WET TREATMENT PROCESS FOR TEXTILES

Inventor: Kurt Bruckner, Berggartenstr. 30, 6123 Bad Konig, Odenwald, Germany

Filed: Aug. 17, 1973

Appl. No.: 389,359

Foreign Application Priority Data
Aug. 22, 1972 Germany 2241121

U.S. Cl. 8/155.1; 68/150; 68/189
Int. Cl. D06B 5/16
Field of Search 8/154, 155.1; 68/150, 189

References Cited
UNITED STATES PATENTS
1,739,458 12/1929 Hazeley et al. 68/150
1,759,145 5/1930 Van Ness 68/150

Primary Examiner—Peter Feldman
Assistant Examiner—C. K. Moore
Attorney, Agent, or Firm—Learman & McCulloch

ABSTRACT

A process for the wet treatment of a roll of textile material comprises passing a liquid from a source thereof in a substantially radial direction through a segment-shaped zone of the roll and relatively moving the roll and the liquid source so as to traverse the entire circumference of the roll. The flow of liquid through such zone may be either radially inward or radially outward of the roll and the liquid which passes through the roll at such zone may be caused to pass through the roll at another circumferentially spaced zone for recovery.

12 Claims, 5 Drawing Figures
WET TREATMENT PROCESS FOR TEXTILES

The invention concerns a process for wet treatment of textiles in the form of an almost cylindrical roll of goods through which the treating liquor passes in approximately radial direction.

When wet processing textiles, one generally attempts to keep the amount of treating liquor used as small as possible. This applies particularly when working with organic solvents because of their costs, and also when taking into account the auxiliary devices required in preparing the solvent, since such devices must be planned depending upon the amount of treating liquor used. Reducing the amount of treating liquor (liquor reduction) is nevertheless desirable for reasons of construction and of operation also when working with aqueous liquors.

This tendency to reduce the amount of treating liquor used is contrary to an increase in the size of the roll of goods (particularly on cylinders or beams) desirable for reasons of economy. Increasing the dimensions of the roll of goods furthermore complicates a uniform wet treatment (for example, uniform dyeing) of the complete goods — particularly when using a comparatively small amount of liquor.

Accordingly, an object of the present invention is to provide a process for wet treatment of textiles (in the form of an almost cylindrical roll of goods, for example, a beam of goods) which would ensure a high degree of uniformity of treatment also for large dimensions of the roll of goods and use of a smaller amount of treating liquor.

In accordance with the invention, the treating liquor at one time flows in the same direction through only one sector zone of the entire roll of goods, and said sector zone continuously moves over the entire circumferential confines of the roll of goods.

If the treating liquor is supplied only to one sector zone of the entire roll of goods at a time, then it is possible to considerably reduce the amount of liquor (with respect to the known arrangement of a roll of goods continuously supplied over the entire circumference) at a predetermined rate of flow. Despite the partial impact of the fluid on the roll of goods, an absolutely uniform treatment is thus ensured by the continuous movement of such sector zone through which the liquor passes, over the entire circumference of the roll of goods, due to the corresponding relative motion of the liquor supply and the roll of goods.

The advantages of considerably reducing the amount of treating liquor used are obvious. Not only does this greatly reduce operating costs, particularly when using the comparatively expensive organic solvents, but it is also possible to construct on a much smaller scale the entire auxiliary equipment required to circulate and prepare the treating liquor (such as pumps, distillation systems, heating devices, etc.).

The relative motion mentioned, between the liquor supply and the roll of goods, can be brought about in various ways. It is possible to have the roll of goods stationary and to rotate the liquor supply for the one sector zone about the axis of the roll of goods. Another possibility would consist in arranging the liquor supply for the one sector zone stationary and in rotating the roll of goods about its axis. Finally, it is also possible to combine these two arrangements, i.e., to rotate the roll of goods as well as the liquor supply for the one sector zone about the roll axis, such rotation being suitably in opposite direction and at a variable, preferably different speed of rotation.

According to a suitable embodiment of the invention, the treating liquor flows through the first sector zone from the inside toward the outside of the roll of goods, and through a second sector zone from the outside toward the inside, whereby the two sector zones (which together form an angle of preferably 360°) continuously move over the entire circumference of the roll of goods. In this manner, the impact of the treating liquor on the individual sections of the roll of goods is by impulse, so to speak. The direction of flow of the liquor through the individual regions changes upon crossing over from the one to the other sector zone. This achieves particularly even uniformity of treatment; the periodic change of the direction of flow in the individual region of the goods furthermore counteracts a possible tendency of the goods to sag or to flatten.

The process of the invention can be employed with a horizontal as well as a vertical arrangement of the axis of the roll of goods. In the former case, wet treatment of textiles wound on a beam would be an example, whereas the use of cylindrically wound goods about a vertical axis would be illustrated by dyeing pressed flock (in an upright cylinder).

According to a suitable embodiment of the invention process, at least a part of the treating liquor is supplied centrally through the roll of goods, the liquor flows through the first sector zone from the inside toward the outside and through the second sector zone from the outside toward the inside, and it is then drawn off centrally through the roll of goods. According to a preferred embodiment of this process, it is thus possible to supply an additional part of the treating liquor from beneath the roll of goods; this additional part of the liquor flows through the lower portion of the roll of goods from the bottom toward the top and is drawn off centrally through the roll. Supplying the treating liquor in a direction opposing gravity advantageously counteracts the annoying tendency to sag, particularly when large beams are used.

These and additional features of the invention are apparent from the following description of several examples shown in the drawings in which

FIG. 1 is a longitudinal cross section of the first embodiment of a device for carrying out the process of the invention;

FIGS. 2 and 3 are sections along lines II—II of FIG. 1 (in two different angular positions of the supply feed for the treating liquor); and

FIGS. 4 and 5 are cross sections of two additional embodiments of devices for carrying out the process of the invention.

According to the embodiment illustrated in FIGS. 1—3, a beam of goods 2 is arranged horizontally and stationary within a housing 1, said beam having a perforated core 3.

A central supply line 4 for the treating liquor is provided in core 3 of beam 2, which supply line is connected to baffles 5 and 6 such that the area through which the liquor can emerge is restricted to a first sector zone 7 indicated schematically in FIG. 2.

Area 8 present between the liquor supply line 4 with its baffles 5 and 6 on the one hand, and the perforated core 3 of beam 2 on the other hand, forms a return feed line for the treating liquor. The liquor supply line 4 with its baffles 5 and 6 is continuously rotated by means of
The process of the invention operates according to this embodiment as follows:

The treating liquor is supplied through feed line 4 (arrow 12) by an outside circulating pump (not illustrated), the liquor emerges from the area restricted by the two baffles 5 and 6 into sector zone 7 (FIG. 2) of the beam of goods 2 and flows through said zone in approximately radial direction from the inside toward the outside (arrow 13). In the remaining sector zone 14, the treating liquor flows in the direction of arrow 15 from the outside toward the inside and is carried off again through area 8 within the perforated core 3 (arrow 16).

By continuously rotating the central supply line for the treating liquor, sector zone 7 through which the liquor flows from the inside toward the outside (and thus also the additional sector zone 14 through which the liquor flows from the outside toward the inside) moves continuously over the entire circumference of the beam of goods 2. FIG. 3 illustrates the position for a liquor supply line rotated by 90° with respect to the position shown in FIG. 2. In this way, it is possible to achieve a uniform treatment of the entire beam of goods. During this procedure, housing 1 is flooded so much (e.g., at level 17) that area 8 for accommodating the return of the treating liquor is always completely flooded.

An additional embodiment represented in FIG. 4, shows the liquor supply line 4' with baffles 5' and 6' arranged stationary and in such a manner, that sector zone 7', through which the liquor thus flows from the inside toward the outside, is located in the upper portion of the beam of goods 2'. The beam of goods 2' rotates continuously about its axis 10' (arrow 18). Housing 1' is provided in its lower section with a pipeline 19 for a return of the treating liquor. The direction of flow of the liquor is indicated by arrow 20.

This embodiment illustrates the possibility of operating with a very small amount of treating liquor. In particular, housing 1' does not have to be flooded at all. Rotating the beam of goods 2' with respect to the stationary supply line from which the treating liquor has an impact only on sector zone 7', ensures in this instance also a uniform treatment of the entire goods.

In the case of the embodiment represented in FIG. 5, housing 1'' is provided at its lower portion with a stationary supply line 41'' for the treating liquor. Also stationary in this instance is the liquor return line 8'' arranged here centrally and provided with baffles 5'' and 6'', whereby the beam of goods 2'' continuously rotates in the direction of arrow 21. The housing is flooded at least up to level 22.

In this embodiment, the treating liquor flows within sector zone 7' from the outside toward the inside, i.e., from the bottom toward the top (arrow 23) and back through the central liquor return line 8''. The direction of flow for the liquor advancing against gravity in sector zone 7'' counteracts the tendency of the beam of goods to sag.

Although the embodiment illustrated in FIG. 5 provides for the entire treating liquor to be supplied from beneath the roll of goods, it is possible within the scope of the invention, in a variation of FIGS. 1 through 3, for example, to supply only the main portion of the treating liquor centrally (as illustrated in FIGS. 1-3), whereas the smaller part of the liquor is supplied from below in a manner apparent from FIG. 5 (a type of by-pass, so to speak), in order to counteract the annoying tendency of the beam of goods to sag.

In all instances it is possible to have additional features for reducing the volume of the treating liquor used; for example, it is possible to provide the roll of goods with shields to reduce the excess volume of the liquor, furthermore, it is possible to incorporate suitable liquid-level displacement floats into the perforated beam, respectively, to utilize this area for accommodating elements which are needed anyhow, such as heating elements, and the like.

I claim:

1. A process for the wet treatment of a roll of textile material comprising passing a liquid from a source thereof in a substantially radial outward direction through a first segment zone of said roll; and returning liquid passed through said roll at said first zone substantially radially inwardly of said roll at a second segment zone.

2. A process according to claim 1 wherein the relative movement of said source and said first zone is continuous.

3. A process according to claim 1 wherein said first and second zones together define a circle.

4. A process according to claim 1 wherein said roll is stationary and said liquid source is rotated.

5. A process according to claim 1 wherein said roll and said liquid source are rotated at different speeds.

6. A process according to claim 1 wherein said roll and said liquid source are rotated in different directions.

7. A process according to claim 1 wherein the axis of said roll is arranged horizontally.

8. A process according to claim 1 wherein the axis of said roll is arranged vertically.

9. A process according to claim 1 wherein said liquid source is at the center of said roll.

10. A process according to claim 1 wherein said roll is enclosed.

11. A process according to claim 1 wherein said roll is partially immersed in said liquid.

12. A process for the wet treatment of a roll of textile material comprising partially immersing said roll in a liquid; passing said liquid from a source thereof in a substantially radial outward direction through a segment zone of said roll; and, relatively rotating said source and said roll to cause said zone to traverse the entire circumferential confines of said roll.
UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,926,552
DATED : December 16, 1975
INVENTOR(S) : Kurt Bruckner

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 25, change "particulary" to --particularly--.

Column 2, line 61, change "such that the area" to --which together constitute a liquid source--.

Column 3, line 21, change "circumference" to --circumferential confines--.

Column 3, line 50, change "41"

Signed and Sealed this
ninth Day of March 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks