Feb. 6, 1962 J. FLEISSNER ET AL 3,019,630

WASHING OR DYEING MACHINE

Filed Oct. 16, 1959 2 Sheets-Sheet 1

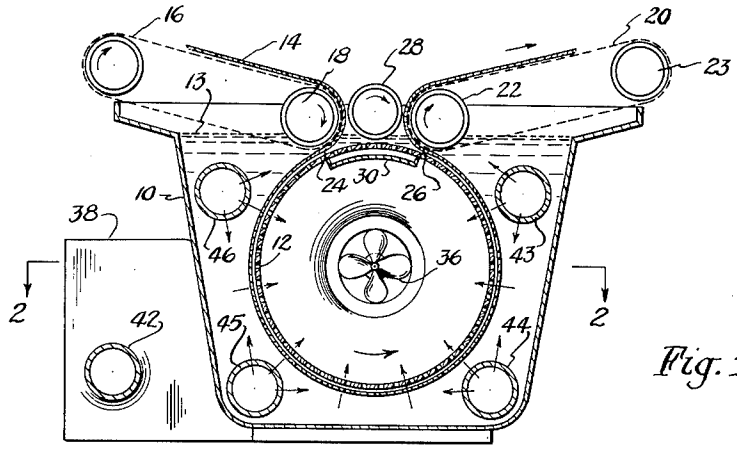


Fig. 1

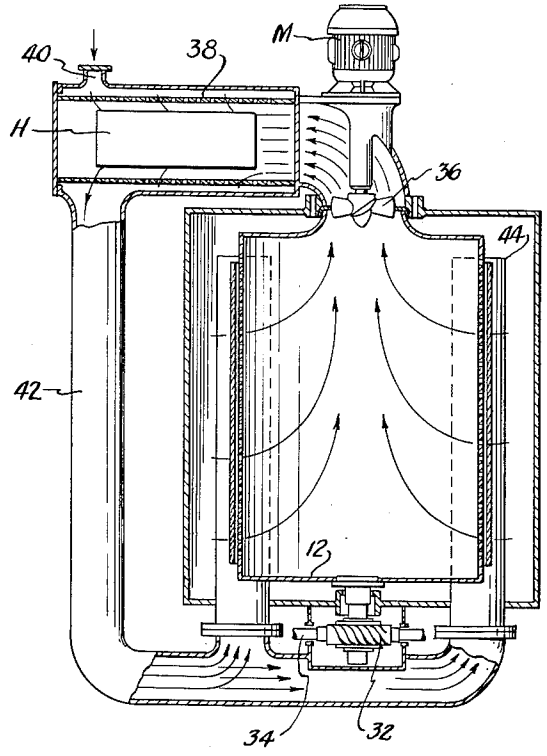


Fig. 2

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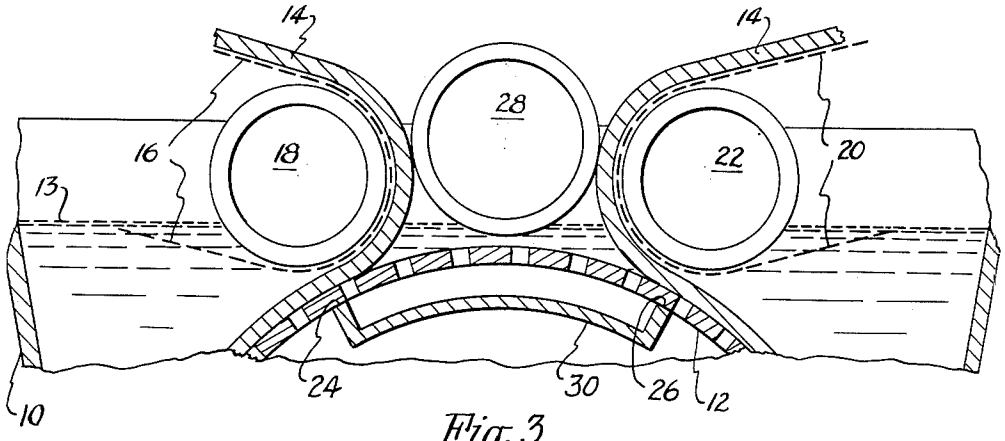


Fig. 3

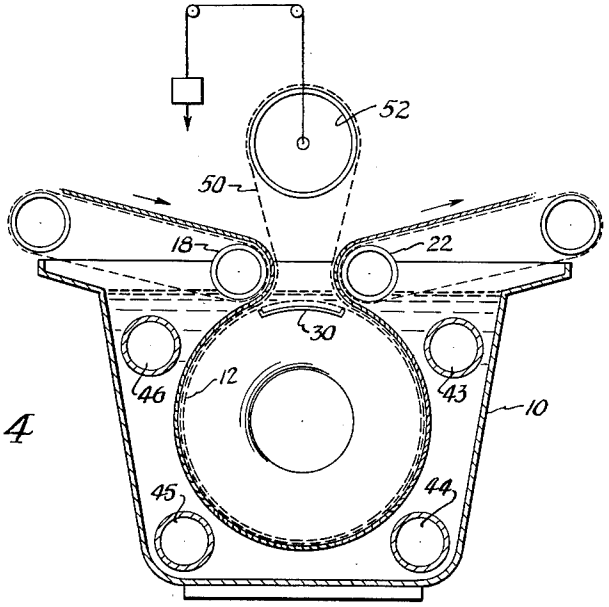


Fig. 4

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United States Patent Office 3,019,630 Patented Feb. 6, 1962

3,019,630

WASHING OR DYEING MACHINE

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Filed Oct. 16, 1959, Ser. No. 853,434
Claims priority, application Germany Aug. 31, 1955
2 Claims. (Cl. 68—158)

This invention relates to washing and dyeing machines and, in particular, is directed to a machine for the washing or dyeing of loose fibers in the form of bats or fleece, fiber bands, rope yarns and the like.

Washing machines are known, such as shown in Hanhart U.S. Patent No. 1,794,403, in which a perforated washing drum is substantially immersed in a tank of liquid and a woven textile drawn around the surface of the drum, with the liquid being drawn through the fabric into the drum by means of a pump producing a flow of liquid in the tank. Such prior structure is adapted to wash fabrics having sufficient tensile strength so that they can be pulled around the drum, but are not able to hold loose fibers or fleece upon the surface of the drum.

The object of this invention is to produce a machine for washing loose fibers or fleece in which means are provided for holding the material on the surface of the drum.

In general, these objects are accomplished by substantially immersing a rotatable perforated drum in a tank of fluid. A suction is produced in the tank by a pump. The loose material is led to an upper portion of a drum and taken from the drum at an adjacent upper portion, with the space between the two portions being closed off by a cover plate. Consequently, the entire suction produced by the pump is effective over the entire surface of the drum contacted by the loose material, and this suction is sufficient to hold the loose material on the surface of the drum during its transit from the ingress to the egress point from the drum. The liquid taken from the drum is cleaned, added to if necessary, and then recirculated into various portions in the tank around the drum so that the fresh liquid is substantially uniformly applied to all of the material being carried on the surface of the drum.

The means by which the objects of the invention are obtained are shown more fully with respect to the accompanying drawings, in which:

FIGURE 1 is a vertical cross-sectional view through the washing machine of this invention;

FIGURE 2 is a cross-sectional view on the line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged detail view of a portion of FIGURE 1; and

FIGURE 4 is a cross-sectional view similar to FIGURE 1 of a modified form of the machine.

As shown in FIGURE 1, the tank **10** has a perforated drum **12** rotatably mounted therein so that the surface of the tank either lies below or the tank is substantially immersed below the surface **13** of the liquid within the tank. The loose fiber material **14** is fed to the drum over an endless conveyor belt **16**, the outlet end roller **18** of which is positioned adjacent the uppermost portion of drum **12**. The material, after passing around beneath the drum, is removed by a discharge conveyor **20** having its inlet roller **22** positioned adjacent a second portion of the upper part of the drum. The material is discharged over roller **23**. The line tangent at the point **24** between roller **18** and drum **12** and the line tangent at the point **26** between roller **22** and drum **12** are each, respectively, located beneath the surface level **13** of the liquid in the tank. Between rollers **18** and **22** is a third roller **28** which assists in directing the loose material **14** from conveyor **16** onto drum **12** and assists in removing the washed

loose material from the drum onto conveyor **20**. Beneath roller **28** and extending between lines tangent at the points **24** and **26**, respectively, is a cover plate **30** which forms a seal against the entrance of liquid or air between these tangent lines.

As shown in FIGURE 2, drum **12** is rotated by any suitable means, such as through a gear **32** driven from any suitable motor source through shaft **34**. The blades **36** of a pump driven by motor M constitute a suction pump for withdrawing water from the interior of drum **12** in the direction of the arrows as shown. This liquid is led through a filter **38** to be cleaned and has make-up, fresh liquid added thereto, if desired, through pipe **40**. This make-up liquid may be preheated or the liquid heated during the filtering and cleaning thereof by means of the heater H. The force of the pump circulates the liquid through pipe **42** back to the four pipes **43**, **44**, **45**, and **46** symmetrically arranged about drum **12**. These pipes are perforated throughout their lengths in the direction of drum **12** so that the liquid discharged therefrom is substantially uniformly applied over the surface of the drum covered by the material **14**.

In the modification shown in FIGURE 4, the roller **28** of FIGURE 1 is replaced by a porous conveyor belt **50** which extends continuously around the tension roller **52** and the drum **12**. Roller **52** is tensioned by means of springs, weights, or other means so that sufficient distance exists between belt **50** and rollers **18** and **22** for the passage of the material **14**.

In each of FIGURES 1 and 4, the material remains on the surface of drum **12** between the ingress line tangent at the point **24** and the egress line tangent at the point **26** over a distance of some 320°. The suction pump creates a differential pressure between the exterior and the interior of the drum so that the liquid is drawn through the material on the drum and held upon the drum by the force of the liquid flowing through the material. Sufficient differential pressure and suction to hold the material on the surface of the drum is possible by reason of the cover **30** which prevents the entrance of air or water through the area of less resistance between lines **24** and **26**. Without this seal provided by the cover **30**, there would not be sufficient suction within the drum to hold the loose material **14** which lacks any tensile strength upon the surface of the drum as the drum is rotated between the ingress and egress points of the machine. Thus the full force of the pump is applied on the material being washed.

This application is a continuation-in-part of our abandoned application Serial No. 587,717, filed May 28, 1956, for "Washing or Dyeing Machine."

Having now described the means by which the objects of the invention are obtained, we claim:

1. In a fibrous material washing machine having a liquid container, a perforated washing drum rotatably mounted on its horizontal axis within said container and adapted to be substantially submerged below the washing liquid surface level to be maintained in said container, first conveyor means for feeding unwoven fibrous material to an ingress point to be borne on the revolving surface of said drum for movement beneath said drum, said ingress point lying just below the surface to be maintained for the level of the washing liquid, second conveyor means for removing said material from said drum at an egress point on the revolving surface of said drum, said egress point lying just below the surface to be maintained for the level of the washing liquid, said second conveyor means being positioned opposite to the said first conveyor means across the top of said drum, pump means for withdrawing washing liquid from the interior of said drum to form a differential pressure between the exterior and interior of said drum for drawing said liquid from said contain-

er through said material borne on the submerged portions of said drum into said drum and thereby firmly holding said borne material on the said drum as the said drum rotates through the major portion of a single revolution to move said material from said first to said second conveyor means, and liquid supplying tube means having a perforated outlet within said container and joined to said pump means for recirculating the said withdrawn liquid substantially uniformly against the submerged surface portions of said washing drum, the improvement comprising a liquid and air excluding cover positioned within said drum on a circumferential surface adjacent to the uppermost portion of said drum, the ends of said cover lying beneath the level to be maintained for said liquid substantially submerging said drum while simultaneously being positioned respectively adjacent the said points of ingress and egress of said fibrous material on said drum whereby a substantially increased suction effect is achieved by the action of said pump which said effect is continuously maintained during the contact of said fibrous material on said drum by increased differential pressure over the fibrous material covered surface of said drum.

2. A fibrous material washing machine as in claim 1, comprising an endless porous belt embracing the perforated washing drum, and roller means mounted above said drum to tension said porous belt, said porous belt being adapted to feed the material onto said drum and remove the material from the said drum.

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