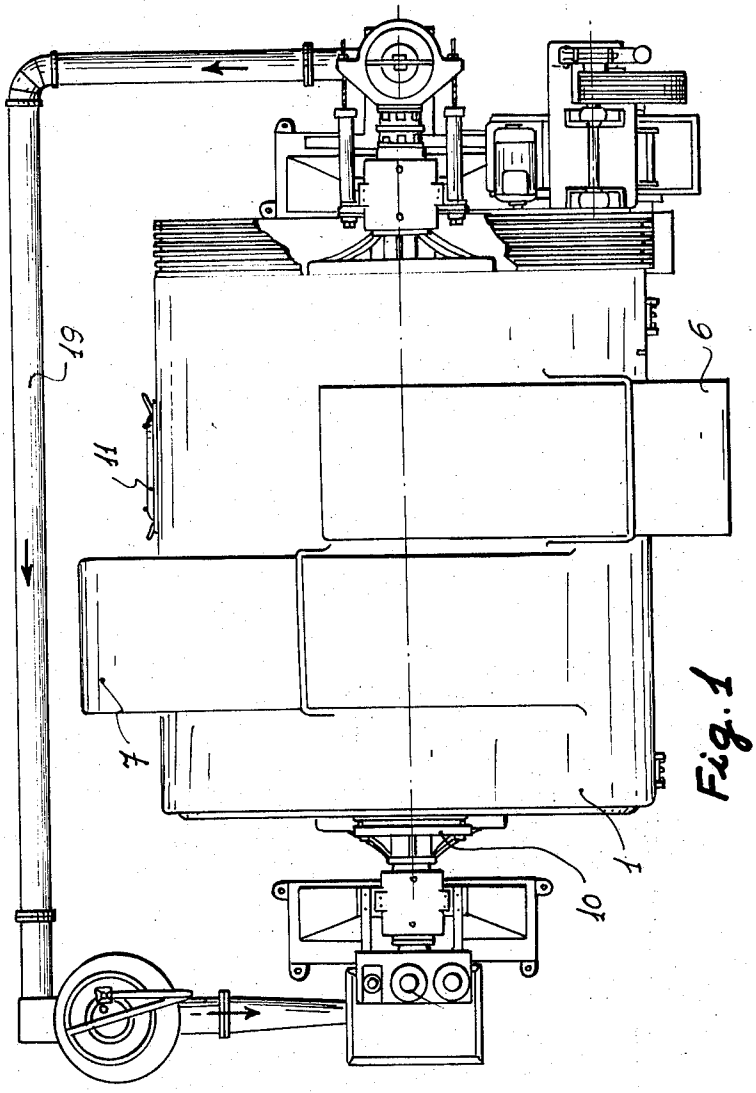


Fig. 1

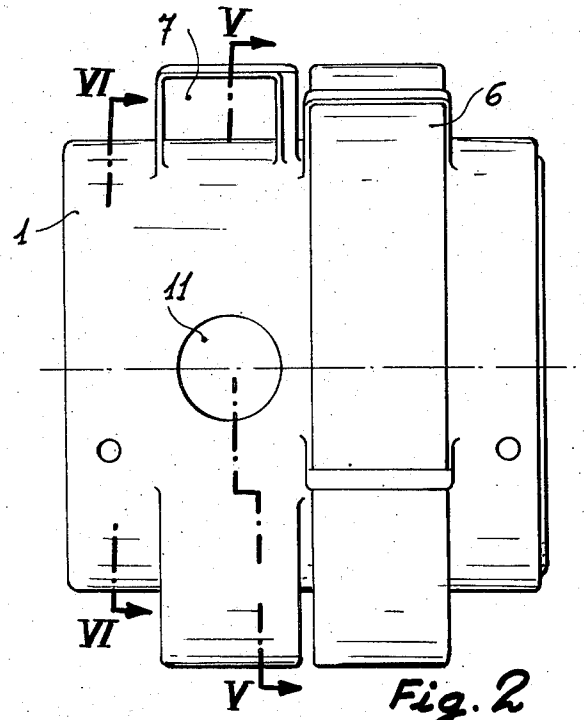


Fig. 2

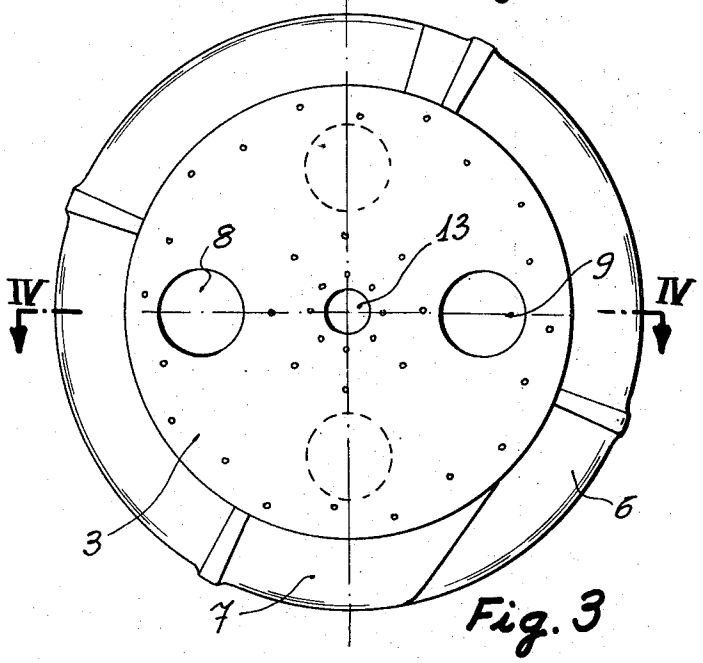


Fig. 3

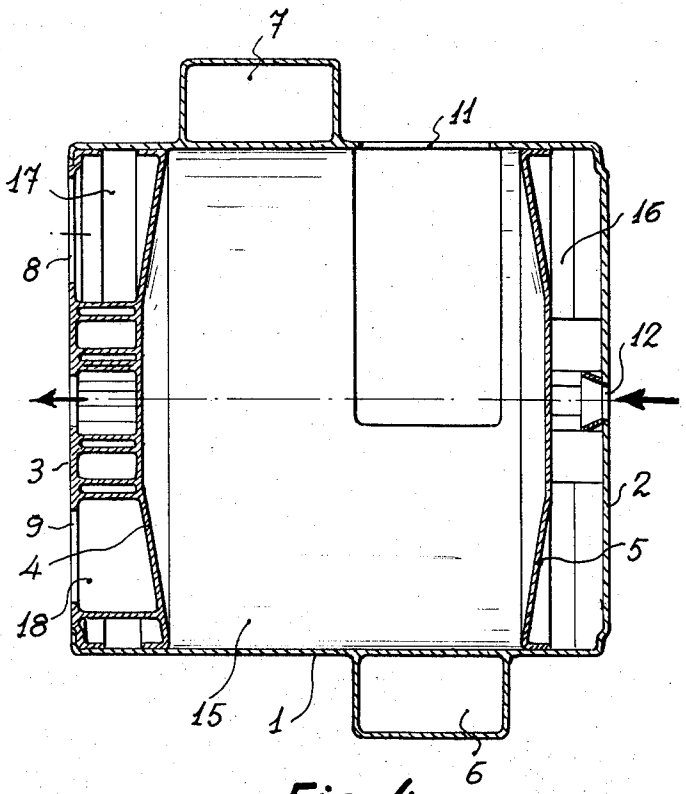


Fig. 4

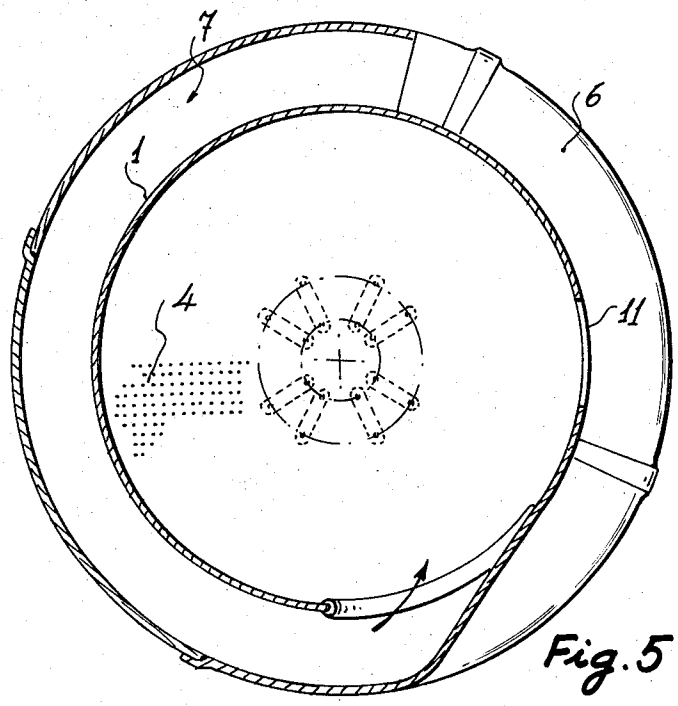


Fig. 5

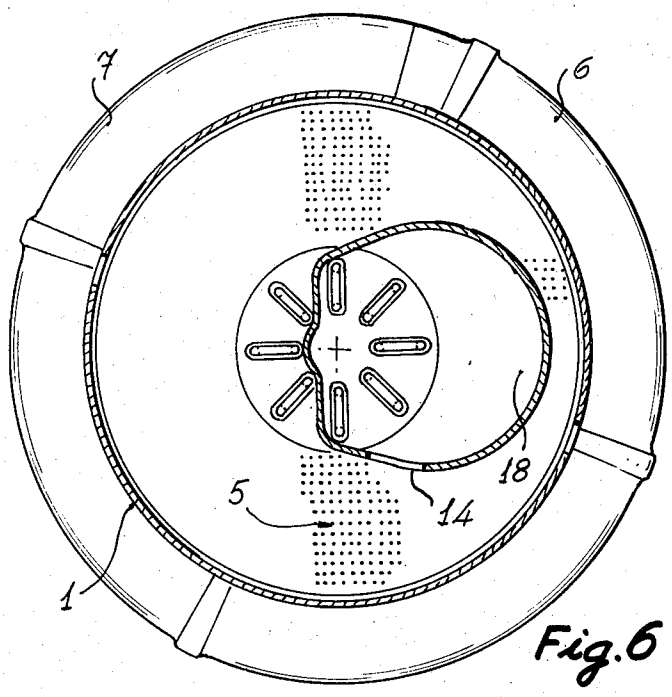


Fig. 6

PROCESSING DRUM FOR TREATING HIDES

BACKGROUND OF THE INVENTION

In the transformation of raw hides obtained from skinning animals, into leathers suitable to the various uses intended by man, it is necessary, among other operations, to ensure intimate contact of the hides with a wide range of chemical products generally in aqueous solution, the hides being suitably stirred.

The stirring operation in chemical products has been effected to-date in various types of arrangements and machines.

All these machines are based on the following basic principles:

1. Containers

All containers within which the hides are able to move together with treatment fluids can be summarized under the following two headings:

a. Tubs.- These are semi-cylindrical tanks located horizontally, open at the top by way of a rectangular face. These tanks are fixed and secured to the floor. They are generally the product of lined civil engineering work, wood and less frequently polyester or other materials. Loading and unloading is generally effected through the open top of the tank. It is an arduous and troublesome operation.

b. Drums.- These are cylindrical containers with one or several doors in the curved face and rotating about their geometrical axis, generally being made of wood, though an increasing number is being made at present in polyester. The liquids are fed in through holes perforated around the drum. Discharge is effected through the side-doors, as well as the loading of the hides. This operation is largely arduous and troublesome.

2. Stirrers

To ensure a homogeneous solution and to displace the mass formed by the hides and the liquid bathing them within the previously cited containers, the following components are used:

c. Rotors.- These are extended blade wheels rotating at the surface of the open face of the tubs cited above. The blades are half-submerged within the liquid/hides mass, and on rotating, promote the movement of the said mass within the tub.

d. Vanes and blades.- These are cylindrical rods or curved and polished profile blades, integral and distributed on the internal face of the curved wall of the drums cited above, and which on rotating the drums, ensure the movement of the contents. If the internal cylindrical and smooth part of the drum lacked such vanes or blades, the stirring movement as produced by rotation, would be very limited and quite insufficient to ensure a homogeneous solution and to unfold the hides within the process liquid.

TO SUM UP

All of the present effective means used in tanneries for these purposes are reduced to fixed containers (tubs) or rotating containers (drums) containing the hides and treatment solution mass, and this is agitated by means of blades independent from the vessel (rotors) or by means of vanes and blades integral with the vessel (drums).

SUMMARY OF THE INVENTION

Although from the general viewpoint, looking at the external appearance and the nature of the movement, the new arrangement may be compared with a conventional drum, the said new arrangement for which a patent is claimed, differs essentially for the following reasons:

CONTAINER

Clearly this is not a mill-type arrangement, nor can it be classified as a drum in the normally accepted sense of the word, since the internal form is cylindrical, excepting that it has two large curved spiral-like ducts of rectangular cross section fitted to the cylindrical part, thus increasing the capacity of the central cylindrical compartment by 20 percent each.

STIRRING

This is the feature with the most marked difference from present-day industrial systems previously cited. The internal walls of the arrangement are smooth, and free from blades or rods or whatsoever projection. Stirring is effected by the transfer of liquid and hides mass which occurs continuously during the rotation of the drum, passing from the drum into one spiral-like duct and then returning to the drum part, at the same time as the other spiral-like duct fills up and so on.

This stirring motion can be compared with a transverse ducting transporting the liquid mass from one compartment to another.

The advantages of this stirring means over those used for conventional drums are considerable:

1.- Faster homogenization of the contents of the drum.

2.- Low drum rotation speed (2 rpm against 8–14 rpm in normal drums).

3.- Greatly reduced power consumption resulting from the lower rotation speed.

4.- Absence of abrasive action against the nap of the hide, as a result of the absence of internal projections.

BRIEF DESCRIPTION OF THE DRAWINGS

Drawings as outlined hereinunder are enclosed to allow better understanding of the object of the invention, given exclusively for purposes of illustrations.

FIG. 1 shows a plan view of the drum according to the invention.

FIG. 2 shows a front elevation of the drum considered separately.

FIG. 3 shows a side view of the fluid discharge.

FIG. 4 shows a longitudinal section on an horizontal plane as indicated by IV—IV of FIG. 3.

FIG. 5 shows a transverse section through the vertical plane indicated in V—V of FIG. 2.

FIG. 6 shows a transverse section through the vertical plane indicated in VI—VI of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the said illustrations and the subsequent description, the component parts of the assembly and its main constituents have been referenced as follows:

1.- Cylinder

2.- Fluid inlet end wall

3.- Fluid outlet end wall

4.- Perforated truncated cone partition
5.- Perforated truncated cone partition
6.- Spiral-like ducts
7.- Spiral-like ducts
8.- Access to fluid outlet compartment
9.- Access to eccentric container
10.- Access to fluid inlet compartment
11.- Access to main compartment
12.- Fluid inlet duct
13.- Fluid outlet duct
14.- Eccentric container loading aperture
15.- Main compartment
16.- Fluid inlet compartment
17.- Fluid outlet compartment
18.- Eccentric container
19.- External recirculation circuit.

The relevant drum is made entirely in polyester to take advantage of its impermeability and the fine surface finish which can be achieved.

Referring to the previously-cited illustrations, it will be seen in FIG. 4 that the drum consists of a cylinder (1), two truncated cone perforated partitions (4, 5), an end wall with the fluids inlet (2), another end wall with the fluids discharge (3) and two spiral-like ducts of rectangular cross section located at the center of the cylinder (1) and wound over more than 180° of the outer face of the cylinder. The spiral-like ducts (6, 7) have radial apertures running in the same direction, though diametrically in opposing positions, as well as the connections curving into the inside of the drum. The outline of one of the connections can be seen in FIG. 5 with reference to component (7).

As may be seen from FIGS. 4, 5 and 6 the inside of the drum is subdivided into four compartments:

1.- The main compartment, housing the hides and in which the processing occurs, demarcated on the one hand by the internal face of the cylinder (1), the perforated truncated cone partitions (4, 5) and the segments of the spiral-like ducts (6, 7) located below the level of the mass of hides and fluid.

2.- The inlet compartment for the fluids (16), limited by the internal surface of the cylinder (1), the perforated truncated cone (5) and the end wall (2) for fluids.

3.- The fluids discharge compartment (17), limited by part of the internal surface of the cylinder (1), the perforated truncated cone partition (4), the fluids outlet end wall (3) and by the eccentric container (18). It may be seen in FIGS. 5 and 6 that both the fluids inlet compartment (16), as well as the fluids discharge compartment (17) communicate with the main compartment (15) by means of the perforated truncated cone partitions (4, 5) allowing the free circulation of fluid between them, and retaining the hides within the main compartment (15).

4.- The eccentric container (18) subdividing the fluids outlet compartment (17), demarcated by the truncated cone partitions (4) and the end wall (3), and by the partition as shown in FIG. 6. It should be noted that the area of the container in contact with the truncated cone partition (4) is without perforations, the said container communicating exclusively with the fluids outlet compartment (17) by means of the loading aperture (14), and with the external recirculation circuit (19) by means of the fluids outlet duct (13) as shown in FIGS. 3, 4, and 6. Accesses (8, 9, 10, 11) are provided to all internal compartments of the drum. The purposes of such accesses are to allow inspection, maintenance, and cleaning of each compartment. The compartments and their related accesses are:

the main compartment (15) by means of access (11)

the fluids inlet compartment (16) by means of two accesses (10)

the fluids outlet compartment (17) by means of access (8)

the eccentric container (18) by means of access (9).

An external recirculation circuit (19) shown in FIG. 1 is located on the outside of the drum, communicating with the drum at the fluid outlet (13) and with the fluid inlet (12).

OPERATION

Movement - The movement is a rotary movement on the geometrical axis of the cylinder (1) in the horizontal position, driven by a unit shown in FIG. 1 equally allowing reverse rotation.

Recirculation - This is effected by way of the eccentric container (18) which, as the drum revolves in a suitable direction and when passing through the lower part of the fluid, fills up by way of the loading aperture (14), raising its contents above the central axis and forcing the fluid to discharge by gravity through the duct (13), thus commencing the circulation in the outer recirculation circuit (19), the fluid finally returning by way of the opposing part of the drum, or by way of the inlet duct (12). The cycle is repeated with each revoltuion of the drum, thus ensuring automatic recirculation of the fluid within the drum. The said fluid in the external circuit passes through the additional equipment (not detailed herein), allowing complete control of the chemical properties of the solution, controlled adjustment of pH, addition of products, temperature control etc. . . , etc. . . , thus allowing the solution to be maintained in the required conditions throughout the whole of the process.

Stirring - As already described previously, the stirring of the hide and fluid mass is effected by transfer from one spiral-like duct to another, during rotation of the drum. The spiral-like ducts (6, 7), as already quoted, are wound around the outer part of the cylinder (1) both in the same direction, but in diametrically opposing positions. Looking at the spiral-like duct (7) in FIG. 5, it can be easily appreciated that in the position shown, the inlet apertures of one spiral-like duct will come below the horizontal axis, and the duct will be filled with the contents of the drum by way of communicating vessels, though as soon as the drum starts moving, turning in the clockwise direction, the contents of duct (7) will be emptied into the inside of the main compartment (15). During this time, the inlet aperature of the other duct will be rotated to below the horizontal axis initiating the filling of the other spiral-like duct (6), which will then repeat the operation and so on. This ensures stirring of the mass in a much more intensive manner than with conventional methods already described, consequently allowing a slower speed, to the advantage of the mechanical components and with a saving in electrical power.

Loading and unloading - In view of the rotation direction of the two spiral-like ducts (6, 7) communicating

by one end with the main compartment (15), hides can be loaded through the apertures of the ducts, whence they are transported into the inside of the main compartment (15), and in the contrary manner, expelling the whole of the contents when the direction of rotation is reversed. This operation is favoured by the truncated cone shape of the perforated partitions (4, 5) as may be seen from FIG. 4.

The advantages of the system over conventional methods are:

1.- Rapid loading of the hides by way of the spiral-like ducts (6, 7) without the need to open or close leak-proof doors.

2.- High speed discharge of the hide and fluid mass through the spiral-like ducts (6, 7) by simple reversal of the direction of rotation of the drum, without manual assistance whatsoever.

The size, shape and materials for each of the various components of the assembly will vary, the assembly itself being subject to variations providing this does not involve any modification in the basic principle of the purpose specified in the above description, which may be taken in its widest sense, and does not constitute a limit to the design possibilities.

What is claimed is:

1. An apparatus for treating hides comprising:

a drum rotatable about its horizontally positioned cylindrical axis, the direction of rotation of said drum being reversible, said drum being formed by a cylindrical wall closed at each end with an end wall;

a perforated partition spaced apart from each of said end walls to form a fluid inlet compartment at one end of said drum and a fluid outlet compartment at the other end;

means for introducing treatment fluid into said fluid inlet compartment and for withdrawing treatment fluid from said outlet compartment;

walls within said one of said compartments forming an eccentric container, said eccentric container having openings communicating with said one compartment and with said means for introducing, whereby fluid in said apparatus is circulated as said drum rotates;

a pair of spiral-like ducts wrapped around a portion of said cylindrical wall, one end of each of said ducts opening into said drum and the other end opening outside said drum, each of said ducts being displaced circumferentially from each other so that their similar openings are also circumferentially spaced apart, whereby rotation of said drum in one direction agitates said fluid as said fluid flow between said ducts and said drum, and rotation opposite said one direction causes said fluid to be discharged out of said drum through said ducts.

2. The apparatus as claimed in claim 1, wherein said ducts are wrapped over a 180° portion of said cylinder, and said openings of said ducts into said drum are spaced diametrically opposite each other.

3. The apparatus as claimed in claim 1, wherein said perforated partitions are in the shape of truncated cones oriented outwardly of said drum.

4. An apparatus for treating materials with liquids comprising:

a drum rotatable about its horizontally positioned cylindrical axis, the direction of rotation of said drum being reversible, said drum comprising a cylindrical wall closed at each end by an end wall;

at least one perforated partition spaced apart from one of said end walls to form a compartment;

means for introducing and withdrawing treatment liquid into said drum through said compartment;

walls within said compartment forming an eccentric container having openings communicating with said compartment and with said means for introducing;

at least one spiral-like duct wrapped around a portion of said cylindrical wall, one end of said duct opening into said drum and the other end opening outside of said drum, whereby rotation of said drum in one direction agitates said liquid and rotation opposite said one direction discharges said liquid out of said drum through said ducts.

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